LEPROSY REVIEW

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THE BRITISH EMPIRE LEPROSY RELIEF ASSOCIATION.

VOL. XI. No. 1. JANUARY, 1940.

SPECIAL AFRICAN NUMBER.

Principal Contents:

REPORTS on–
Nyasaland
Northern Rhodesia
The Bibanga Leper Settlement, Belgian Congo
Southern Rhodesia
Basutoland
South Africa
Nigeria
The Enugu Leprosy Conference
Cyprus

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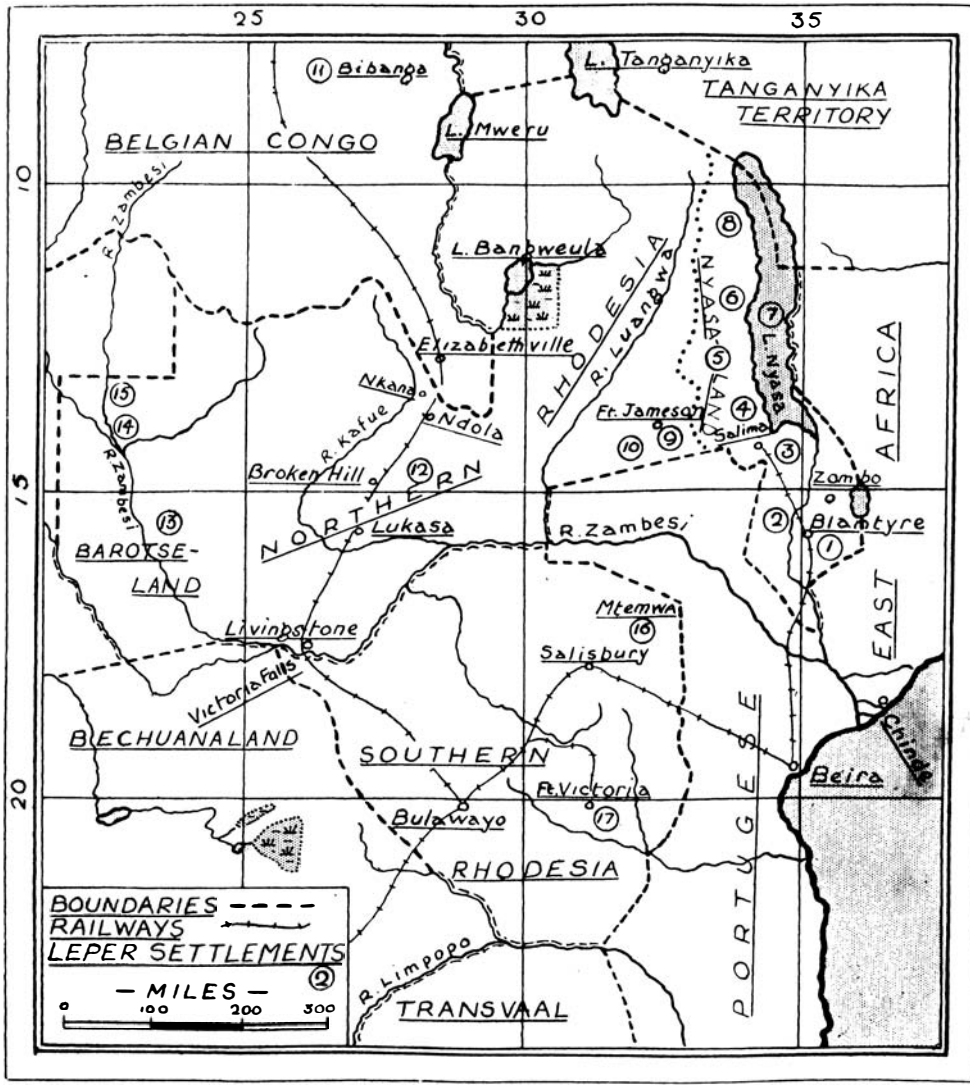

FIG. 1. MAP TO SHOW LEPER INSTITUTIONS IN SOUTH CENTRAL AFRICA.

LEPER INSTITUTIONS

1. Malamulo.
2. Likwenu.
3. Utale.
4. Mua.
5. Loudon.
6. Bandawe.
7. Likhoma.
8. Livingstonia.
9. Mwami.
10. Nsadzu.
11. Bibenga.
12. Fiwila.
13. Mongu.
14. Chitokoloki.
15. Balovale.
16. Mtemwa.
17. Ngomahuru.

INTRODUCTORY NOTE

This issue of *Leprosy Review* consists of Reports on visits paid by Dr. Muir to seven British territories and the Belgian Congo during a four months' tour in the summer of 1939. In the order visited these countries were : Nyasaland, Northern Rhodesia, Belgian Congo, Southern Rhodesia, Union of South Africa, Basutoland, Nigeria and Cyprus.

OBJECTS OF TOUR

The tour was made on behalf of the British Empire Leprosy Relief Association, and on the invitation of the Colonial Office, the High Commissioner for South Africa and the Medical Departments in each of the countries visited. The itineraries were arranged by the Medical Directors, except in the Belgian Congo. An abstract of the whole tour is attached showing the methods of travel and the places visited.

The objects of the tour were :—

1. To visit as many leprosy institutions as possible and study the methods adopted for treatment and control.
2. To study leprosy as found in each country, the frequency, distribution and type; also to investigate the economic, nutritional, sociological and other factors influencing leprosy.
3. To advise Medical Departments, doctors and others interested in the subject regarding improved methods of dealing with leprosy.
4. To attend the Leprosy Conference called by the Director of Medical Services, Nigeria, and held at Enugu in August, 1939.

In this introductory note an attempt is made to abstract and co-ordinate the various aspects of the leprosy problem as they presented themselves to the writer during his travels. These may conveniently be grouped under distribution, legislation, treatment and research.

DISTRIBUTION

Leprosy is distributed widely over Africa. Only in a few places, such as the dry deserts inhabited by nomadic tribes, is it uncommon. In South Central Africa it is most common in the hot, moist, low-lying land along Lake Nyasa, and the somewhat similar Zambesi basin in Barotseland. Reference has been made (pp.14, 19) to the difference in type of the disease as it exists in

these two places, and possible reasons are suggested for this difference.

The distribution in South Africa is dealt with only in brief. The Report on Mkambati (p.46) shows the frequency to be diminishing in Pondoland, where an anti-leprosy campaign has been intensively carried on for some time; whereas in Zululand it is only more recently that the Amatikulu institution has attracted cases, and control is still at an earlier stage.

One of the most interesting findings is the much more severe type found among Europeans in South Africa (p.43), and in Cyprus (p.70) as compared with the Bantus both in the Union and in the Rhodesias. The reason for this is not at all clear.

The wide-spread distribution in Cyprus is of interest, the 188 known cases being scattered through 91 families and 56 villages all over the island.

LEGISLATION

Among the countries visited there exists the widest possible divergence of methods of control. In the Union of South Africa leprosy is counted as a major problem. During the last 20 years between two and three million pounds have been spent on its relief and control (p.48). A compulsory system has been adopted, but the rigour of this system has, at least in the native reserve areas, been modified by the willing co-operation of the people themselves (pp.45, 49). This system, though expensive, is gradually leading to the elimination of the disease.

Basutoland, surrounded as it is by Union territory, has adopted similar legislature. Here, too, the expenditure has been high, but there is reason to believe that the measures adopted are proving gradually effective (p.42).

In Cyprus also compulsion is in force (p.73); but there expenditure has been restricted and there has been the absence of a far-sighted policy which might ere now have brought the disease under control. Methods have been suggested which it is hoped will soon master the disease and eliminate it from the island.

Southern Rhodesia resembles its neighbour South Africa in supplying leprosy institutions owned and financed by Government; but so far no widespread attempt at compulsory segregation has been made. The reason for this is not that leprosy is a less serious problem, but probably that the country has been more recently developed, and is as yet less wealthy. Also leprosy has not yet become as frequent a disease among the European population as it has in South Africa.

In Northern Rhodesia, Nyasaland and Nigeria the great

majority of the leprosy institutions are on the basis of a partnership between the administration and missions, the former supplying a greater or less part of the funds, and the latter supplying the balance of the funds and undertaking the responsibility for the work. In these three countries the mission-run institutions are of two widely different kinds: those with whole-time medical, nursing and lay European staff, such as the Itu, Uzuakoli, Oji River and Ossiomo institutions; and those in charge of a nurse or lay worker and with little or no medical supervision. The International Leprosy Congress at Cairo adopted among its resolutions that :—

"Voluntary organisations have in the past, and can in the future, aid greatly in anti-leprosy work. It should be emphasised, however, that the control of leprosy is the inescapable responsibility of the governments concerned."

In Nigeria the larger institutions just referred to show what excellent work can be done by mission-government co-operation; but in Nyasaland and N. Rhodesia the small institutions, though doing noble relief work, are of little value towards the ultimate control of the disease. One reason for this is here, as elsewhere in Africa, the poverty of the country. But, as has been shown in the reports, a great deal more could be done with little additional expenditure. In the past a much more important reason has been that leprosy does not obtrude itself as an urgent problem like malaria and sleeping sickness, and there is apt to be wishful reasoning that as the general standard of hygiene and nutrition improves leprosy will disappear. The fallacy of this argument is pointed out (p.65).

TREATMENT

Leprosy still lacks what may be called a specific remedy, and on this account considerable skill and experience are necessary to obtain the best results. In most of the institutions visited there was considerable room for amendment in the methods used. The improvements suggested may be divided under mental, mobilization, complicating diseases and typing.

Mental. The first essential for the treatment of leprosy is to provide the right social atmosphere. If the patient is discontented or lazy or non-co-operating; if his self-respect has been lost and not regained, then treatment is badly handicapped. In some places (p.21) leprosy was looked upon as a privilege rather than a curse. The mental aspect of the question is very fully recognised in some but not in all of the institutions visited.

Mobilization. Reference has been made repeatedly in most of the Reports to the importance of mental and physical activity.

and the use of occupation therapy, well-regulated physical exercises, baths, etc. A trophic ulcer frequently interferes with the patient's activity; as he cannot walk freely or take exercise the disease becomes aggravated. The importance of immediate operation to relieve the condition is discussed on pages 47 and 50. In most institutions a large proportion of the patients were found to be chronic invalids, largely as a result of palliative, as opposed to more radical, treatment of such ulcers.

Complicating diseases. Not less important is the treatment of complicating disease. In reports on several institutions reference has been made to treatment of diseases of dirt, such as scabies and various mycotic and septic infections, to eye complications such as trachoma (pp.53, 55, 64, 74), to malnutrition, anaemia, malaria and various parasitic infestations.

Typing of Cases. Great confusion was found in almost all institutions visited regarding the typing of cases, and the significance of the types in treatment, prognosis and control. It was not realised that many early neural cases will heal up in a few months under intradermal injections of chaulmoogra (pp.24, 27, 33, 41, 50). Also the diffuse infiltration lesions of the lepromatous type were not recognised, and too much stress was laid on the bacteriological examination of the nose to the exclusion of skin smears.

Attention to these few points should speed up recovery of many cases, prevent the milder type from degenerating into the more severe (pp.41, 45) and make anti-leprosy treatment more popular. Above all, individual attention to each case is necessary, and it must be understood that considerable medical skill, both special and general, are necessary to get favourable results in leprosy.

RESEARCH

It is important that research should be kept in the forefront of the plan of all well-equipped leper settlements. The main advance that has been made in our knowledge of leprosy in the last twenty years has been in the field and the clinic, rather than in the highly equipped laboratory. And the main chance of advance in future is likely to be based chiefly on the work of the whole-time leprosy doctor with his unique knowledge of the habits and customs of primitive peoples, and having at hand the rich clinical and epidemiological material of a leper settlement.

An editorial in the last issue of *Leprosy Review* suggested many of the subjects which require investigation.

* * *

The writer wishes to express his thanks to the Governments and Medical Departments of the various countries visited, and especially to the Medical Directors who drew up the itineraries and made the principal arrangements for transport and visiting the various centres, to the medical and administrative officers, missionaries and others who supplied hospitality, arranged visits to leprosy and other institutions and spared no pains in making the tour interesting and useful.

ITINERARY

May	27	Left England by Imperial Airways.
June	1	Arrived Blantyre, **Nyasaland.***
,,	2-14	Visited Nyasaland leper institutions at Malamulo, Likwenu, Utale, Mua and Loudon, the Jeanes School, the Nutrition Research Centre at Chintembwe, and made a short survey in the region of Salima.
,,	15	Arrived Fort Jameson in **Northern Rhodesia.***
,,	16-17	Visited Mwami and Nsadzu Leper Settlements.
,,	18	Fort Jameson—Lusaka by Air.
,,	19-20	Visit to copper mines at Nkana and Roan Antelope.
June	23-July 3	Visit to Bibanga, **Belgian Congo*** (rail and motor).
July	4	Toc H meeting, Ndola.
,,	5	Fiwila Leper Settlement.
,,	6-8	From Kapiri and Broken Hill to Mongu and Balovale in Barotseland, and back to Lusaka by air.
,,	9-11	To Livingstone and Victoria Falls.
,,	12-13	To Salisbury, via Bulawayo, **Southern Rhodesia.***
,,	14-21	Visits to Mtoko and Ngomahuru and on to Beitbridge.
,,	22-26	At Pretoria and Johannesburg, **Union of South Africa.**
,,	26-30	At Botsabelo, **Basutoland.** Travel by train and motor.
July	31-Aug. 8	At Emjanyana (Transkei) and Mkambati (Pondoland) Leper Settlements. Travel by motor.
Aug.	9-12	At East London. Spoke to Toc H and Medical Society and Rotary.
,,	12	To Durban and Elandskop.
,,	15-16	At Amatikulu Leper Institution (Zululand).
,,	17-21	Durban to Kano, **Nigeria,** by air, via Khartoum.
,,	21	Visit to Yada Kunyu Leper Settlement (Kano).
,,	22-24	At Zaria Leper Settlement.
,,	25	To Oji River Leper Settlement by train and motor.
,,	26-27	At Oji River.
,,	28-30	Leprosy Conference at Enugu.

Sept.	1-3	At Uzuakoli Leper Settlement.
,,	4-7	At Itu Leper Settlement..
,,	8	At Ossiomo Leper Settlement.
,,	9	At Ilesha Leper Hospital.
,,	10	At Ogbomosho and to Lagos by motor.
,,	11	At Lagos—medical meeting.
,,	12-15	Lagos to Khartoum, **Anglo-Egyptian Sudan.**
,,	16	Omdurman Leper Clinic.
,,	19	Khartoum to Cairo.
,,	20	Cairo to **Cyprus** (train and steamer).
,,	21-26	Cyprus—Leper Camp and tour round island.
,,	26	Cyprus to Alexandria, by air.
Sept.	27-Oct. 2	Alexandria—England.

* The institutions visited in Nyasaland, the Rhodesias and the Congo are indicated by numbers on the map.

FIG. 2.

UTALE INSTITUTION: father and mother are advanced lepromatous cases; what chance has the child?

LEPROSY IN NYASALAND

Nyasaland was constituted a British Protectorate in 1891. It is a long narrow country, 550 miles in length but only 100 miles across at its widest part. The greater part lies to the west of Lake Nyasa. The plain along the lake shore varies in breadth; from it rises a plateau intersected by rivers flowing into the lake. The southern part, through which the River Shire flows from the lake to join the Zambesi, consists of highlands, rising in places to mountains. The area is nearly 48,000 sq. miles and the population consists of 1,781 Europeans, 1,600,000 natives and 1,400 Asiatics.

My two weeks visit to Nyasaland (see itinerary on p.7) included inspection of six out of the nine leprosy institutions and visits to the Jeanes School, the Nutrition Centre at Chintembwe, the Blantyre Mission Hospital and the Zomba Native Hospital. Two days were spent in visiting villages in the region of Salima and inspecting leprous patients. I had the benefit of the company and advice of Dr. de Boer, Director of Medical Services, during the first part of the tour and of Dr. Watson, his deputy, during the latter part. After so short a visit it is impossible to form any concise idea of the extent and nature of such an insidious disease as leprosy; all I can hope to do is to propose improved methods in use in other countries, and suggest steps that may be taken to make further investigations of the disease.

Frequency and Distribution

Leprosy though not the greatest, is among the more important, health problems in Nyasaland. The number of lepers can only be guessed at, as an expert survey has not yet been made. Only a fraction (about 600) are at present resident in leper settlements or camps. The Catholic Fathers at Mua suggested that in their area along the Lake shore there might be as many as 150 per thousand of the population suffering from leprosy, but this estimate appears to be excessive. The District Commissioner of the Mzimba District in a recent census found 100 cases in 150,000 inhabitants (0.6 per thousand). In India it was commonly found that census figures had to be multipled five to ten times to reach the correct figures, so the estimate for Mzimba may be short of the full number.

A further idea of the distribution of leprosy is gained from Table I which shows the homes of the lepers seen in the six leprosy institutions visited. Counting Mwami leper camp, which though situated in Northern Rhodesia admits chiefly lepers from Nyasaland, there are at present nine of these institutions. I was able

to visit six of them, viz. Malamulo, Likwenu, Utale, Mua, Loudon and Mwami. Unfortunately there was not time to see Bandawe, Likhoma and Livingstonia; these latter had last year average daily rolls of 62.2, 10.8 and 7.8 respectively. Besides the 359 patients seen at five settlements there were said to be 147 others home on leave.

TABLE I

District of Patient's Home	Malamulo	Likwenu	Utale	Mua	Loudon	Totals
Karonga ...	4	0	0	0	0	4
Mzimba ...	23	0	0	0	12	35
Chiromo ...	1	0	0	1	0	2
Dowa	14	3	2	0	0	19
Liwonde ...	1	0	0	0	0	1
Dedza	17	1	2	27	0	47
Ft. Johnston ...	1	9	6	2	0	18
Ncheu	7	1	5	7	0	20
Lilongwe ...	1	5	20	2	0	28
Zomba	10	14	8	0	0	32
Chiradzulu ...	3	0	4	0	0	7
Blantyre ...	9	2	5	0	0	16
Chikwawa ...	8	0	1	0	0	9
Cholo	34	0	1	0	0	35
Mlanje	37	2	20	0	0	59
Kota-Kota ...	1	0	0	0	0	1
Pt. Herald ...	8	0	2	0	0	10
P.E.A.	9	1	1	3	0	14
N. Rhodesia ...	0	0	0	0	2	2
	188	38	77	42	14	359

From this table it will be seen that patients may travel a good distance from their homes and do not always seek or obtain admission to the nearest institution. Thus 23 out of the 35 lepers in the Mzimba district in the north found their way past several nearer settlements to Malamulo in the south. The cause of this is probably that patients of all religions and sects are encouraged to go to Malamulo and the treatment there has been under more regular medical supervision. According to the table, the highest numbers of lepers are from Mlanje, Dedza and Mzimba. This does not, however, prove that the highest incidence is in these districts, as many factors may have come into play to induce patients to go for treatment from one area and not from another.

All that can be concluded is :—

(a) That leprosy is a common disease in Nyasaland.

(b) That probably only a small fraction are at present in leprosy institutions.

(c) That the distribution is uncertain, but that there are indications that it is most frequent in the more populous areas along the lake shore south of Domira Bay.

LEPROSY INSTITUTIONS

The following are a few notes on each of the six settlements visited.

Malamulo. This institution lies about 20 miles south of Blantyre. It is run by the Seventh Day Adventist Mission who supply a part-time doctor, a nursing sister and partly-trained African assistants. Government subsidised it with a grant of £284 3s. 0d. in 1938. Funds are not sufficient for expansion, and 20 to 25 patients per month are said to be turned away for lack of accommodation. The patients are housed in round huts of brick and dambo sand roofed with thatch, which cost £2 each to erect.

There was a daily average of 233.1 patients in 1938. On the day I examined them there were 192 present, 18 being absent at their homes. About 25 local lepers attend as outpatients. There is land to the extent of 200 acres attached to the settlement in which the patients work four mornings a week and produce maize sufficient for food for two months. This is being increased. About twopence a day is expended on each patient's food.

The following suggestions are offered :—

(a) The huts might be placed further apart so as to give more privacy to the patients, and individual bore-hole latrines might be substituted for the present communal ones.

(b) Patients should be carefully examined and treated for complicating diseases such as ankylostomiasis. The Medical Department is willing to arrange for drugs.

(c) Bacteriological examinations should be carefully done under supervision. The laboratory assistant needs further training in this work; a course under the Government Pathologist would be valuable.

(d) Hydnocarpus oil for injections has been supplied by B.E.L.R.A. This might be supplied by the Medical Department as mentioned later.

(e) It would be a distinct advantage if the Medical Officer could find more time to spend at the settlement; though his difficulty in doing this along with his other duties is fully appreciated.

(f) The Malamulo settlement is the largest, best staffed and most popular leprosy institution in the country; as far as I could judge excellent results are obtained in many cases. There is, however, no attempt being made to follow up cases or to do any preventive teaching in the villages. This is a very essential line of work which might be developed if staff were available.

(g) The discipline in the settlement is good. The fact that more patients are seeking admission than can be accommodated makes this possible. I would suggest that the able-bodied patients be encouraged to do more work to the extent of their capacity. Exercise backed by good nourishment is the most important element in leprosy treatment, and the willing co-operation of the patient counteracts his feeling of inferiority and helps him towards recovery.

Likwenu. This settlement is about 17 miles north-west of Zomba. It is run by the Universities Mission who supply a part-time nursing sister (Miss Jones). Occasional visits are given by the doctor of the Mission who superintends a large area. There is an African assistant. At the time of my visit 35 patients were present, 17 more being absent visiting their homes. Some of the patients showed vitamin B deficiency and others were suffering from hookworm disease. There are about 300 acres of land attached to the settlement and each patient is given about 3 acres to cultivate. The patients live among their fields and their huts are thus separate from each other. There is one latrine among two or three patients. Government gave £82 last year as a subsidy. No families are allowed to accompany the patients, but the latter are allowed to go home and visit their families. It is hoped soon to be able to make provision for separate care of children, and then families will be allowed. Bacteriological examinations are frequently made of lepromatous cases. Patients are given about twopence worth of food daily in addition to what they can gather from their fields. They are also given fruit from an orchard attached to the settlement.

The following suggestions are made :—

(a) The huts might be placed closer together instead of being scattered through the fields. They might take the form of small villages, the huts of open cases being separate from those of the closed cases. This would make control simpler and encourage communal life.

(b) The patients appear to be having too much done for them, they tend to be lazy. The remarks about Malamulo would apply here and to a much greater extent. I gathered the idea that the patients are being induced to stay in the settlement and do not sufficiently appreciate what is done for them.

(c) The latrines might be placed nearer the huts, one for each hut, and should be made deeper if possible.

(d) The frequent absence of patients from the settlement makes for the spread of infection by open cases.

(e) Only open cases which are tending to become negative require repeated bacteriological re-examination.

(f) Examination and treatment for hookworm and other accompanying diseases are very necessary. Very many of the cases showed distinct signs of improvement, but better results would undoubtedly be obtained if other diseases were eliminated and if the patients led more active lives.

Utale. This settlement is 60 miles north west of Zomba. It is under the Marist Fathers and a sister is in charge. The settlement is on the other side of the river from the main Mission

buildings. I found 78 patients present but was told that there were 57 others absent at their homes. There are very fine brick buildings. Huts to accommodate two families are erected of brick and tiles at £12 each. There are also some round mud and wattle huts which cost 15/- each. The chief difficulty in this site is termites, which destroy the woodwork of the buildings. There is also a hospital building newly erected which was empty. There are at present 8 non-leprous children of lepers born in the settlement and 6 which were brought by their parents; it is expected that there will be more in future (fig. 2).

It is proposed to put up a children's home at an expense of £565 10s. 9d. to house these children. This seems a large sum; the hospital cost only £355. Here also there seems to be too much done for the patients, who are lazy in consequence. They only work one hour a day for the community though they will work for wages and make 6/- a month. They get twopenceworth of food a day, and are given free clothes if they are unable to work. There seems to be the fear that the patients will go away if they are asked to do more to support themselves. What is required most in this institution is skilled medical supervision. The sister-in-charge is devoted to the work, but she has not had the benefit of special training in leprosy.

A grant of £178 18s. 0d. was given last year by Government.

Mua. This settlement is situated in the Dedza District on the plain which slopes down to the Lake, from which it is about 7 miles distant. It is under the care of the White Fathers, a trained nursing sister being immediately in charge. The site is comparatively cool and healthy, being 400ft. above the Lake. There are 35 acres of land of which about 5 acres are used for buildings, the rest being cultivated by the patients. 44 patients were seen, but we were informed that there were actually 88 in the settlement, half of them being absent on leave. The patients are housed in round huts of wattle and thatch, which are sanitary and suitable for the purpose and inexpensive to erect. Several of the patients appeared to be suffering from hookworm. Treatment with hydnocarpus oil injections is given by the sister, but there has hitherto been no medical supervision.

It is suggested that two sisters be sent to Uganda for special training in leprosy work under Miss Laing at Kumi. I understand that in future the Medical Officer at Dedza will supervise the settlement medically. Though the incidence of 15 per cent of leprosy mentioned by the Fathers is probably excessive, this region seems to have many lepers, and it would be well if a careful survey and an educative campaign were carried out. With this in view the White Fathers are translating the B.E.L.R.A. booklet "Control of Leprosy" into the local vernacular and this can be distributed to the schools throughout the country. A grant of £93 10s. 0d. was given last year by Government.

Loudon. This small settlement near the road from Kasungu

to Mzimba is under the charge of the Church of Scotland Mission. There were 14 patients present, 13 being absent on leave. They were well nourished and appeared to be benefiting from the treatment which is carried out by the hospital sister and an African assistant. With two exceptions all the patients were from the Mzimba district in which the settlement is situated. A grant of £30 10s. 0d. was given last year by Government.

Mwami. This small settlement is just over the Nyasaland border in Northern Rhodesia about 12 miles from Fort Jameson. It is under the care of the Seventh Day Adventist Mission. There were 37 patients present on the day of our visit, though there were stated to be others absent in the fields. The settlement is in charge of Miss Ingle a nursing sister who had formerly worked in the Malamulo settlement. There is at present no medical supervision. The patients are lodged in round huts of burnt bricks and mud and thatch which are neat and clean and suitable for the purpose. There is a small hospital which however is not much used. The patients cultivate the land with difficulty as it is not very fertile. Most of the patients had good physique, but a few of them were obviously lazy.

Several of the patients might be dismissed as free from all active signs to make room for others more in need of treatment. Almost all were capable of work apart from laziness, and if their relatives object to their return home the authorities might be asked to take measures for them to be received back to their villages. Here as in the other settlements the majority of patients were of the lepromatous type. The patients are well looked after and many appear to be improving.

TYPE OF LEPROSY

I classified the patients seen at the above six settlements into five groups : (a) severe lepromatous cases (L_2 and L_3); (b) slight lepromatous cases (L_1); (c) cases with tuberculoid lesions; (d) cases with flat lesions; (e) cases with no active signs. Each of these categories was again subdivided for sex and for deformity or crippling. The classification is only approximate, as reliable bacteriological examination results were not available in all cases. The findings are given in Table II.

It will be noticed that lepromatous cases constitute 61 per cent of the whole. This is a very large proportion, if these cases represent a cross section of the leprous population of the country. Survey of villages in North India showed only 5 to 10 per cent of lepromatous cases, while in the N.E. Belgian Congo the proportion of mild neural cases was even larger than in North India. In the Report on Northern Rhodesia (p.19) the possible reasons are given for the comparatively large number of lepromatous cases in Nyasaland.

TABLE II

Types		Malamulo M.	Malamulo F.	Likwenu M.	Likwenu F.	Utale M	Utale F.	Mua M.	Mua F.	Loudon M.	Loudon F.	Mwami M.	Mwami F.	Totals		
Severe	D.	6	1	3	1	6	2	2	0	3	1	2	2	29)	138	35%
lepromatous	U.	52	10	5	1	16	5	6	2	2	1	9	0	109)		
Slight	D.	8	0	4	3	6	2	3	0	1	0	0	0	27)	101	26%
lepromatous	U.	33	15	3	0	6	5	2	5	1	0	3	1	74)		
With tuber-	D.	1	0	0	0	3	0	2	0	0	0	2	2	10)	47	12%
culoid lesions	U.	9	6	1	1	3	4	4	3	1	0	1	4	37)		
With flat	D.	3	2	3	1	3	0	1	1	0	0	1	0	15)	54	
lesions	U.	17	12	1	1	0	4	2	0	1	0	0	1	39)		
No active	D.	0	1	1	2	10	0	4	3	1	0	5	2	29)	56	
signs	U.	11	5	4	0	2	1	0	0	2	0	1	1	27)		
		140	52	25	10	55	23	26	14	12	2	24	13	396		
		192		35		78		40		14		37				

(D.: Deformed. U.: Undeformed.)

SUGGESTIONS FOR FUTURE POLICY

Two main Institutions required. All the leprosy work in Nyasaland is at present in the hands of missions. These, with the small annual cost to Government of £900, are caring for some 600 lepers. The efficiency of the work done varies in the different institutions according to the amount of skilled medical supervision available. For the efficient running of a leprosy centre a whole time medical man and two sisters or lay workers are advisable; and the size of the centre should be such as to justify the services of this staff, either by increasing the number of patients to four or five hundred or by combining a moderate sized settlement with preventive village work. To deal effectively with leprosy as it exists in Nyasaland today there should be at least two such leprosy centres, one for the Southern and one for the Northern Province. Unfortunately the care of lepers is divided among nine comparatively small units which, with one exception, are without medical supervision and most of which are of the nature of asylums and of little value towards the control of leprosy.

For the Southern Province the Malamulo settlement might be developed into an effective centre which would gradually control leprosy. This institution is, however, hampered by lack of funds, and large numbers of patients have to be refused. For the Northern Province an efficient institution is required in an accessible site on the plain bordering the Lake. For this there are two alternatives which are discussed below; either to develop the White Fathers' settlement at Mua, or to found a new settlement under Government.

(1) The present Mua settlement is situated in the midst of what is apparently one of the most leprous areas in the country. It can be reached by road and train from north and south. More land for agriculture would be necessary and I understand that this might be difficult or impossible to obtain. For its development a whole time officer trained in leprosy work would be necessary. The medical department might apply to the British Empire Leprosy Relief Association for a European Sanitary Worker with practical anti-leprosy experience, whose whole salary, etc. would be paid by B.E.L.R.A. and who would work under the direction of the Director of Medical Services. He would visit in turn the various settlements in Nyasaland and help to organise occupational treatment and introduce other improvements. Thereafter he would be stationed at Mua and, under the supervision of the medical officer at Dedza, help the Mission to develop the settlement into a first class anti-leprosy unit. These suggestions, if approved, would involve a certain amount of extra expense to Government, but with the co-operation of the Leprosy Association a beginning would be made in the effective control of leprosy which so far has not been attempted.

(2) The alternative scheme is for Government to begin a new leper settlement situated in the region of Salima. This would require considerably more expense and sufficient suitable land would have to be found. Some 1,500 to 2,000 acres of arable land would probably be required to provide farms for 400 patients so as to make the institution as nearly self-supporting as possible and provide occupation therapy which is all-essential for the treatment of leprosy. Preferably there would be a whole time doctor and one or more European Sanitary Officers; but if this proved impossible on account of expense the Sanitary Officers could conduct the settlement under the supervision of the local Medical Officer. I understand from Mr. Ducker of the Empire Cotton Growing Association that suitable land might be available a few miles north of Salima station. I understand also that the local chiefs and other leading Africans in this neighbourhood are anxious for the formation of a leper settlement by the Government.

Leprosy Expert. In the Report of my last year's tour in East Africa (*Leprosy Review*, January, 1939) the appointment of a Leprosy Expert for East Africa is suggested. B.E.L.R.A. has offered to pay part of the expense if this appointment is made. I would suggest that Nyasaland should take part in this scheme.

Survey—Training—Education. Nyasaland with its various races and climates offers an almost unique opportunity for the study of leprosy, and in doing this the co-operation of the Nutrition Centre might be requested. In the control of leprosy the co-operation of the Jeanes School might be of considerable value if practical teaching about leprosy were included in the syllabus. It is important that a thorough survey combined with an educative campaign be carried out with a view to instructing chiefs, teachers and others with influence and education in the simple methods required to prevent the spread of leprosy. A clerk trained in village survey work and in the recognition of leprosy might be employed to make enquiries and collect the names and addresses

of lepers, their families and other contacts, along with other information. The District Commissioner might then make arrangements for these lepers and contacts to appear for examination by the Medical Officer. In this way a survey might gradually be carried out followed by education in preventive measures. Compulsion when applied from outside the community is likely to lead to concealment and defeat its object, but compulsion from within the community can be effectively brought to bear by educating local public opinion.

Africans in charge of dispensaries might be carefully trained to give treatment to leprous patients. This training might be carried out in connection with one of the larger leper settlements.

Reference has already been made to the translation of the booklet "Control of Leprosy" into the local dialect. This might be printed and distributed widely to chiefs, teachers and other influential and educated Africans.

In making the survey special attention should be given to age groups, the effects of nutrition, complicating diseases, climate, elevation, race, tribal customs and especially to customs regarding isolation of lepers and treatment of leprosy.

Treatment. A note on the supply of drugs which applies also to Nyasaland is added to the Northern Rhodesia Report.

LEPROSY IN NORTHERN RHODESIA

Northern Rhodesia is a large country (290,320 sq. miles) with a scattered population of about 1,376,000, of which some ten thousand are Europeans. It is some six times the size of Nyasaland, yet it has a smaller population than that country. Communications are difficult, and important centres are far apart. It was accordingly not possible to reach all the places I should have liked to visit in the fourteen days at my disposal, though with the use of air transport I was able to include such far apart places as Fort Jameson and Balovale (*see* map).

NUMBER OF LEPERS

No census of leprosy has yet been attempted; the most reliable figures are those based chiefly upon tax-exemption statistics; but, as the practice with regard to exemption of lepers from taxes varies in different districts, the figures even as a gauge of comparative frequency are only approximate, and they only represent a fraction of the whole number of lepers.

The official figures for 1934 in the five provinces are shown in Table I.

TABLE I

Province	Area	Population	Lepers	Lepers per sq. mile	Lepers per mille
Barotse ...	60,890	332,093	4,365	0.07	13.14
Eastern ...	22,350	242,662	178	0.008	0.73
Northern ...	80,385	399,277	918	0.01	2.30
Central ...	68,710	163,676	485	0.007	2.96
Southern ...	48,335	196,757	802	0.016	4.07
	280,670	1,334,465	6,748		

It is apparent from these figures that Barotseland is the most affected province, and this seems to be the general consensus of opinion of administrative and medical officers.

TYPES OF CASES

I had an opportunity of visiting three leper settlements conducted by missions receiving Government grants, viz. Mwami (Seventh Day Adventists), Nsadzu (Dutch Reformed), Fiwila (U.M.C.A.), also two leper camps attached to Government hospitals at Mongu and Balovale. I examined the patients at these institutions and classified them according to the type of disease, dividing them into five groups : (1) Severe open cases

(L_2 and L_3); (2) Slight open cases (L_1); (3) Patients with definite tuberculoid lesions; (4) Those with flat macules, including residual; (5) Those with no active signs. Each group is again subdivided into those with and those without definite deformity and disablement. Males and females are given separately. This classification is an approximate one, as bacteriological examination results were in many cases not available. The results are as follows :—

TABLE II

	Mwami		Nsadzu		Fiwila		Mongu		Balovale		Totals
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
1. Deformed ...	2	2	4	0	3	0	2	0	3	0	16
Undeformed	9	0	6	2	3	0	0	2	1	1	24
2. Deformed ...	0	0	8	2	0	1	0	1	0	1	13
Undeformed	3	1	1	0	2	2	4	1	0	0	14
3. Deformed ...	2	2	0	0	4	2	5	2	8	0	25
Undeformed	1	4	4	1	1	3	13	6	9	3	45
4. Deformed ...	1	0	2	1	1	2	3	0	0	1	11
Undeformed	0	1	2	1	1	1	0	0	0	0	6
5. Deformed ...	5	2	0	1	2	1	0	0	4	2	17
Undeformed	1	1	0	3	2	3	0	0	3	1	14
	24	13	27	11	19	15	27	12	28	9	185

There are also some two or three other leper settlements which lack of time prevented me from visiting; but the whole number of lepers provided for by institutions is not more than two hundred and fifty.

We can, to a limited extent, take the above figures as an index of the proportions of the different types of leprosy present in the regions served by the various institutions. It may be noticed that patients with definite tuberculoid lesions form 37.8 per cent of the whole, and severe open cases 21 per cent. But if the figures of the first three institutions are taken separately those with tuberculoid lesions form only 22 per cent, and severe lepromatous cases 28 per cent; while those from Mongu and Balovale have over 60 per cent of tuberculoids and only 11 per cent of severe open cases. The proportion of tuberculoid cases is thus nearly three times as great in the Barotseland (Mongu and Balovale) figures as in those of the other institutions, while the latter show $2\frac{1}{2}$ times as many severe open cases.

In the institutions visited in Nyasaland the percentages of tuberculoid and severe open cases were respectively 12 and 35; and in that seen in the Belgian Congo they were 35 and 24. The significance of these figures is better seen as arranged in Table III.

TABLE III

	Barotseland	Belgian Congo	Central and East N.Rhod.	Nyasaland
Percentage of cases with				
Tuberculoid Lesions ...	60	36	22	12
Severe Open Cases ...	11	22	28	35

It is seen that the proportion of cases with tuberculoid lesions diminishes, and that of severe open cases increases, as one passes from Barotseland to Nyasaland. As severe open cases indicate susceptibility, and tuberculoid indicate resistance to the disease, it might at first sight be supposed from the above figures that leprosy is of a milder type in Barotseland than in the Central and Eastern Provinces of Northern Rhodesia and in Nyasaland.

However, it has already been shown in the official figures, which correspond with the consensus of opinion, that leprosy is much more common in Barotseland than elsewhere. We have thus the curious phenomenon of a preponderance of the milder type of leprosy in the region where there is the highest number of cases.

I suggest the following explanation of this phenomenon.

The majority of any population is naturally resistant to leprosy, and a small minority are highly susceptible. When the latter are infected they are liable to develop a severe open type, especially if the general health is depressed by malnutrition or complicating diseases. Comparatively short and slight contact with an open leper may be sufficient to produce leprosy in such a case. A much more prolonged and close contact, however, is necessary to produce the disease in the resistant case, and only the milder type with tuberculoid lesions is likely to occur.

It has already been argued in the report on Nyasaland (p.14) that the type of leprosy there is on the whole mild, as compared with that in India, Burma and the far east. Lepra reaction, a sign of great susceptibility, seldom occurs, trophic ulcers are slight and comparatively uncommon, there are very few child lepers; all these indicate racial resistance. The same indications of a mild type are present also in Barotseland.

The difference between these two regions is, to use a metaphor, not in the bacillary seed, nor yet in the basic nature of the body soil, but in the intensity with which it is cultured. The people in Barotseland are, I understand, dirty and promiscuous in their habits; the population is condensed along the Zambesi River; the climate is warm and moist and biting insects form a plague, create irritation of the skin and favour the scratching in of lepra bacilli; precautions are not as a rule taken to isolate infectious cases and prevent the spread of infection. Whereas the people of Nyasaland are better educated, cleaner, and less promiscuous in their habits, and are accustomed to take more precautions to prevent themselves being infected. Presupposing equal racial resistance and the same proportion of susceptibles in each of the two regions, we should expect slightly fewer severe cases in Nyasaland, as susceptible

individuals are liable to acquire the disease whether their contact is major or minor; but we should expect a much smaller number of cases of the resistant type in Nyasaland where the chances of intensive infection are so much less. Thus the conditions expected would appear to correspond with the limited facts known.

Nutrition. There is reason to believe that malnutrition has an important bearing on leprosy. This country would form a suitable place for the study of this factor. Dr. Board has suggested to me that casava as a basic diet has something to do with the high incidence of leprosy in Barotseland, and Dr. Meiklejohn mentioned the same in connection with the highly leprous area bordering on Lake Bangweulu. This is a matter that needs careful consideration.

Tax Remission. In Table I the number of lepers given is based chiefly upon those that apply for and obtain tax remission. The custom varies in different districts, but in Balovale it is usual to remit the tax of six shillings to all who are considered to be suffering from leprosy, however slight their lesions. The reason for this is that it is the custom to earn money with which to pay taxes by working at the mines; those with leprosy are refused at the mines, and it is therefore difficult for them to earn money to pay the tax. In consequence a slight patch which is definite leprosy, but which remains the same for years, is highly prized, as it remits the tax and yet gives no inconvenience to the "sufferer." This tax remission, as at present practised, seems to hinder rather than help the control of leprosy. I had an opportunity of examining some 50 labourers at the Roan Antelope Copper Mine. I was struck with their fine physique and with the fact that though a large proportion come from highly leprous Balovale, none of them showed even the slightest signs of leprosy. This, however, is easly explained by the custom regarding tax-exemption.

LEPROSY INSTITUTIONS

The following are short notes on the leper settlements and camps visited, or with which I was able to establish contact.

Mwami. A report on this settlement appears in the Nyasaland Report, as it is situated near the border about 12 miles from Fort Jameson, and receives grants and patients from both countries. It is under Miss Ingle, a Nursing Sister of the Seventh Day Adventist Mission. I saw 37 patients, though others were absent in the fields. There is no medical supervision. The housing is good. The patients are somewhat lazy, but the Sister is doing all she can to encourage occupation treatment. Several of the patients might be dismissed to make room for others in more need of treatment. I examined and classified the patients as shown in Table II.

Nsadzu. Is about 46 miles from Fort Jameson and is under the Dutch Reformed Mission. There is at present no Sister in charge, but it is hoped soon to have one. Meanwhile the settlement is visited once a week

by Dr. Kok, the lady doctor of the mission station at Madzimoyo. I saw 38 lepers and 2 non-lepers; of these 33 were local, 3 came from Tanganyika Territory and 2 from Nyasaland. There were 4 children with leprosy. There are 1,000 acres of land, partly cultivated by the patients. The huts are in need of repair, but this is being arranged for. I examined and classified the patients as shown in Table II. Of the patients, 18 were deformed and disabled; a large proportion. There seems to be great need for an active settlement in this region, but it is not likely to flourish without trained European supervision.

Fiwila Leper Village. Is in the Mkushi District and is run by the U.M.C.A. Mrs. Munday, a trained nurse, is in charge; she is the wife of Rev. J. Munday, the priest in the mission station a few hundred yards distant. I saw 34 patients, who are classified in Table II. The settlement caters for the Lala, a very primitive tribe. Their semi-nomadic habits and the loose tribal ties make it difficult to induce them to enter a stationary leper village, even though every care and attention is paid to them. Mr. Munday gave me several interesting facts regarding these people which have a bearing on leprosy. It was easier formerly to detect leprosy when the Lala wore fewer clothes; now they tend to hide the disease, especially the women, as the knowledge that they are lepers may interfere with their chances of marriage. The totemic system is strong among these people, and interferes with tribal discipline; also the contact with European and other outside influences is having the same effect. Leprosy tends to spread when the tribal discipline of primitive people becomes bad. The people of this tribe are badly undernourished, as game has become scarce; they are dirty, covered with scabies, infected with worms and venereal disease. The leper village is doing excellent work. Water is laid on and shower baths are provided; the patients are kept happy and industrious, busy with agriculture and various industries.

Mongu. Here at the Government headquarters of Barotseland there is a leper camp attached to the General Government Hospital, with 18 patients. In company with Dr. Jamieson, the Medical Officer, I examined these and 21 out-patients, and classified them as given in Table II. There were 9 others who appeared as lepers, but in whom I found no signs of leprosy; apparently there is a desire to be diagnosed as a leper, as the government tax is remitted. The in-patients get free huts and rations, and in addition are paid for work done. The number of lepers in the camp is no indication of the numbers in the district.

Balovale. On the upper Zambesi is the headquarters of the northern district of Barotseland. The leper camp is attached to the General Hospital and is supervised by the Medical Officer. I examined the 37 patients in company with Dr. Will, and discussed the method of dealing with them administratively with Mr. Jones, the District Commissioner. The classification is given in Table II. The patients are dirty, and many of them suffer from scabies. In spite of their proximity to the Zambesi they are not fond of washing.

Chitokoloki. This mission settlement lies about 21 miles south of Balovale on the Zambesi. Unfortunately time did not permit a visit. I understand there are between 30 and 40 patients.

Chilubi. On this island in Lake Bangweulu there is a small leper settlement under the White Fathers, of which Dr. Meiklejohn is in charge. Unfortunately I was unable to visit it, but I had an opportunity of discussing leprosy as it exists in that region with Dr. Meiklejohn. On the island of Chilubi itself, with its 1000 inhabitants, there are said to be 100 lepers, and the disease is supposed to be very common among the Babisa tribe who live between the lake and the Luapula River. These people are said to be very dirty and infested with hookworm and other worms; jiggers is particularly bad. Their food is casava and fish, but they are undernourished and suffer from scurvy. In the settlement itself, which is increasing in size, there are at present 33 cases, but of these there are only 4 severe open cases. Apparently the resistance is fairly high, but the disease is spread by the promiscuousness and insanitary habits of the people. Among the Bemba tribe to the east of the lake leprosy is not common; they are more sanitary and feed on millet and not casava.

SUGGESTIONS

(1) *Tax Remission.* A large proportion, probably a majority, of lepers who are exempted from taxes have only a few tuberculoid lesions which would heal up within six months under active treatment. I therefore suggest that in these cases, tax should only be exempted on medical certification that treatment is being taken regularly. Treatment of tuberculoid patches by intradermal injections of hydnocarpus oil and with caustics should then popularise treatment centres, when it is seen that this type of the disease clears up quickly, and when the counter-attraction of tax remission no longer exists. Much money could thus be saved to Government and the control of leprosy would be facilitated.

(2) *Recognition of Leprosy by Officials and Others.* I consider it is highly important that all Government officials who have to deal with tax-exemption should be acquainted with the appearances of the various forms of leprosy and the nature of the disease. They, and also missionaries, teachers and others who are in constant touch with the people, could do much to prevent leprosy if they were acquainted with the more important facts about the disease.

(3) *Training of Medical Orderlies.* I consider also that not only Medical Officers, but medical orderlies under their supervision, should be trained to recognise and treat leprosy. Possible means of arranging for this training are mentioned below.

(4) *Need of First Class Settlement.* There are at present in Northern Rhodesia a number of small leper settlements and camps, but none of these has an expert whole-time worker in charge. I consider it important that there should be at least one centre managed by a whole-time expert who has already been trained at a large modern leprosy institution. I suggest that the Medical Department apply to the British Empire Leprosy Relief Association for the free services of one of the staff of Toc H Sanitary Workers who are trained in the modern methods in use in Nigeria, his salary and travelling expenses outside the country to be paid by the Association, and accommodation and travelling inside the country to be provided by Government.

(5) *Site of Settlement.* In choosing a site for a first-class settlement it is important that it should be situated in the midst of a highly endemic area. Before definitely fixing a site a survey of the surrounding area should be made to determine at least approximately the amount of leprosy.

(6) *Survey of Balovale District.* I suggest therefore that if a special leprosy worker is appointed he should first of all make

a rough survey of the Balovale District which appears to have the largest incidence of leprosy, and that, if found suitable, this should be selected as the site.

(7) *Training Centre.* Once a settlement was established it could be used as a training centre; also the special officer could pay visits to other settlements, advise regarding improved methods and carry out training at any centre where leprosy is being treated.

(8) *Leprosy Officer.* The above is only a rough sketch of the work of a special leprosy officer; he would work under the Director of Medical Services and the direct supervision of the local Medical Officer; the advice of the Leprosy Association would be available as to how his services might best be used and anti-leprosy work developed.

(9) *Improvements in Treatment.* In visiting the various leprosy institutions I have noticed that various improvements might be made in treatment. Intradermal injections of tuberculoid lesions would lead to their rapid healing and the " turn over " of patients might be considerably increased. I have demonstrated new methods to those in charge, but one of the main requirements is an effective uniformly non-irritant hydnocarpus preparation. I suggest that this be supplied to all leprosy treatment centres by the Medical Department in bottles, ready for use, in the form of creosoted hydnocarpus oil. This can be obtained in two pound tins from a reliable Indian firm and prepared according to instructions in a note recently sent out by the Association (see the July, 1939, number of the *Leprosy Review*). Each consignment should be sent out along with printed instructions as given in the above mentioned note. The oil should be ordered once a year from India, with instructions to send the bill to the Leprosy Association for payment. All the oil should be bottled in one pound or half pound bottles, creosoted, sterilised and stored till required. This suggestion and offer also apply to Nyasaland.

(10) *Leprosy Expert for East Africa.* Much good work is being done by the missions in attending the lepers, but this could be increased considerably if there were expert medical supervision. In my last year's report on East Africa I recommended the appointment of a Leprosy Expert who would visit in succession the various British territories, spending a few weeks or months at each leprosy treatment centre. B.E.L.R.A. has offered to pay £350 a year for five years towards the expense, provided the remainder is met by the various territories participating. I believe that a suitable expert is available, who has been approved by the Colonial Office. The leprosy work in Northern Rhodesia and Nyasaland would undoubtedly benefit greatly by joining in such a scheme.

THE BIBANGA LEPER SETTLEMENT, BELGIAN CONGO

At the kind invitation of Dr. Kellersberger, I visited his station at Bibanga, Lusambo Province, Belgian Congo, on June 26th and inspected his anti-leprosy work during the three days I was there. The Leper Settlement is situated some three miles from the Mission Station on the edge of an escarpment looking down to the Lublilash valley. The patients are housed in neat square huts of sun-dried bricks and grass thatch. Each family has a separate hut with two rooms which are rather dark from lack of windows, but are well ventilated under the thatch. Each hut has a separate pit latrine 6 or 7 feet deep; they appear to be fairly sanitary, though they are open and breed flies to a certain extent. The huts are well spaced and are arranged in broad streets lined with rows of trees. It is proposed to place all open cases at the one end of the settlement and closed cases at the other end. At the time of my visit there were on the roll 205 men, 136 women, 57 boys and 30 girls, making a total of 428. They all live in families and no attempt has so far been made to separate children from infectious parents. Several of the patients were absent on leave at their homes.

TYPES OF CASES

I had an opportunity of inspecting 289 patients and discussing them with Dr. Kellersberger and his African assistants. I made a rough classification of these into five groups: (1) Severe lepromatous cases (L_2 and L_3); (2) Mild or unadvanced lepromatous cases (L_1); (3) Neural cases with tuberculoid lesions (N_1, N_2, N_3); (4) Undetermined cases with flat lesions; (5) Cases without active signs. These groups were divided without bacteriological examination and the classification is, therefore, only a provisional one, probably the best possible in the short time available. Each group was sub-divided into cases with or without deformities and disablement, and was also divided into males and females.

Group		Males	Females	Totals
(1) Deformed	...	0)	3)	3)
Undeformed	...	40) 40	22) 25	62) 65
(2) Deformed	...	5)	4)	9)
Undeformed	...	22) 27	33) 37	55) 64

Group		Males		Females		Totals	
(3) Deformed	...	5)		3)		8)	
Undeformed	...	35)	40	61)	64	96)	104
(4) Deformed	...	4)		2)		6)	
Undeformed	...	9)	13	8)	10	17)	23
(5) Deformed	...	2)		1)		3)	
Undeformed	...	21)	23	9)	10	30)	33
			143		146		289

The table shows several points of interest :—

FIG. 3.
BIBANGA: leprosy in young child, accompanied by scabies, impetigo, malnutrition.

(1) The large proportion of lepromatous cases, just over 50 per cent of all those with active lesions. Only half of these might be considered as serious infection spreaders. There were very few of the grosser forms of lepromatous case. No case of lepra reaction was found and I understand that this condition is very rare. Only 9.3 per cent of the lepromatous cases showed serious deformity or disablement, and the few trophic ulcers of the feet were chiefly slight and superficial.

(2) Forty per cent of the active cases had definite tuberculoid lesions, though none of these could be classed as "major." This is a large proportion, but corresponds with findings in the Stanleyville Province of *Congo Belge* (*Leprosy Review*, January, 1939). Only 7.6 per cent of these had serious deformity or disablement.

(3) In thirty-three cases (11 per cent) no active signs were found.

(4) Comparing the males with the females, 33 per cent of the former and 18 per cent of the latter were classed as serious lepromatous cases (L_2 and L_3); among the women there were fewer and milder deformities, and the disease, as elsewhere, is of a definitely milder type among women than among men. There are fewer women than men on the roll.

Accompanying Diseases and Other Conditions. A large proportion of the patients were found to be suffering from scabies (fig. 3), and different forms of mycosis, complicated by septic infections. In some a condition resembling chronic pellagra and

other forms of deficiency skin diseases were found. A few had septic eye complications and several had enlarged spleens and livers, suggesting malaria and bilharzia. The majority showed fairly good physique.

SUGGESTIONS :

(1) The patients with no active signs might be discharged, except, perhaps, some of those too disabled to earn their living.

FIG. 4.
Plantation of Hydnocarpus anthelmintica trees at Bibango, Belgian Congo

(2) Many of the neural cases might be cleared up rapidly with intradermal injections and painting with caustics. The rapid clearing up of these would certainly popularise the treatment, and the discharge of many of these two groups would make room for other patients; and many non-leprous children dependent on them would be removed from the dangers of living in a leper settlement.

(3) Stress should be laid on clearing up complicating diseases, especially those of the skin. Care might be taken that patients wash thoroughly and daily with soap and plenty of water. Oil should be supplied to rub on the skin, and scabies and mycosis treated (Fig. 3).

(4) Strictness should be exercised to prevent unauthorized absence from the leper settlement.

(5) Children of open cases should be separated from their infectious parents.

(6) Nourishing food, vitamins, etc., should be supplied to those in need of them.

It is fully realised that the settlement is badly handicapped for need of funds and closer supervision. A very fine piece of work is being done by Dr. Kellersberger, but it is only one of his many activities. Only about 7 francs per month per capita (21 cts. American money) is supplied by the Government, and this covers only a fraction of the amount required.

The patients build their own houses and support themselves to a large extent by their own agriculture, but the land available (only about 500 acres) is inadequate for the present number of patients. There should be a nursing sister in immediate charge, as there is in many of the settlements in Nyasaland and Northern Rhodesia.

Such essential supplies as soap and oil for rubbing on the skin are wanting for lack of money. It is impossible to run a leper settlement without adequate funds.

Hydnocarpus Plantation. An interesting feature is the plantation of Hydnocarpus anthelmintica trees from which excellent oil is obtained for treatment. This useful tree might be further cultivated with profit in other places (fig. 4).

General Conclusions. Bibanga is one of the few places in the Belgian Congo where leprosy is being effectively treated. In spite of all the disadvantages mentioned above, good results are being obtained, though I consider that without great difficulty better and more rapid results might be obtained in many cases.

Leprosy, as in the Stanleyville province, appears to be on the whole of a mild type, certainly considerably milder than that found in India, Burma and Malaya. Ordinary cleanliness of the people and the clearing up of skin diseases connected with dirt should, to a large extent, reduce the number of cases in this region, especially those of the neural type. The people at large appear to have high resistance to leprosy, even in spite of malnutrition and complicating diseases; but the infection is apparently broadcast by dirt, scratching and promiscuousness.

I would strongly recommend that the excellent work being done by Dr. Kellersberger should receive further support from Government, from the Mission and from others who are interested in helping sufferers from leprosy, and in controlling this widespread disease.

LEPROSY IN SOUTHERN RHODESIA

Southern Rhodesia is separated from Northern Rhodesia by the Zambesi and from the South African Union to the south by the Limpopo River. To the east lies Portuguese East Africa, and to the west Bechuanaland. Its area is one and a half million square miles and the population in 1936 was 1,212,769 of which 55,395 were Europeans, 2,239 Asiatics and 3,135 coloured. It is a self-governing colony since 1923.

The time available for my visit—from July 14th to 24th, 1939—was unfortunately very short, and any views I express are limited by lack of knowledge of local conditions.

In Nyasaland and Northern Rhodesia anti-leprosy work is done chiefly by missionary organisations in small settlements subsidised by Government grants; in Southern Rhodesia this work is conducted in two comparatively large Government settlements and one small mission settlement.

The Report for 1938 gives the following figures:—

Settlement.	On register beginning of 1938.	Admitted.	Discharged.	Died.	On register at end 1938.
Ngomahuru	458	120	50*	41	490
Mtemwa	284	155	102	9	377
Mnene	40	9	3	2	46

MTEMWA. (Mtoko District).

This settlement lies in the north-east of the country, not far from the Portuguese frontier and on the road from Nyasaland to S. Rhodesia.

I had an opportunity of paying a visit on July 14th, 1939, in company with Dr. Martin, the Medical Director, and Dr. Barnet, the medical officer in charge, and inspecting a number of the patients. Time was not available for examining all the patients and classifying them, but I received a complete classification later from Dr. Barnet. The following points appear to be particularly noteworthy :—

1. The large proportion of lepromatous cases (55%). In this respect the findings are similar to those found recently in Nyasaland which is not far distant. There were 90 cases with tuberculoid lesions.

* See note on discharges from Ngomahuru in 1938 on p.34.

2. The comparatively mild type of the lepromatous cases, and the absence of lepra reaction. There were only 33 (0.8%) disabled and deformed cases.

3. The uncommonness of trophic ulcers, and the comparatively mild type of those ulcers found.

4. The dirtiness of the patients' skins, and the frequency of scabies, tinea and septic infections.

5. The large number of patients with enlarged spleens.

In my Report on Nigeria (Leprosy Review, October, 1936), the following requirements for the site of a leper settlement are mentioned, and these requirements have been generally approved in Nigeria and elsewhere:—

" (a) Four or five hundred acres of good arable land with suitable soil, preferably in elevated undulating country—not excessively hot.

(b) Not on a main road but within two or three miles of a main road. Communication with all parts of the province should be as easy as possible; and yet the settlement should be far enough away from main towns and lines of communication to render isolation easy in a well-disciplined settlement.

(c) Good water supply both for domestic use and for cultivation.

(d) Healthy site, or one capable of being rendered healthy, with special reference to malaria, sleeping sickness, etc. It is also important that the settlement should be situated inside the most highly endemic area."

It is advisable that the site of the Mtemwa Settlement be examined in the light of these requirements, especially as regards water supply and the prevalence of malaria. The chance of improvement or recovery of the patients is very much prejudiced by the prevalence of skin diseases due to dirt, and I was informed that the want of water is largely responsible for this condition. Also the prevalence of malaria is bound to counteract any benefit that may be derived from treatment. I understand that the question of transferring the settlement to a more suitable site is being considered on the grounds of health, water supply and accessibility. I have not had time to form a personal opinion, but I certainly consider that there is need for careful investigation of the question.

NGOMAHURU

Ngomahuru is about 15 miles from Fort Victoria and not far from the famous Zimbabwe Ruins. I spent about four days there and had an opportunity of examining 436 of the patients, discussing them with Dr. Moiser, the Superintendent, and classifying them into five groups. 1. Severe open cases (L_2 and L_3); 2. Slight open cases; 3. Those with definite tuberculoid lesions; 4. Those with flat and residual lesions; 5. Those without active signs. Each group

was subdivided into those with and those without deformities and disablement, and the whole was subdivided into men, women, boys and girls :

Group.		Men.	Women.	Boys.	Girls.	Totals.	
1. Deformed	...	4	4	0	3	11)	
Undeformed	...	64	22	10	0	96)	107
2. Deformed	...	3	7	0	0	10)	
Undeformed	...	70	23	3	0	96)	106
3. Deformed	...	14	13	1	0	28)	
Undeformed	...	51	22	4	0	77)	105
4. Deformed	...	0	1	0	0	1)	
Undeformed	...	5	1	0	0	6)	7
5. Deformed	...	28	14	0	0	42)	
Undeformed	...	57	8	4	0	69)	111
Totals	...	296	115	22	3		436

The fifth group was composed of those who had, and those who had not, been formerly open cases; I recommended the cautious use of potassium iodide in several of those of the former who were in robust health, with a view to discovering bacillary foci which might otherwise be missed. This group was unusually large, as several arrested cases had not been discharged owing to the absence of the Medical Superintendent on leave.

Of those with active lesions, only 50 (15 per cent) had deformities and disablement. The last group, without active signs, contains a much larger proportion of these, as it is partly composed of cases which have sought admission only when the disease had already begun to cause crippling.

The number of cases with tuberculoid lesions is large, nearly a quarter of the whole.

There were comparatively few cases with trophic ulcers, and these were, on the whole, of a mild type. Though the proportion of lepromatous cases was large, very few of them were of the severe type which ends by causing bone destruction.

I saw no case of " lepra reaction," and I understand from Dr. Moiser that this condition is uncommon.

On the whole, the form of leprosy found at this settlement is of a mild type, as is shown by:—

1. The mild type of lepromatous cases;
2. the few deformed and disabled cases, and the fewness and mildness of trophic ulcers;
3. the small proportion of child lepers, an acknowledged sign of low virulence of leprosy;
4. the large number of definite tuberculoid cases.

The European Staff of the Settlement consists of a Medical Superintendent, a steward and a Toc H Worker supplied by B.E.L.R.A. The African staff includes a clerk and three medical orderlies, and much of the work of the settlement, such as tailoring, building and horticulture is done by the patients.

The patients are housed in square huts built of bricks and thatch by the patients themselves at a cost of about seven shillings each. They are divided into six villages in which the patients are arranged as follows :—

1. Single males belonging to S. Rhodesia who are not severe open cases, about 150 in number.
2. Similar patients who have migrated to S. Rhodesia, chiefly for the purpose of labour, about 90 in number.

3 and 4. Married quarters for similar patients, also including young girls, some 90 in number.

5. Males and females who are severe open cases, some 50 or 60 in number.
6. Quiescent cases awaiting further examination before discharge.

I understand from the Superintendent that it is found impossible entirely to prevent intermixing of the sexes, and that some 4 to 6 illegitimate births take place each year.

Urgent Requirements. I was very much impressed with the need for a *trained European nurse* who would act as matron. Few first class leper settlements in other British territories are without a matron. Among her duties would be to control the women patients, to train male and female nurses from among the most suitable patients, and to establish and superintend a creche.

Another urgent need is for *skin sanitation.* There is little doubt that leprosy is spread by scratching of the skin, and that the presence of tinea, scabies and septic skin disorders helps to disseminate leprosy. They also lower the patients' health and retard or prevent recovery. A large proportion of the patients in the settlement are suffering from these conditions. Shower baths and a supply of soap are urgently necessary, and the patients should be supplied with oil for inunction, to prevent cracking and abrasion of the skin.

Microscopic and other special examinations are at present carried on under considerable handicap in the treatment room. A small, but well-equipped, *laboratory* is urgently required, with a suitable annex for stool-examinations. The Kahn, sedimentation and other tests, if introduced, would considerably enhance the efficiency of the work. The laboratory work is under the Toc H worker: it would be valuable if he could have a short period of training at a Government laboratory. He should also have an orderly to help him in his laboratory work.

Special Treatment. The special treatment consists of injections of an expensive proprietary preparation of hydnocarpus oil. The report of the Cairo International Congress makes the following statement: " No proprietary preparation of hydnocarpus oil or esters, or any other proprietary preparation at present on the market is more effective than the pure oil and esters prepared in institutions." (*Leprosy Review,* October 1938.)

I would suggest, therefore, that much money could be saved with no loss of efficiency if the oil were used. In examining the patients I found that a large proportion of them showed hard lumps in the muscles which had been injected. To prevent this, I would suggest (a) using heated hydnocarpus oil with 4 per cent creosote; (b) dividing the dose so that not more than 1 c.c. is injected at any one point; (c) injecting slowly.

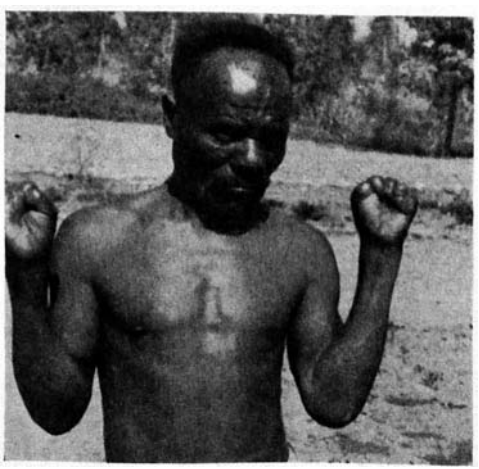

FIG. 5.
NGOMAHURU: fine physique in spite of crippled hands.

I would suggest the use of intradermal injections in cases with tuberculoid lesions, and that trichloracetic acid be painted on carefully in such cases by trained workers.

Occupational Treatment : The physical development of a large proportion of the patients is excellent, and most of them are kept fully occupied with agriculture, horticulture and general work about the colony. Games such as football are very popular. The settlement is one of the best run Government leprosy institutions I have visited in Africa, and the results obtained, as far as I could judge by my examination of the patients, compare very favourably with those of other first class settlements.

The climate is particularly suitable for the treatment of leprosy

as it is dry and never excessively hot, and there is a constant cool breeze, but no excessive or unpleasant winds.

The following is a table of admissions and discharges of patients from 1929 to 1938, during which period 1,452 patients were treated :

	No. on list	Admitted	Re-admitted for further treatment	Re-admitted for economic reasons	Discharged	Died	Deserted
1929	224	49	—	—	—	9	5
1930		108	4	—	98	12	3
1931		139	9	—	34	22	7
1932		172	9	4	98	21	3
1933		127	7	—	24	30	1
1934		139	12	—	78	23	2
1935		116	14	3	114	37	2
1936		79	6	3	159	32	6
1937		179	—	2	129	25	5
1938		120	8	1	50*	41	5
Total		1,228	69	13	784	252	39
			4.7%	0.9%	53.9%	17.3%	2%

GENERAL COMMENTS

British Leprosarium. A number of European patients suffering from leprosy have been treated with marked success at Ngomahuru, and a suggestion has been made that a leprosarium for British patients should be instituted. A certain number of Britons working in endemic countries are liable to contract leprosy. Many of these have been treated in England with discouraging results, as the climate is unsuitable, especially in winter, and the ostracism connected with the disease causes mental depression. At Ngomahuru patients may lead an active and care-free outdoor life, in an ideal climate and under expert medical supervision. I understand that the Medical Department and Government look upon this suggestion with favour, and a proposal has been put forward to build some suitable houses which may be rented to patients. It is hoped that it will be possible to overcome any difficulties that there may be in obtaining travelling facilities or in entering the country.

Surveys. With the aid of funds supplied by B.E.L.R.A. a leprosy survey was carried out by Dr. Moiser in 1932. The two provinces of Gatu and Chibi were surveyed; 9,698 people were examined in the former and 9 lepers (0.92 per thousand)

* The small number discharged in 1938 was due to the absence on leave of the Medical Superintendent.

found; in the latter 6,814 were examined and 57 cases (8.3 per thousand) found. At this rate it may be suggested that there are six or seven thousand lepers in S. Rhodesia, at least 2,000 of whom are open cases requiring segregation. This is only a rough surmise, and I consider it important that surveys in other provinces be carried out.

Leprosy is seldom found among purely nomadic tribes, nor is it common among those who have settled in large well-organised communities or townships. It is in the semi-nomadic period between these two stages that it is commonest, when tribal discipline is disintegrating and nothing has as yet taken its place. The natives of Southern Rhodesia and the surrounding countries are still in this period of flux, and the demand for labour in the mines and other industries has the effect of rendering semi-nomadic those who would otherwise have settled down on the soil in a more tribally organised condition. I consider it therefore only just to the native that definite and serious steps should be taken to counter a danger that is rendered more acute by modern labour demand. The best methods of doing this could be ascertained by including investigation of this subject in the leprosy survey.

Treatment at Clinics and Training of Doctors. While severe open cases are unsuitable for treatment at clinics, a large proportion of neural cases, especially those with tuberculoid lesions, could with advantage be treated at the general clinics throughout the country with every hope of recovery. Few doctors are familiar with the practical points connected with the diagnosis, type-differentiation and treatment of leprosy; and I would suggest that here, as in India and other countries, all doctors in Government employ should receive a short course of training from an expert in leprosy. The simpler non-infectious cases could then be treated at general clinics, the more severe and contagious cases being sent to one or other of the leper settlements. In this way, at very little extra cost, large numbers of cases might be treated and the treatment popularised.

Specialised Staff. In visiting the British territories of Africa one is particularly struck with the semi-nomadism not only of the native, but also of the Government Medical Officer, and the frequency with which he is changed from one station to another. This is no doubt contingent on the exigencies of the Service. For obvious reasons specialists form an exception to this rule. Leprosy is a complicated disease the treatment and control of which can be effectively undertaken only by specialists. It is

partly on this account that, in the absence of Government specialists, leprosy has been chiefly dealt with by Christian missions, which, with their settled staff, are able to give continuity and effective service.

The Ngomahuru Settlement forms an exception to this rule. Here we have a Government Leprosy Specialist who, on retiring after his full term of medical service in Africa, has given ten years to studying, relieving and controlling leprosy.

He has turned a wilderness into a beautiful garden, and shown how lepers can be attracted and effectively treated without compulsion. The table on page 34 shows in ten years 53.9 per cent of patients discharged as disease arrested, and only 4.7 per cent re-admitted with relapse; under the voluntary system it is unlikely there are many more relapsed who have not sought re-admission.

I consider it very necessary that there should be a third doctor engaged in leprosy work in connection with the two Government Leprosy Settlements. He could take charge at these settlements while the medical officers are on leave, and at other times he could carry out surveys, train doctors in leprosy and initiate treatment of leprosy at suitable general clinics. The staff should also be increased at Mtemwa Settlement by the appointment of a European similar to the Toc H worker at Ngomahuru. B.E.L.R.A. would be willing to find a suitable man, though I am unable to say if they are in a position to pay his salary. I have already referred to the need of a European matron at Ngomahuru.

The additions that I have suggested above are only the most obvious and urgent. Ngomahuru is at present not the economic proposition that it might be. It may be compared to a twenty horse-power engine which is only doing ten horse-power of work. If the suggestions made above are carried out—additional doctor, survey, training of doctors in charge of clinics, treatment of mild leprosy at clinics and forwarding of serious cases to the settlement —then it could work at full strength and deal effectively with a larger " turn-over " of patients.

These comments on Ngomahuru apply also to Mtemwa Settlement. This institution has suffered from what has so far proved an unsuitable site, and from frequent changes of medical staff. There certainly is room for two first-class leprosy settlements in the country; and, given Government support, it should not be difficult to establish a second effective settlement on the lines of Ngomahuru.

LEPROSY IN BASUTOLAND

THE COUNTRY AND THE PEOPLE

Basutoland is a small mountainous country surrounded by the South African Union on every side. The main part of the country consists of high mountains and valleys in which communications are difficult; but there is a strip of plain along the west side where most of the population resides, and east of this on the way to the mountains is a plateau indented by the plain.

Basutoland is one of the three Crown Protectorates under the High Commissioner. The population is just over half a million. There is a Paramount Chief and sub-chiefs who rule the country in consultation with the Resident Commissioner and other British officers. The tribal system is considerably stronger than obtains in the Union with the exception of the native reserves.

Many diseases, such as malaria, hookworm, bilharzia, which in other parts of Africa predispose to leprosy, are absent or rare in Basutoland; but as elsewhere venereal diseases and scabies are common. On the whole the nourishment of the people is fairly good, but there is seasonal malnutrition when certain food stuffs are difficult to obtain.

FREQUENCY OF LEPROSY

Most of the information in this paragraph is culled from the report prepared by Dr. Germond for the Sir Alan Pym Commission. Leprosy is said to have been unknown in Basutoland before the Griqua immigration about 1840. It is possible that up till then tribal control kept it in check, as leprosy is a disease connected with loosening of tribal control. A survey in 1891 showed 200 lepers, but there may have been many more.

In 1914 a form of compulsory segregation was initiated, and the Botsabelo leper settlement was begun with 657 patients gathered in six months with the help of the chiefs. In 1914 there was rioting, and 245 patients deserted; it took 15 years for the numbers in the settlement to rise again to what they were originally. In 1929 two native inspectors were appointed and later four others, one being placed in each of the six districts.

The following table gives the general statistics of patients for the first 20 years :—

Admissions	2648	Deaths	1305
Readmitted deserters ...	760	Discharges	546
Recurrences	104	Deserters	941
		In settlement on September 30th, 1934 ...	720
Totals	**3512**		**3512**

Admissions have varied in number from time to time according to the vigour of the efforts made to reach patients, the number and efficiency of native leprosy inspectors, etc. Recently it appears that the numbers are decreasing due to diminution of the frequency of leprosy.

THE COMPULSORY SYSTEM

The most suitable method of leprosy control varies in each country according to such factors as the size and nature of the country, the concentration of the whole and of the leprous population, facilities for transport, the advancement of education, the nature of the government and the number of the medical officers available. As Basutoland is surrounded by the Union of South Africa in which lepers are compulsorily segregated, it was inevitable that a certain amount of compulsion should be used. The method employed in Basutoland is perhaps wrongly called "compulsory"; it is rather a form of paternal moral suasion. This is shown by the fact that only on very few occasions has it been necessary to invoke the law in persuading patients to enter the settlement.

A suggestion has been made that able-bodied lepers of the non-infectious type should be segregated in small leper villages and treated by District Medical Officers; but experience elsewhere shows that without adequate supervision such camps are not a success, and that it would be exceedingly expensive to obtain this supervision; moreover the treatment in such villages, under existing circumstances, could not be nearly as good as at Botsabelo. Concealment is the chief disadvantage of compulsion, but this is being overcome : (1) by more efficient and better trained native leprosy inspectors; (2) by occasional surveys in limited areas; (3) by providing motor transport and thus facilitating the journey to the settlement; (4) by making the settlement more attractive socially, and speeding up the recovery and discharge of milder cases by more efficient treatment. On the whole I consider that under the circumstances the present method of recruiting patients is the best possible for Basutoland.

On the other hand I would suggest some modifications in the system in force for examining, treating and discharging patients :—

(1) A distinction might be made between the two main types of leprosy in examining patients for discharge. All cases should be examined bacteriologically on admission. Those which are negative and distinctly of the neural type with tuberculoid lesions need not be re-examined bacteriologically as long as they show no clinical signs of deteriorating into lepromatous cases. Strongly positive advanced lepromatous cases need not be re-examined until

they show signs of reaching the negative stage. These omissions would save considerable time.

(2) When a formerly bacteriologically positive case gives a negative finding the examinations should as a rule be repeated at the same sitting, up to ten smears being taken from the skin in different parts of the body, and from the nose, until a positive is found. If these all prove negative he may be pronounced negative at that sitting, but similar examinations should be repeated at three month's intervals for one or two years, or even longer, depending on the former severity of the case and the speed at which it cleared up.

(3) I would suggest using the iodide test, regulated by the sedimentation test, in suitable cases as a further assurance that the patient is bacteriologically negative (see *Leprosy, Diagnosis, Treatment and Prevention*, 6th edition).

(4) The milder type of neural case, with few tuberculoid lesions and with little or no deformity, in which the clinical signs clear up rapidly under treatment, might be discharged after a shorter probationary period but not less than a minimum of six months after admission.

(5) At present the examination of the mucous membrane of the nose is the chief criterion of positive bacteriological findings. I suggest that the most outstanding lesion of the skin be first examined, and that in cases with generalised flat diffuse infiltration of the skin the lobule of the ear be chosen. If repeated examinations of the skin in different parts of the body prove negative, the nasal mucosa should be examined. Fallacies are more frequent in nose than in skin examination due to the presence of partially acid-fast saprophytes in the former. The nose is seldom found positive until after fairly wide-spread lepromatous infiltration of the skin.

(6) I consider that the above recommendations, if carried out, would accelerate the discharge of a large proportion of the milder cases, without increasing the danger of relapse, and thereby popularise the treatment and attract patients. The change in the method of examination of the severer lepromatous cases would ensure fewer relapses from among that type.

BOTSABELO SETTLEMENT

Staff. This consists of a medical superintendent, a medical officer, a clerk, a compound manager, a farm bailiff, an artizan, a matron, a nursing sister. The African staff includes 8 leprosy inspectors, an interpreter, 3 dispensers, 2 female nurses, a chief guard, 10 guards, a mechanic, a mason, a carpenter, 11 labourers.

Patients. One of the most striking features noticed was the excess of female over male patients; this is contrary to the findings in most countries. The following table shows the relative number of the sexes in the settlement over several years :

		Males	*Females*
May,	1930	299	361
,,	1932	345	368
,,	1933	355	383
,,	1934	352	376
,,	1935	345	381
June,	1938	322	365
,,	1939	342	406

I had an opportunity of examining the 54 women patients admitted in the previous twelve months and found 57 per cent to be of the milder neural type with only five deformed; and 43 per cent of the severer lepromatous type with only one deformed. The examination of the 16 men admitted in the last three months showed only 38 per cent neural of which half were deformed. Thus, although there are more female patients than men, the former appear on the whole to have the milder type, though the small number of men examined is not adequate to form an opinion.

FIG. 6.
In Basutoland obesity may predispose to leprosy among women.

The reason for this unusual finding of excess of females over males is difficult to explain, especially as males are more frequently medically examined than females at centres of mine recruitment, and are thus less liable to escape detection. A possible explanation is the less active and more sedentary life of the women witnessed to by their obesity and flabbiness as compared with the men (fig. 6).

Social Organisation. As in many other similar institutions the paramount importance of the organisation of the social life of the leper has not yet been fully realised and no provision is made for it in the budget. The leper differs from other patients in three essential ways: he is not a free agent; he has to spend years instead of days in the institution; he is not as a rule confined to bed and does not feel seriously ill, so that his nature calls out for a normal social life like that of a healthy person. Too often the Government leprosy institution, while spending lavish sums on staff, equipment,

food and clothing, fails to provide for this basal need which is at the foundation of all success in anti-leprosy work and treatment; discipline, and the recovery of the patient are accordingly hampered. The Botsabelo settlement is particularly fortunate in its present superintendent and matron who, with the help of Miss Johnson, have taken a keen interest in and organised the social side; but the authorities would do well to follow the example of some of the best mission-controlled institutions and appoint permanent workers who would attend to this aspect of the work. The need is particularly clamant among the women and the children, and attention to this need might help to solve the problem referred to later under *sex segregation and children*.

Special Treatment. I have suggested substituting *Hydnocarpus wightiana* oil with 4 per cent creosote for the iodised esters at present used. The oil when obtained from a reliable Indian firm (such as the Ernakulum Trading Company, Ernakulum, S.W. India) is more stable and less irritant than the esters, and the price is very much less. The disadvantage of its greater viscosity may be overcome by injecting as hot as it can be tolerated.

Intradermal injections in tuberculoid lesions should be given beyond the apparent edge. In several instances lesions were found to have spread beyond the marks of former injections. Iodised esters produce more or less permanent marks which, though not objected to by the patients, yet hide the lesion and make it difficult to assess progress of the healing process.

In assessing the tolerance of lepromatous cases for hydnocarpus injections the regular and repeated use of the sedimentation test is invaluable.

Accompanying Diseases. As mentioned above the usual predisposing and accompanying diseases are absent with the exception of scabies and venereal diseases. I suggest that the Kahn or other similar test should be used in every case.

Deterioration of Resistant Cases. Some leprologists have questioned whether the neural type with distinct tuberculoid lesions ever degenerates into the more severe lepromatous type. In the Pretoria leprosarium I saw a number of such cases, and I also noticed a small number of these among the few patients I examined at Botsabelo. This is a matter which calls for careful investigation as to its frequency, its cause and whether it occurs more frequently inside or outside the settlement. There is as a rule a distinct " threshold " between the two types, and it probably requires a marked deterioration of general resistance, from whatever cause, to permit passing of the threshold from one type to the other (see *Leprosy Review*, October, 1939, p.225).

Laboratory Work. The suggestions made above with special reference to bacteriological examinations, sedimentation tests and Kahn tests imply considerably more laboratory work. This would be made possible by the appointment of two trained African laboratory assistants who would work under the supervision and direction of the doctors.

Sex Segregation and Children. In a settlement where a certain amount of compulsion has been used in recruiting the patients it is difficult to enforce strict discipline with regard to isolation of the sexes, and the rules in force are sometimes broken in spite of supervision. Thus a certain number of children are born in the settlement. Organisation of the social life of the settlement and especially of the women referred to above might help to solve this problem. It is a serious matter when it is remembered that children are more susceptible to infection than adults unless separated from infectious parents at birth. It has long been felt that a creche is necessary for children born in the settlement and for healthy children brought in by leper mothers. A voluntary creche is at present under construction at a distance of about 80 miles from the settlement; it will be run by the late matron of the settlement; children are to be admitted only if so desired by the parents, but there is reason to believe that they will cooperate. While it is hoped that this will to a certain extent meet the situation there should be, as elsewhere, a creche associated with and within easy access of the settlement, and under the same direction as the settlement.

Another matter worthy of mention is the isolation of young children with slight leprous lesions from infectious lepers; otherwise superinfection may take place and a mild case be changed into a more severe one.

GENERAL REMARKS

The Basutoland Government is to be congratulated on its antileprosy campaign as it has gradually developed into its present form. Excellent work has been done by its past and present staff. A sum of about £18,000 a year is spent on the settlement and the leprosy inspectors. There are definite signs that at last the disease is being brought under control. One of the difficulties in finally accomplishing this may be the less stringently applied rules in some parts of the Union. It would be unwise for many years to come to relax in any way the present system; and from time to time such additions should be made as careful investigations show to be necessary.

REPORT ON LEPROSY IN THE UNION OF SOUTH AFRICA

INTRODUCTION

On behalf of the British Empire Leprosy Relief Association and at the invitation of the Department of Public Health, I visited the Union of South Africa during part of July and August, 1939, and studied leprosy and the methods adopted for its relief and control at the four principal leper settlements : Pretoria, Emjanyana, Mkambati and Amatikulu.

As requested by the Secretary for Public Health I embody in the form of a report my impressions.

I shall describe shortly some of the main features and comment on particular matters concerning each of the four institutions, and then deal with more general matters.

LEPER INSTITUTIONS

West Fort Leper Institution, Pretoria. This is situated some seven miles to the west of Pretoria. The staff consists of a Medical Superintendent and three other medical officers, a female nursing staff of 28, 10 overseers (male nurses), 3 storekeepers, 4 office staff and 5 others.

The estimated running cost to Government in 1939 was £23,004 for staff and £21,000 for supplies. It housed on June 30th, 1938, 95 Europeans, 681 Natives, 90 Mixed Coloured and 7 Asiatic.

The disease appears to be of a severer form among the Europeans than among the Natives. Every one of the twelve Europeans admitted during the last twelve months was of the severe lepromatous type, while of the Natives admitted during the same period only twenty-five per cent. were lepromatous, the remainder being of the milder neural type more likely to recover. The reasons underlying this severity of type among Europeans are worthy of careful investigation. All contacts of lepers admitted are examined periodically, and it is not likely that the difference between the two classes of patients could be due to milder cases among Europeans escaping detection. Malnutrition is common to both classes of patients, so this could not account for the difference. There are two possible explanations which present themselves :—

(1) That contacts are less close among Europeans and that therefore only the minority of susceptibles in the European community acquire the disease and that in the severe form, whereas contacts are so close and so frequent among Natives that even non-susceptibles acquire leprosy though only in the milder form; and (2) that climatically the European is at a disadvantage in South Africa as regards leprosy, or that the disease produces in him more mental and consequently more physical depression,

and in this way lowers his resistance. The question of racial resistance to leprosy is a most important one and the contrast between these two communities at West Fort offers a unique opportunity for its study.

In spite of the severer type, the total number of European lepers has for some years been steadily decreasing and is now only about half what it was twenty years ago. This is no doubt chiefly due to segregation of infectious cases.

FIG. 8.
PRETORIA INSTITUTION: febrile reaction with swelling of face in lepromatous case.

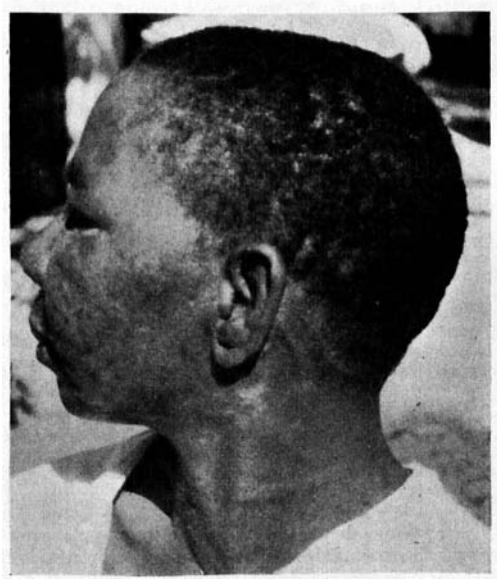

FIG. 9.
PRETORIA: reacting major tuberculoid lesion of face; notice clear-cut margin and thickened cervical nerves.

Outside America there are few leprosy institutions in the world where so much is spent by the State on each patient. For treatment, nursing and catering, the staff and supplies are adequate.

Besides the differences of types in European and Native patients there are two other features which I noted as peculiar to or at least particularly common in this institution :—

(1) Several patients were seen with scars of old tuberculoid lesions who had later developed lepromatous lesions (*Leprosy Review*, October, 1939, p.225); some of them had undergone a similar deterioration after admission to the institution, as shown by comparing past records with the present condition. (2) Several lepromatous cases with nodules of the face and widespread diffuse lesions of the body develop sudden swelling and oedema of the lesions of the face but not of the body. This is accompanied by a rise of temperature. This condition resembles the condition known as " lepra reaction," so common in India and elsewhere, but comparatively uncommon in East, Central and South Central Africa (fig. 8).

All these peculiarities offer problems for investigation; I would suggest that the possible connection with lack of sufficient physical exercise be looked into, as this lack is one of the most apparent differences between West Fort and most of the institutions in the parts mentioned above (*see also* p.47).

Emjanyana Leper Institution is situated in the Transkei. It has a staff of 22 Europeans and 88 natives, and an annual expenditure of £24,898. On the 30th June, 1938, there were 665 patients, all natives. This institution has a distinct advantage over West Fort in that all the inmates are from native tribes and most of them from tribes in the Transkei, though patients are also admitted from the Cape Province. The Superintendent, who has been in charge for twenty years, studied the customs of the people and planned the present form of the institution upon these customs. In consequence, law and order are maintained through native headmen and by the patients themselves. The settlement is divided into two main camps, male and female, more than one mile apart; the females are not allowed to wander from their enclosure except in groups, which is in accord with native custom.

There is a creche for children born of newly admitted patients or children brought in with their leprous mothers; they are looked after in the creche till the mother is discharged, or till the child can take ordinary food and be handed over to relatives. The creche is in the female compound and mothers are allowed to see but not to come in contact with their children.

There is a farm and a vegetable garden, each under European supervision; from these meat, milk, mealies, vegetables, etc. are supplied to the patients.

I had an opportunity of examining and discussing a number of cases with Dr. Willmot and Dr. le Roux, members of the

Leprosy Board, and Dr. van der Lith, the Medical Officer. About three-quarters of the patients admitted are of the neural type, most of them with tuberculoid lesions, only one-quarter being lepromatous. This proportion is similar to that of the Native patients admitted at West Fort. In the year ending 30th June, 1938, one hundred and seventy-two patients were discharged, almost all being from among the neural type. Large as this number is, possibly even more could be discharged if trophic ulcers were operated on and dead bone removed. So far patients have objected to such operations, but with patience and persuasion this objection should be removed. It is worthy of note that about 41 per cent. of discharges last year were from this institution which contained only 29 per cent. of the segregated patients. This may be partly due to the fact that the patients themselves insisted on compulsory treatment. I think it might be possible to get better results with lepromatous cases if the treatment of suitable cases was regulated with the help of the sedimentation test, and if sufficient healthy exercise could be arranged for all who are fit for it. At present only about one-third of the male patients have regular employment and it has been noticed that those so employed make better progress than the others.

The system adopted at Emjanyana has taken the sting out of compulsion. The place is so popular that more than a third of the patients come in of their own accord, and the others make no difficulty when told to go to a depot or other place where they are collected and brought in by the settlement's motor ambulance.

Mkambati Leper Institution. This institution is situated in 90 square miles of ranch land bordering on the shore of Pondoland. The ranch supplies meat and milk to the patients and staff. The institution is under a resident Superintendent, and the medical and nursing staff is supplied by the Holy Cross Mission some 30 miles distant, Dr. Drew visiting from there and the three European sisters being in residence.

There are about 200 patients of which, as in other institutions, the majority are of the neural type.

The most striking feature of the Mkambati Settlement as compared with others is the almost complete absence of patients with trophic ulcers. This is due to four chief measures :—

(1) Prompt operations on the feet of patients and removal when necessary of sufficient bone. This method has also been followed in several of the principal Indian institutions.

(2) The patients wash thoroughly in soap and water daily and then rub oil on themselves and on each other. Separate enclosures fitted with shower baths are provided for men and women.

(3) Patients are taught to take care of their teeth; they are given a mixture of Tr. Ipecac., Peroxide of Hydrogen, Liquor arsenicalis and

Glycerine (equal parts) to rub on the teeth and gums. Noses are douched with 1 in 150 Dettol and sprayed with S.T.37 (1 in 3 solution).

(4) There are communal exercises such as Indian clubs and massage, and special exercises are used to prevent deformities of the hand.

All accompanying diseases are treated and an endeavour is made to regulate special treatment according to the general condition of the patient. As in most institutions where individual, as opposed to mass, treatment is given, the sedimentation test is used in judging the general resistance of the patient and his tolerance of special drugs.

As in other institutions in the Union, sufficient bacteriological examinations of the skin do not appear to be used in determining the type and condition of the patient and in regulating the treatment. I consider it highly important that there should be a well equipped clinical laboratory and an African laboratory assistant, without which it is impossible adequately to carry out these examinations and also such essential examinations as the Sedimentation and Kahn tests.

The children born in the institution are brought up successfully in a crèche. As elsewhere it is found that unless they are kept in the crèche till they are three years old they are unlikely to survive when handed over to outside relatives.

The large proportion of patients discharged (see table on p.51) is worthy of note.

Amatikulu Leper Institution. The Amatikulu Leper Institution is situated in Zululand near the coast and some 14 miles north of the Tugela River. There is a European staff of seven, including the Superintendent and Matron. The part-time medical officer visits the institution four times a week. Under the Matron the nursing is carried on by trained African male and female nurses.

There is a large stock farm connected with the institution which supplies milk and meat to the patients.

There are hospital wards for the male and female patients. The most of the patients are housed in round huts of the native type; but these are gradually being replaced with brick and cement houses.

There are 472 patients, of whom 103 were passed for discharge by the Leprosy Board as arrested cases on the day of my visit. This is a large proportion, and speaks well for the efficacy of the treatment. Of the 136 patients admitted in the last twelve months only 20 were of the lepromatous (severe) type, an even smaller proportion than in the other institutions. The large number of admissions and discharges shows the popularity of this settlement.

The patients appear to be happy and contented, and no fences or other restrictions are necessary to keep them from absconding.

While the numbers of the Mkambati Institution are diminishing, apparently due in large measure to the elimination of leprosy from Pondoland, the numbers at Amatikulu are tending to increase; this may be attributed to the fact that this institution is now attracting patients from long-existing foci which hitherto have not been reached.

I had an opportunity of examining, along with members of the Leprosy Board and the visiting physician, a number of the patients. They appear to be types very similar to those in the other institutions. I was informed that cases of "lepra reaction" are not infrequent, especially in the winter. In these the face and sometimes the limbs become suddenly swollen and congested and there are febrile symptoms. This state is found only in the lepromatous type (fig. 6). There is a large proportion of patients with trophic conditions which might be cleared up by operation.

GENERAL REMARKS

Compulsory Segregation. The system of leprosy control in the Union of South Africa differs from that in most other British Territories in that it is compulsory. In consequence it has been necessary to spend far more money than elsewhere. In 1918 the estimates for leprosy were £118,000 and in 1939, £125,596, as shown in the following table :—

Pretoria Leper Institution	European Staff	55)	
	Native Staff ...	72)	£23,004
	Supplies ...		21,000
Emjanyana Leper Institution	European Staff	22)	
	Native Staff ...	88)	12,948
	Supplies ...		12,950
Amatikulu Leper Institution	European Staff	8)	
	Native Staff ...	57)	6,417
	Supplies ...		5,300
Bochem Leper Institution	European Staff	1)	
	Native Staff ...	6)	1,032
	Supplies ...		1,750
Mkambati Leper Institution	European Staff	8)	
	Native Staff ...	65)	5,195
	Supplies ...		5,000
Maintenance outside institutions of indigent patients and their dependants			20,000
Transport of patients and their relatives to and from institutions			8,400
Contingencies and Union Leprosy Board and Advisory Committee			2,600
		Total ...	£125,596

These figures do not include capital expenditure. In 1918

there were 2,374 patients in the various institutions and 20 years later there were 2,265. Though the number of lepers in the institutions does not appear to have decreased greatly, it can be stated with some degree of certainty that the number of lepers outside has decreased considerably during this period. On June 30th, 1938, there were 1,764 patients who had been discharged but were still under surveillance, and 2,738 others had already been released from surveillance. As is mentioned above, there is now only about half the number of European patients segregated that there was 20 years ago; and, while the number of native cases still at large cannot be accurately stated, there is no doubt that improved treatment, improved transport and improved medical services in the districts have accelerated the turn-over of patients.

As shown above, an almost entirely voluntary system obtains at Emjanyana, and it is unfortunate that the lack of tribal cohesion at West Fort has so far made it impossible to organise a similar system there. On this account it is the more urgent that the social life of the Native patients at West Fort should be organised, so that the sting of compulsion may as far as possible be removed.

A compulsory system similar to that in the Union would necessarily be impossible in other British Territories in Africa, if for no other reason, on account of expense. The Union spends between £40 and £50 a year on each of its segregated lepers. A corresponding expenditure in Nigeria would cost many millions a year. There, the chief hope of controlling leprosy is through educating the people in the danger of infection and how it can be avoided, and thus gradually bringing about segregation through compulsion applied by the community itself.

In the Union, the degree and nature of compulsion has been determined largely by the resistance of certain classes of lepers to voluntary segregation and by the importance which the community sets upon the removal of sources of infection. It has also been determined by the ability and willingness of the community to pay the price. There seems little doubt that if the present system is persisted with it will succeed in the end.

Treatment in the Leper Institutions. I would suggest that more emphasis be laid on developing physical culture among the patients, and consider that this would result in better results, especially in those with the severe type of the disease who at present seldom recover or are discharged from the institutions. Also in treating cases of this type I would strongly advocate the use of the sedimentation test.

At present iodised esters of hydnocarpus oil are used. In place of this the equally beneficial oil itself as supplied by a reliable

Indian firm might be used. Iodised esters when injected intradermally blacken the skin and make it difficult to determine the degree of improvement in tuberculoid lesions. The oil is cheaper and is more stable and less likely to become irritant, especially if 4 per cent creosote is added. The disadvantage of its greater viscosity can be overcome by injecting it hot (*Leprosy Review*, July, 1939, p.186).

Intradermal injections tend to accelerate the clearing up of tuberculoid lesions; *each* lesion should be injected in turn and reinjected at an interval of not less than a month, this being repeated until all active signs have disappeared. If there are too few lesions to supply injection sites for a month, intramuscular injections may be given in the intervals. It is well to inject at least half an inch beyond the margin of a macule, as the infection has generally spread beyond the apparent edge.

The treatment of trophic ulcers, especially those of the feet, is a most important matter. I have referred above to the almost complete absence of trophic ulcers at Mkambati. This is in marked contrast to the other institutions. Trophic ulcers of the feet are generally associated with decalcification and necrosis of the bones, especially of the metacarpal and phalangeal bones. When less radical measures fail to cause prompt and permanent healing of trophic ulcers, it is important that without delay dead and diseased bone be removed by operation. If this is not done the patient soon becomes a chronic invalid, he absorbs toxins from his septic sores, he is immobilised and his muscles become soft and flabby; in consequence his leprosy becomes worse and his chance of recovery without serious deformity and disfigurement soon disappears. Anyone wishing proof of the importance of immediate operation, and of the other measures for keeping the patient strong and active, has only to visit the Mkambati Institution.

Educational Campaign. Leprosy is likely to be completely eradicated only when the classes among whom it exists have learned the dangers of leprosy and how they may be avoided. With this end in view a small illustrated pamphlet, entitled "Control of Leprosy" has been prepared by the British Empire Leprosy Relief Association and widely distributed by the Medical Departments throughout Africa, especially to those who are responsible for administration and education. It has been translated into four of the principal African vernaculars. I would suggest that this be used in educating the public regarding leprosy.

Examining Patients. At present great stress is laid upon positive bacteriological examination of material taken with a swab

from the nose. In my experience mistakes are sometimes made by confusing partially acid-fast saprophytes such as the smegma bacilli, frequently present in the nose, with lepra bacilli. For making a smear it is better to gouge out a small piece of mucous membrane with a sharp knife. Before each examination the knife should be carefully flamed, as wiping and boiling do not always remove all the acid-fast bacilli gathered from the last case.

The nose is seldom positive without the skin also being positive, though the reverse is scarcely true; and I would suggest that the chief reliance be laid on a positive skin finding, either from an obvious skin lesion such as nodule or plaque, or from the lobule of the ear. When repeated examinations of skin lesions are negative the nasal mucous membrane should also be examined by the method mentioned above.

The diagnosis, and especially the clinical diagnosis, of leprosy are often exceedingly difficult for doctors who have not had adequate opportunities of studying all types of cases under an expert. I would suggest that increased facilities be given to district surgeons to undergo such study at one or other of the leprosy institutions.

Standards for discharge of patients. Neural cases with less extensive lesions and with good physique will as a rule heal up rapidly under intradermal injections, and the restrictions of repeated bacteriological examinations necessary for lepromatous cases need not be applied.

For lepromatous cases in good general health, who have reached the stage of becoming repeatedly bacteriologically negative, I would suggest the careful application of the iodide test (see *Leprosy Diagnosis, Treatment and Prevention,* 6th Edition). No pronouncement of negative findings should be given on any one occasion till several skin (from different parts of the body) and nose smears have been examined carefully. Without these strict rules relapses are more liable to occur.

The following two tables give the number of patients in the institutions on June 30th, 1938, and the admissions, discharges, etc. for the year ending June 30th, 1938 :—

Institution	Europeans		Native		Mixed Coloured		Asiatic		Total		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Persons
Pretoria	64	31	455	226	57	32	3	4	579	293	872
Mkambati	—	—	117	85	—	—	—	—	117	85	202
Emjanyana	—	—	349	316	—	—	—	—	349	316	665
Amatikulu	—	—	281	167	—	—	—	—	281	167	448
Bochem	—	—	45	32	—	1	—	—	45	33	78
Total ...	64	31	1247	826	57	33	3	4	1371	894	2265

Institution	Admission for first time	Readmission as recrudesced	Discharged	Died
Pretoria ...	215	18	131	97
Mkambati ...	44	11	66	24
Emjanyana ...	255	12	172	84
Amatikulu ...	93	26	35	41
Bochem ...	19	4	11	11
Totals ...	626	71	415	257

Classification of Cases. The institutions in the Union have not yet adopted the method of classification recommended by the recent International Leprosy Congress at Cairo. Much research in leprosy is being done throughout the world, and the use of varying forms of nomenclature is bound to lead to confusion. I would therefore suggest that the use of the international classification would be an advantage both to workers in South Africa and to those outside the Union who seek to benefit by studying the valuable contributions made within the Union to the subject of leprosy.

RESEARCH AND CONFERENCE

In the past many valuable contributions have been made to the subject of leprosy by workers in South Africa. In my tour of the Union I have been struck by the wealth of material available and the strong desire of the doctors to undertake investigations into the many unsolved problems of leprosy. The best treatment is generally carried out by those who are themselves actively engaged in research. Such research, as well as the employment of such important tests as the Kahn and the Sedimentation, would be made possible or facilitated by providing suitable clinical laboratory equipment and African laboratory assistants.

Bacteriological examination should be counted as a part of clinical examination. The skin should be studied clinically with the aid of repeated bacteriological examinations, otherwise a wrong impression is apt to be gained from naked-eye appearance alone. It is therefore necessary for these examinations to be made on the spot.

One of the chief handicaps in the way of research and improved methods is the isolation in which the doctors of the leprosy institutions have to work. This could be remedied by holding yearly conferences in one or other of the leprosy institutions; at these leprosy workers in South Africa could meet, and leprologists from neighbouring countries, such as Southern Rhodesia, might be invited to attend.

LEPROSY IN NIGERIA

The following is the report on a short tour in Nigeria between the 21st of August and the 14th of September, 1939. Its objects were to visit certain of the leprosy institutions, especially those in which agents of B.E.L.R.A.-Toc H are working; to study progress made in leprosy relief and control since 1936, when a previous visit to Nigeria was made; and to attend a leprosy conference called by the Director of Medical Services and held at Enugu from the 28th to the 30th of August. Readers are referred to *Leprosy Review*, October 1936, which records a previous similar tour.

LEPROSY INSTITUTIONS

Eight leprosy institutions were visited : Yada Kunyu (Kano Province), Zaria, Oji River, Uzuakoli, Itu, Ossiomo, Ilesha and Ogbomosho. A few notes are recorded on each of these.

Yada Kunyu Leper Settlement is situated 9 miles to the East of Kano City. It has taken the place of the former settlement at Somaila which was abandoned on account of its inaccessibility and the difficulty of obtaining water. The present settlement was begun 18 months ago by the Sudan Interior Mission, which supplied the staff consisting of the Medical Superintendent, two sisters and an industrial supervisor. The cement-block dispensary, the water supply, the road from Kano and part of the drugs have been provided by Government; while the other buildings, the equipment and part of the drugs have been contributed by the S.I.M. and the American Mission to Lepers. The Native Administration has supplied £841 towards patients' subsistence and drugs.

There were 293 patients at the end of March, 1939. I examined the 27 patients admitted in the last three months and found that 60% were neural cases with tuberculoid lesions, and 22% were lepromatous; so that the proportion of types is similar to that in most other parts of Africa visited.

I was shown a number of lepers, both adults and children, suffering from eye symptoms. In most of these there were signs of either present active trachoma or of scarring and trichiasis, the effects of former active trachoma.

Much progress has been made in this well-staffed settlement, and it is hoped to raise the number of patients to five hundred. Out-patient and educative work is also being undertaken with a view to leprosy control.

The settlement at Somaila was begun along the right lines, and the treatment of patients is now being continued on the same lines and under much more favourable circumstances on the new site. Stress is laid upon occupational therapy, both agricultural and industrial occupation being arranged for. If the number rises to 500, more land will be required. Particular care is being taken

of the children, and it is hoped soon to establish a creche. The lepers themselves are being taught to help in nursing and treatment.

The Native Administration is particularly fortunate in having the Mission to care for the lepers of the province. The same Mission has also leper settlements on similar lines in the Katsina and Sokoto Provinces and is contemplating still further extensions.

Zaria Leper Settlement. This institution was begun by the Government some years ago and was handed over to the care of the Church Missionary Society in October, 1937. It lies some 9 miles to the south of Zaria, adjacent to the Zaria-Kaduna road. It is about 4½ miles from the C.M.S. Hospital at Wusasa, from which it is visited by the hospital doctor. The settlement has resident staff of a Toc H lay worker and a lady sent out by B.E.L.R.A. and, during the latter's absence on leave, a nursing sister from the hospital. The Nigerian Branch of B.E.L.R.A. and the Native Administration have supplied most of the cost of the treatment block, which is a permanent structure. The patients are lodged in huts arranged in rows.

The Native Administration gives an annual contribution of £350 for patients' subsistence, which maintains 107 patients. There are also 31 disabled pensioners in whom the disease has disappeared, who are maintained for the present by special donations from the Native Administration and Europeans in Zaria. The maintenance allowances are handed over to the patients in cash, each of them buying his or her own supplies.

I had an opportunity of examining all the inmates including the pensioners, and classified them roughly into 27 severe lepromatous (L_2 and L_3); 7 slight lepromatous (L_1); 47 neural cases with tuberculoid lesions, 25 of whom showed no deformity or disablement; 36 in whom active signs had disappeared, and 26 in whom signs of present or past leprosy were not discovered.

There was a tendency on the part of some of the patients to act as if they suffered from anaesthetic lesions which, on careful examination were not found to exist. This wishful acting is perhaps to a certain extent a sign of the popularity of the settlement and the aversion of patients to being discharged.

There were 62 patients in whom active lesions could not be discovered, from which may be deducted the 31 pensioners, leaving 31 the most of whom, if further examination fails to show active signs, might be discharged. This would make room for new admissions, and I understand that many patients are seeking admission.

The Zaria institution was begun as an asylum or refuge, and naturally a large proportion of the inmates were hopelessly crippled

cases who had sought refuge in the last stages of the disease. It is always difficult to transform such an institution into a hopeful active settlement to which patients come with the object of recovering and being restored to their normal status in the community. It is much easier to begin a fresh settlement like that at Kano with the latter object in view from the outset.

The lot of the 31 pensioners and such ex-leper patients as, on account of their deformities, cannot be taken back into their homes is a sad one, and humanity demands that they should be cared for; but as long as they are kept in the Zaria settlement they are bound to influence adversely the hopefulness of the institution and prejudice the chance of recovery of otherwise hopeful cases. A suggestion is offered later of a method of arranging for such cases.

As at Yada Kunyu settlement, I found a large amount of eye trouble. Examination of 23 adults showed 3 active cases of trachoma, 6 others with old trachoma scars but no trichiasis, and 7 with trichiasis. In no case did I find the eye condition to be due to leprosy. In 14 children I found 2 doubtful and 6 definite cases of active trachoma and 1 with scars of former trachoma.

The brightest outlook at the Zaria settlement is the organisation of the social side. There are about 40 acres of arable land which have been developed with the aid of the Agricultural Department. But more land is needed if the settlement is to expand and supply food for the patients.

The European resident staff is lodged in mud houses which have been condemned on account of their proximity to a swamp. A suitable site for new houses is available and their construction should be proceeded with without delay. I think it would be wise to make them of a more permanent type and this could be done without undue expense.

With regard to the present distribution of maintenance allowances to the patients, I consider it is a mistake to give these in the form of cash for the following reasons. There is no assurance that the patients use these for their own nourishment; buying at retail prices is always more expensive than buying wholesale; many foodstuffs may be bought more favourably in the cheap season and stored and distributed later.

Many of the neural cases might become arrested quickly through the use of intradermal injections, and by radical operations on their feet for removal of bone. There might thus be a much quicker turn-over of patients and the popularity of the institution would be still further increased.

The B.E.L.R.A. has undertaken to supply a whole-time doctor for leprosy work and he is expected to arrive about the end of the year.

The Native Administration is extremely fortunate in having this leper work undertaken by such an efficient and devoted staff, with so little expense to themselves; but the institution as it stands at present is not an economical proposition. There are hundreds of lepers in Zaria province; they are seeking admission to the settlement voluntarily; the staff is able to deal with far more cases but cannot admit them for want of subsistence money and for want of sufficient farm land, and the health of the staff is endangered for want of suitable quarters. The Zaria province is a poor one, but I believe that every effort will be made by the Native Administration to support the settlement adequately when the above facts are understood.

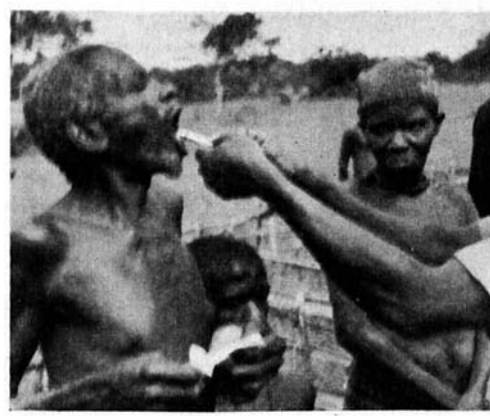

FIG. 10.
OJI RIVER LEPER SETTLEMENT: administering an anthelmintic with a hypodermic syringe.

Oji River Settlement. This institution aims at relieving and controlling leprosy in the Onitsha Province, at the centre of which it is situated; it is distant by 27 miles from Enugu and by 40 from Onitsha town. In addition to 250 in-patients, it supplies out-patient treatment to some 3,000 lepers at Agulu in the Awka Division, Awwa in the Udi Division, and at the settlement itself. It is hoped soon to open other clinics in the Nsuka and Onitsha Divisions. At present the staff has been almost overpowered with the voluntary attendance of out-patients, but it is hoped as soon as possible to organise from these clinics as centres, educational and preventive work in the villages, and at the same time gradually complete a survey of leprosy in the province. These clinics are conducted by the doctor and the lay workers, with the assistance of the African staff, consisting chiefly of suitable patients who have been trained for the work.

The central buildings include a hospital and treatment centre. The patients live in huts of the native style.

The staff consists of a doctor, two or three B.E.L.R.A.-Toc H lay workers and a nursing sister. The settlement is conducted by the Church Missionary Society. The doctor is supplied by the Halley Stewart Fund through B.E.L.R.A. The Leprosy Association provides the rest of the European staff and are supplying a second doctor towards the end of the year. The staff are housed in excellent permanent houses.

As from April, 1938, the Native Administration of the province are supplying for three years the sums of £1,500, £1,700, £1,700, for general maintenance, including £130 a year for the maintenance of patients who are unable to support themselves.

The rule is adhered to as far as possible that each patient has to pay each year £2 for the services of the settlement, including the hire of farm land. Able-bodied patients earn ninepence to half a crown per week by doing four or more hours work a day on the settlement farm, or in other work of the community. Suitable work at similar wages is provided for those who are less able. Weak patients are admitted to hospital and when necessary are exempted from the annual fee; they are also put on special diet during the time they are in hospital.

Land, averaging ¾-acre each, is given to patients according to their ability to cultivate it usefully. Thus patients maintain themselves on their wages and on the produce of their own farms, the disabled being assisted according to the degree or nature of their disablement. The communal farm is used to try and instruct (so far with poor results) the patients in improved methods of farming; in this the Agricultural Department has given much help.

Many more patients could be admitted if funds were available, and it is expected later to raise the number to 500. In the meantime not only are large numbers of patients being treated, but valuable public health education is going on, and the people and their chiefs are becoming conscious of the nature and seriousness of leprosy, and that through simple means within their control it can be prevented.

The work of the settlement is well organised, each member of the European staff being responsible for one or more departments. As farming and industries develop approximation to self-support may be reached. Negotiations are under way for an additional 100 acres of land adjacent to the settlement, and on the south side of the Enugu-Onitsha road. Acquiring this land will increase the scope of the farming, and will also make it possible to control the breeding places of mosquitoes and make the settlement more healthy as regards malaria for both staff and patients. This, I

consider, an important point, and it is to be hoped that the land will be acquired without delay. The absence of towns and villages within a radius of five miles has made the acquisition of land easier than in other places.

The Oji River Settlement is planned upon different lines from other leper institutions. The settlement is not an end in itself, but a centre for treatment of special cases and for training of staff, with the ultimate object of getting at the root of the problem and stamping out leprosy from the province with the help of the people themselves. These methods, which have for some time been employed in India, are worthy of study by others engaged in anti-leprosy work.

Uzuakoli Leper Settlement. This Native Administration Institution is situated in the Owerri Province, some 75 miles south of Enugu.

The Medical Superintendent is a missionary of the Methodist Mission and he is assisted by two Toc H lay workers supplied by B.E.L.R.A. and four non-leper Africans. The rest of the work is done by patients. There are eleven hundred patients housed in neat rows of sanitary huts, arranged in villages within the Settlement.

The hospital, treatment centre and other administrative buildings and the European Staff quarters are of a permanent type, and have been erected chiefly with the labour of patients.

The treatment arrangements are excellent, including occupation therapy in all its forms and communal physical exercises. Agriculture and industries make the settlement partly self-supporting. The annual expenditure on running expenses, including the doctor and the rest of the staff except the two Lay Workers, is only £3,000. Of this sum £1,500 is paid by the Native Administration, and £800 by Government. The settlement might be made even more self-supporting but for the fact that more than 50% of the patients are of the severe lepromatous type, many of whom are incapable of doing more than very light work. This, the infectious type of leprosy, is the chief danger to the community and it is felt that as many of them as possible should be segregated in the settlement.

Excellent teaching and training are provided for the patients, many of whom are able to help in administrating treatment and in carrying out leprosy control methods in the villages.

The Settlement has made considerable progress since my last visit in 1936. One of the most important developments is along the lines of survey, village prevention, and out-patient clinics. Many patients continue to seek admission to the settlement, but the numbers have had to be limited. Out-patient treatment in villages

is in great demand and is gradually being introduced, but only in places where the whole-hearted co-operation of the people and their chiefs has been obtained. It is felt that treatment alone will never control leprosy if those under treatment are at the same time infecting others in their own homes.

In this direction a very interesting experiment is being made in educating the community and introducing self-help in the villages. A village is chosen where the co-operation of the chief and people is assured. A building for a clinic is erected by the villagers. A house to house survey is made, all cases of leprosy being noted down. The village has to supply land for the erection of a hamlet where all these lepers can be segregated and can cultivate their crops. This hamlet is erected by the lepers themselves under the direction of the settlement staff, a suitable trained patient from the settlement being left in charge of the work. At the same time a weekly clinic is started and a patient is left as dresser to attend to ulcers and to see that patients remain properly isolated. Default in this respect is penalised by refusal of treatment, which is regarded as a serious punishment, so highly is treatment prized. Already seven such out-clinics have been begun. I had an opportunity of visiting one of them and was greatly taken with the enthusiastic spirit of the people, both patients and others. I found the new leper hamlet a well laid out spacious hamlet, with roomy huts, a simple but effective model in sanitary village building.

This plan of controlling leprosy is still in the experimental stage, but it seems to get down to the very roots of leprosy control. It has been made possible by the very modest grant of £120 from Government, which is more than used up in transport, drugs and the salaries of the African staff. Under the doctor the work is in the charge of one of the Toc H lay workers. I would emphasise the importance of this experiment, not only for its leprosy control value, but also as an effective general public health measure. I consider that it should receive very active support from the Native Administration and Government.

The Uzuakoli Settlement is thus much more than a well-organised centre for segregation and treatment of lepers. It is rather the hub of a wheel which is gradually radiating into the village life of the people. It is a centre of training of leprosy patients who are found to be the most enthusiastic and efficient apostles of anti-leprosy methods. Its sanitary village planning is gradually " taking on " with the people. What astonishes one most is the modest cost at which all this is managed, though doubtless with more resources it could be more rapidly expanded and more effectively done.

Itu Leper Settlement. This institution was founded in 1928 by Dr Macdonald, of the Church of Scotland Mission. It was the first in the country to be begun in the form of an agricultural settlement, and later institutions have been modelled on similar lines.

The institution is fortunate in having abundant land, the extent of which has now risen to three square miles; this, along with the industries, makes it possible to develop self-support to a very great extent. The products of agriculture and industries last year were valued at £1,125.

FIG. 11. Oil inunction at Itu Leper Settlement.

The European Staff consists of the Medical Superintendent and an Industrial Worker, for whose support an annual grant of £1,000 is given by Government, and two Toc H workers supplied by B.E.L.R.A. The Medical Superintendent's wife is a trained nurse and has trained the African nurses. A further grant of £1,000 is given by Government and a capitation grant of £700 by the Native Administration. The African staff consists of two non-leper dispensers and 5 nurses for the creche; also a laboratory assistant, headmaster and engineer, who formerly suffered from leprosy. Otherwise all the work is done by the patients themselves.

There are at present in the colony some 2,200 patients. Of these some 400 are unable to do more than occasional or light work. They include some 80 hospital patients and the school children; the latter are employed for two hours a day on the work of

the settlement. Able-bodied patients do two days' work a week in return for service received. They also are given work for which they are paid on a contract basis and are employed for two out of every three weeks for about 35 hours a week. The older children are employed, some 52 at a time, as temperature-takers, for which they are paid at ninepence a week. The large majority of patients have to bring £3 when admitted to the settlement to pay for their food during the first three years, after which they have to collect £1 a year from relatives if longer treatment is required. This, unfortunately, excludes the poorer type of patient, but it has been found the only method practicable under present financial conditions.

FIG. 12. ITU SETTLEMENT: the children's daily ration.

The principal crops raised in the Settlement consist of yam, coco-yam, casava, rice and palm-oil, with subsidiary crops of hydnocarpus, ground nuts, pawpaw, soya and various vegetables. Industries consist of palm-oil, timber, soap manufacture, etc.

There are a large school for the children and two adult schools, an excellent brass band, and such activities as Scouts, Cubs, Guides and Brownies. The church holds 1,800, and is usually crowded at services.

The discipline of the settlement is maintained by a leper court and leper police. The whole place is excellently organised as regards treatment, finance, and the social, mental, physical and spiritual life of the people. It must have a profound effect on the

life of the country through returned patients who have spent several years in the settlement.

Unfortunately, the greater part of this influence is likely to be exerted in other parts of Nigeria rather than close at hand. Only about 350 to 400 patients come from among the Efik-speaking people of Calabar, the great majority being from other provinces. The Efik people are apparently a servile race, having formerly been slaves and sufferers from the slave trade. In consequence it is harder to win their co-operation in a campaign against leprosy than among Ibo tribes in the Owerri and other provinces; and yet a survey of 4,626 people showed an average incidence of at least 7.6 per cent., which, if it holds throughout, would mean a total number of some 76,000 lepers in Calabar Province. How this huge incidence is to be dealt with on a provincial basis is a matter requiring careful consideration.

Ossiomo Leper Settlement. This institution is situated in the Benin Province, and receives patients from Benin and Warri Provinces. It was begun originally as an asylum of the old type, the most of the inmates being disabled and either unwilling or unable to work. Five years ago, Dr. Lengauer was appointed as Medical Superintendent and set about transforming the institution into an agricultural settlement on the lines of Itu and other modern leper settlements. In this work she has been badly handicapped by the tradition of the original patients. It is always easier to form an agricultural settlement from the beginning than to transform an already existing asylum. The site is a most unsuitable one. The land is inadequate and more is difficult to obtain. The soil is of a poor quality. Apart from a limited amount of rain water collected from the roofs of the permanent buildings, the water has to be carried from a stream more than a mile distant.

In spite of all these difficulties much progress has been made in the last three years since my former visit (*Leprosy Review*, 1936, p. 180). There are now 325 in-patients and 75 attend regularly as out-patients. Of the 325 in the settlement, 112 are lepromatous (34 per cent.). Although the number of patients has increased, the Native Administration grants are still the same, and 55 of the patients have been admitted on a self-supporting basis. Large numbers of patients, especially of the lepromatous type, present themselves for admission, but during the last six months it has been necessary to turn away 100 cases for lack of accommodation and funds. These applications for admission have increased considerably since 11 patients were discharged as disease-arrested 18 months ago.

The income of the settlement is derived as follows:—

	£
Native Administrations (Benin and Warri Provinces) ...	1,590
Government, through Nigerian Branch of B.E.L.R.A.	50
From paying patients	100
From farms	20

Of these sums £550 supports the Medical Superintendent and her two European assistants (a nursing sister and a welfare worker); £600 is spent on the subsistence of patients; £120 on drugs; £80 on bedding and clothing; £40 on repairs to buildings; £60 on the clerk and messenger. The patients are given one shilling a week, except 42 who get sixpence and a few who are entirely self-supporting. In the creche there are 18 babies of lepers. Of the patients, 224 are men, 60 women and 43 children.

An " Ossiomo Aid Society " in Belgium renders some financial help from which school teachers, home passages and various services are met.

From what Dr. Lengauer tells me I gather that leprosy is very prevalent in the Benin and Warri Provinces. As an example, in three villages with a population of about 2,800, some 60 lepers presented themselves voluntarily on one visit, although there was at the time pouring rain; presumably there were many more.

Lepers driven out on becoming disabled or disfigured sometimes form themselves into separate village communities. Of these there are known to be seven, with a total population of about 192 cases. The condition of these people is pitiable as nothing is done for them. Many wander about and the women are often found trading in the markets.

The people themselves say that formerly they drove out all known lepers and that then leprosy was less; now they are allowed to remain in the villages as long as they are able to work, and leprosy is accordingly increasing. Some signs of co-operation are, however, found; for instance, one chief has sent an intelligent youth to be trained at his expense at the settlement, with a view to controlling leprosy in his village.

There is no doubt that in these provinces leprosy is a major problem, and that, if anything effective is to be done to control it, the devoted work at Ossiomo will need to receive considerably more support.

Ogbomosho Leper Settlement. This is the only settlement in the Yoruba country. It is situated a few miles outside this city of some 80,000 inhabitants, and is run by the American Baptist Mission, who receive a grant of £330 a year from the Native Administration.

There are at present 75 in-patients living on and farming the 180 acres of settlement land. There are also 150 out-patients who attend for treatment and live in small farms which they cultivate in the neighbourhood of the settlement. With a few exceptions these patients come from the Oyo Province, in which the settlement is situated.

With the help of the Agricultural Department, crop rotation and the use of macuna (green manure) is being attempted. It is found that the patients, those both inside and outside the settlement, with the exception of the few who are unable to work, are able to support themselves by cultivation. The patients, on the whole, appear to be well nourished.

Until six months ago patients were refused admission unless able to work. At present about 50 per cent. are lepromatous, and 50 per cent. neural cases, chiefly with tuberculoid lesions. I was surprised at the large proportion of major tuberculoids, some of them in a state of active reaction.

Many patients seeking admission are turned away, as the Administration has set a limit to the number in the settlement. Among the complicating diseases of admitted patients trachoma and pyorrhoea are not uncommon.

It is commonly reported that leprosy is much less frequent among the Yorubas than elsewhere in Nigeria. I understand, however, from Dr. Glenn Walker, the Medical Superintendent of the settlement, that there is probably far more than is generally supposed. He states that a chief who is asked if he has any lepers in his town, denies the fact according to the custom of the tribe, it being considered wrong for a Yoruba chief to disclose any defects among his people. Where chiefs have denied cases, numbers of lepers have been found in the neighbourhood of his house.

I understand that, though funds are available, the authorities are opposed to increasing the grants or the number of patients in the settlement until a survey has been made to determine the number of lepers in the province. One of the resolutions at the Enugu Conference was to the effect that " detailed surveys employing special staff are undesirable if not associated with the offer of treatment." This would apply more especially to the Yorubas, who generally have a town and a farm residence, and can therefore easily withdraw from the one to the other to escape detection if their suspicions as to the objects of a survey were once wakened. The only feasible method of forming an idea of the incidence of leprosy is by forming clinics at different suitable centres throughout the province, and attracting patients by giving them treatment. It would probably be necessary at the same time to attach a certain amount of arable land to each clinic, as the patient who attends is

liable to become publicly known as a leper, and it is the custom to drive the publicly known leper from his home. Dr. Walker contemplates gradually founding such clinics, and I consider that he should be given facilities, financial and otherwise, for taking this step. It appears to be the only immediate means of advancing anti-leprosy work and ascertaining the seriousness of leprosy in the Oyo Province. To help in the conduct of clinics, Dr. Walker has begun training some of the more intelligent patients at the settlement.

I disagree with the suggestion that the leprosy problem should be shelved until the improvement of general hygiene and nutrition has caused it to disappear; the experience of other provinces mentioned in this report exposes the fallacy of this point of view.

With a view to developing clinics, Toc H workers were supplied by B.E.L.R.A. to the Ogbomosho Settlement and have done good work there; and I would recommend that if and when the Administration encourage a forward policy and ask for the return of Toc H workers, B.E.L.R.A. should consider such a request favourably.

THE ENUGU LEPROSY CONFERENCE

A conference on leprosy was called by the Director of Medical Services. It met from the 28th to the 30th of August, 1939, and the sessions were held at the Club at Enugu on the first two days, and at Oji River Leper Settlement on the last day. Grants were given by B.E.L.R.A., London, and by the Nigerian Branch, towards the expenses of the Conference. Delegates attended from almost all the leper institutions in the country, and the following were also present: H.H. the Chief Commissioner of the Northern Provinces, the Resident of Onitsha, the Superintendent of Agriculture, and the Assistant Director of Education. Unfortunately the Director of Medical Services was prevented by important matters from being present. At the first session the delegates were welcomed by H.H. the Commissioner of the Eastern Provinces. An introductory address from Sir R. Briercliffe, the D.M.S., was read by Dr. Naudi, the S.M.O. Kano, who acted in his absence as chairman of the conference.

It is hoped to publish in the next issue of *Leprosy Review* a detailed report of the conference; the following are the titles of the subjects discussed :—

(1) Settlement Organisation.

(2) The Organisation of Leprosy Control in Nigeria.

(3) Some Problems of Research Work.

(4) The Organisation of Leprosy Workers in Nigeria, with reference to the use of Lay Workers.
(5) Field Survey Work in connection with Research and Control.
(6) Diagnosis, including Differential Diagnosis of Leprosy, as seen in Nigeria.
(7) The Leprosy Problem as it affects Children.

On the third day a visit was made to Oji River Leper Settlement and to the Awwa Out-Patient Clinic connected with that settlement. Cases were demonstrated and discussed.

Appreciation was expressed of the usefulness of the conference, though it was felt that the time allowed was too short.

The following Resolutions were passed by the conference :—

1. That powers be taken to enable control of the area surrounding a leper settlement to be made effective for the creation and preservation of healthy conditions.

2. That this Conference recommends that the form of financial and statistical returns adopted by the Nigerian Branch of the British Empire Leprosy Relief Association be used in all leper settlements.

3. That this Conference commends to the attention of Provincial Leprosy Boards the statement in the Cairo Leprosy Congress Report that " the present view is that the open case constitutes the greatest danger to the public health, and therefore such cases should be prevented from contact with healthy persons, especially children."

4. That, apart from a general enquiry through existing services, detailed surveys employing special staff are undesirable if not associated with the offer of treatment, and this Conference commends to the attention of the Provincial Leprosy Boards the Propaganda-Treatment-Survey System (Reference—*Leprosy in Nigeria*—Muir, 1936).

5. That we desire to stress the importance of research work in leprosy, particularly the assessment of the factors which comprise the resistance of the individual to the disease and the relationship of resistance to such questions as the type of disease, age groupings, nutrition and complicating diseases.

6. That all leprosy workers in Nigeria be encouraged to submit to the scientific sub-committee of the Nigerian Branch of B.E.L.R.A. reports (preliminary or final) of investigations or observations which they have made.

7. That each province (where it does not already exist) appoint as soon as possible a representative Leprosy Board to formulate and carry into effect schemes for leprosy control and relief upon a provincial basis.

8. That administrative officers should be invited to co-operate to a greater extent in anti-leprosy work, and that facilities should be provided for their training at leper settlements.

9. That the Education Department should be represented on Provincial Leprosy Boards and should be kept informed periodically of the development of leprosy work in the various provinces; that special training should be given in training colleges, including visits to leper settlements; that it is desirable that leprosy should be included among the subjects upon which teachers are examined.

10. That facilities should be provided, as need arises, for leprosy lay workers to obtain special courses of training under the Agricultural, Forestry, P.W.D., Health, Veterinary, and other Nigerian departments, and that organisations sending out lay workers to leprosy institutions should consider arranging for courses of instruction at home in such subjects as book-keeping, building, photography, carpentry and scouting.

GENERAL REMARKS

Policy of Leprosy Control and Relief. During the last three years, since my previous visit to Nigeria in 1936, considerable progress has been made both in determining policy and, in some provinces, in carrying it into effect.

(1) In Northern Nigeria, leprosy work, formerly under the supervision of Government Medical Officers, has been handed over to missions: that at Maiduguri to the Sudan United Mission, those at Kano, Katsina and Sokoto to the Sudan Interior Mission, and that at Zaria to the Church Missionary Society. These missions have supplied doctors, sisters and lay workers, and favourable results are beginning to appear. I consider that the Administrations concerned are very fortunate in having this difficult work so efficiently undertaken at a minimum cost to themselves, and that, while the convictions of Mohammedan authorities should be respected and safeguarded, the missions should be encouraged in every way possible in undertaking and extending this useful humanitarian work.

In the South Eastern Provinces, the missions in charge of leper settlements have considerably extended and developed their work.

(2) Another principle has been accepted that leprosy should be organised on a provincial basis and under a Provincial Board. This principle has not yet, however, been effectively carried into practice. One of the resolutions of the Enugu Conference recommends that each province (where it does not exist) appoint as soon as possible a representative Leprosy Board to formulate and carry into effect schemes for leprosy control and relief upon a provincial basis; another resolution is " that administrative officers should

be invited to co-operate to a greater extent in anti-leprosy work, and that facilities should be provided for their training at leper settlements ' ; another resolution is ' that the Educational Department should be represented on Provincial Leprosy Boards and should be kept informed periodically of the development of leprosy work in the various provinces, that special training should be given . . .''; a third resolution refers to co-operation of the Agricultural, Forestry, P.W.D., Health, Veterinary and other departments.

From the above it is clear that much effective help can be obtained from various Government departments, and it will be well if these resolutions are carried out and representative Boards appointed in all provinces where leprosy is a serious problem, that these Boards should meet at regular intervals, and that the leprosy experts in each province should keep the Board fully informed of progress, and should work out schemes for the co-operation of various departments to be submitted for consideration of the Board.

The training of teachers regarding leprosy is a particularly important method of reaching the public, and leprosy is not likely to diminish until the public understands the danger of leprosy and the simple methods by which that danger can be averted.

Much also can be done by administrative officers in their daily contact with the people if only they are fully acquainted with the nature of leprosy and its control.

(3) A third development in anti-leprosy policy is that of using the leper settlement not only as an end in itself, but also as a centre of training and enlightenment, from which anti-leprosy work may be extended to the villages. Though still in an experimental stage, enough has already been done to show the importance of this line of attack if leprosy is to be brought under control. The exact methods to be adopted will necessarily vary in each province according to the customs of the people and the degree of co-operation they are willing to give.

But it is obvious that if, as is now computed, there are some 400,000 lepers in Nigeria, and if of these 50 to 100 thousand are open infectious cases, only a small fraction of lepers can ever be segregated in leper settlements. The final control must therefore be delayed until the people at large become " leprosy conscious," and this state can best be attained by an effective system of practical training centred in the leper settlement. Actual practical demonstrations of how leprosy can be controlled in a limited area are likely to have more effect on the mind of the natives than any amount of theoretical teaching. Examples of these methods are shown in the descriptions of the Oji River and Uzuakoli Settlements.

As mentioned above, the administrative, educational and other departments can do much in forwarding this object.

(4) The effectiveness of treatment and control work is generally enhanced by linking it with original investigations along well thought out lines. Dr. Davey's paper at the Enugu Conference was an able exposition of what investigations should and what should not be undertaken in connection with a leper settlement. Many problems still await solution. Some of these, such as cultivation and experimental inoculation of the bacillus, require well-equipped laboratories, considerable equipment and specialised personnel; these can only be undertaken at special centres. But there are many other problems, such as identification of types of lesions and their subsequent course, the reaction of types of cases to treatment, both general and special, and the whole question of resistance to the disease, which can only be undertaken effectively by whole-time expert workers who remain for a series of years in close touch with the people in a leper settlement. Another important subject for investigation is the causes of high and low incidence as found in different districts; this includes the systematic study of anthropological, social, economic, nutritional and other problems; but definite results arrived at should be of immense value in controlling leprosy. Resolutions of the Enugu Conference, Nos. 5 and 6, have special reference to this subject and it is hoped that leprosy workers in Nigeria will keep in touch with the Scientific Sub-Committee of the Nigerian Branch of B.E.L.R.A., which should be able to give advice and co-ordinate investigations in different centres.

(5) In going round the various leper settlements, I was impressed with the devotion of those engaged in the work, but felt that in many places the effectiveness of the work could be considerably increased by expert advice and training. With this in view I would suggest that periodic courses of training be held at such centres as Oji River, Uzuakoli and Itu. The duration, nature and other details of the course could be worked out in detail by the Nigerian Branch of B.E.L.R.A. If this is arranged I would recommend that a grant towards the expenses be made by B.E.L.R.A., London. Much help could also be given by the leprosy expert of the Nigerian Branch visiting the more recent settlements.

(6) Much appreciation has been expressed of the work done by the Lay Workers sent out by B.E.L.R.A.—Toc H. Suggestions for the further training of these and other Lay Workers are made in the tenth Resolution of the Enugu Conference.

(7) Arrangements have been made for buying hydnocarpus oil in bulk from a reliable firm in India and, after preparation, distributing free to all leprosy institutions. This oil, which is cheap, non-irritant and comparatively stable, has been found to be as effective as more expensive preparations.

LEPROSY IN CYPRUS

On the invitation of the Director of Medical Services, I paid a short visit on September 21st, 1939, to the Island of Cyprus. The visit lasted only four days and I could not gain more than a general idea of the problem of leprosy in that time.

THE AMOUNT AND TYPES OF LEPROSY

In Cyprus segregation of lepers is compulsory, and there are at present 122 cases segregated in the leper farm outside Nicosia. Of these nine were absent on leave, but I had an opportunity of examining 71 men and 42 women and classifying them according to the type of the disease and according to whether or not they were deformed and disabled as shown in the table :—

Type.		*Men.*	*Women.*	*Total.*
Advanced lepromatous	Deformed	15	15	30
(L_2 and L_3)	Undeformed	21	16	37
Mild lepromatous	Deformed	7	3	10
cases (L_1)	Undeformed	14	1	15
With Tuberculoid	Deformed	1	—	—
lesions (N_1)	Undeformed	—	1	1
With only residual	Deformed	9	4	13
lesions	Undeformed	3	2	5
Without leprosy		1	—	1

The remarkable feature of these figures, when compared with similar statistics from institutions in Africa and India, is the great preponderance of lepromatous cases, that is of the severe open type associated with low resistance to the disease. There were only two cases of the neural resistant type with tuberculoid lesions. Taking only the active cases, the lepromatous type forms 98 per cent. of the whole; whereas in the African institutions it forms only 25 to 50 per cent., and in surveys made in India it is in a still smaller proportion. Only in the European patients in the Pretoria Leper Settlement in South Africa have I found a similar state of affairs; whereas the native population of the same institution gave only twenty-five per cent. of lepromatous cases. This would suggest at first sight that the lepromatous type preponderates among light coloured races, while the neural type is more common among dark coloured races. But this is not confirmed by findings elsewhere, as for instance in Malaya where the major tuberculoid type of lesion is more common among light-coloured Chinese than among dark-coloured Tamils. To what extent a systematic survey of leprosy throughout the island would reveal a higher proportion of this

latter form remains to be seen. I was informed of 40 cases formerly in the leper farm but now on parole, and presumably the most of these would have been of the neural type.

DISTRIBUTION

No attempt at a survey of leprosy has yet been attempted, and the only indication of the distribution of the disease is the towns and villages from which the patients have been admitted to the Leper Farm. I obtained information of 188 cases; of these 121 are resident in the farm, 14 on parole and 53 dead. These are distributed among 91 families as follows:—

Number of present or former acknowledged lepers in family.	*Number of families.*	*Total cases.*
1	45	45
2	25	50
3	5	15
4	7	28
5	4	20
6	5	30
Total	91	188

Besides the 188 cases mentioned above, there are 26 other known cases on parole. These and the first mentioned 14 cases on parole report to the doctor once a month.

Another remarkable feature is that none of the cases come from the larger towns, confirming the usual finding that leprosy is a disease of the villages, and when found in towns it is chiefly by migration from villages. The 91 families mentioned above belong to 56 villages distributed all over the island. The region with most infected villages is round Paphos, and that with fewest infected villages is Tilliria to the north of the latter. Whether this comparative exemption from leprosy in Tilliria is due to the proximity of the copper mines is a matter for investigation.

The wide distribution of leprosy foci, and the fact that the great majority of cases are of the open, infectious type (67 being of the most dangerous L_2 and L_3 type), would suggest that there is ample opportunity for the spread of the disease, especially as in the villages there is considerable housing congestion and the people tend to be promiscuous in their habits. There are two other factors which would increase this danger. Most cases, though highly infectious, have not the nodular but the diffuse type of lepromatous lesions, which are not conspicuous and tend to escape detection till they are far advanced. Also most cases are in an advanced stage of infectiousness before they are admitted to the leper farm There-

fore the present system of segregation does not get down to the root of the problem; it only removes a limited amount of the infection from contact with the population.

On the other hand, a fairly reliable index of the frequency of leprosy in a community is the number of deformed cases that are found, and I am told that there are comparatively few in the villages throughout the island.

SURVEY

The above facts leave one in doubt as to the incidence of leprosy and the question as to whether or not it should be considered as a serious problem in the island. The only way to answer this question is by carrying out a careful survey.

This might be most effectively done by examination of contacts with known cases, and where necessary this might be supplemented by examination of school children. Compared with other public problems in the island, such as malaria, tuberculosis, malnutrition and trachoma, leprosy may be a minor one. It is one, however, which, if thoroughly investigated and dealt with for a few years, could be brought under effective control. I understand that leprosy in Cyprus is not regarded with horror to the extent that it is in other places. It is generally found that when a population becomes ' leprosy conscious ' the disease tends to die out. Thus a survey should be accompanied by education of the people with regard to the nature of leprosy, its dangers and how they can be avoided. To carry out a thorough survey it would be necessary to employ an expert doctor for a number of years. I would suggest that the British Empire Leprosy Relief Association should, if possible, assist in the provision of such a doctor. Possibly the survey of other diseases might be included in his duties.

THE LEPER FARM

The present accommodation of the farm is only sufficient for 100 patients. The admission of the present 122 cases has thus led to a certain amount of congestion, and some cases have had to be refused admission. If a survey were carried out there would presumably be need of considerably more accommodation.

The present *staff* consists of a part-time doctor, a matron, a lay superintendent, and a lay worker supplied by the British Empire Leprosy Relief Association to organise the social activities of the patients. There is also one female nurse and there are four guards. I consider that the efficiency of the treatment could be improved if the doctor were free to attend the farm at least three afternoons in the week.

The *compulsory system,* which in the British Empire is in force in only a few places such as South Africa, Cyprus and Malta, has certain distinct disadvantages. When admitted to an institution against his will the patient tends to take up the attitude of non-co-operation. In effect he says : " you have brought me here against my will, it is up to you to do everything, I shall do nothing." This attitude is fatal in leprosy as regards the discipline of the institution and the chance of recovery of the patient. We have no " specific " for leprosy. The treatment consists of improving the physical and mental condition of the patient to the highest possible standard, and when this is attained the special treatment with chaulmoogra injections is of great value. On this account the nonco-operating patient with a grudge is not likely to benefit from treatment.

The present *site* of the farm is contrary to several of the generally accepted requirements. Among these requirements are: plenty of arable land and of water; not so near to a town or village that the patient will trespass there. The present site lacks both arable land and water and is far too near to Nicosia. Removal of the farm to a more suitable site has been contemplated for some time, and I consider that this should be done as soon as possible so that fresh accommodation may be prepared for new patients admitted as a result of the survey. This could be done at a minimum of expense by making the patients' houses with help of leper labour, and in the usual Cypriot style, only more sanitary.

The *labour* and the *social life* of the patients should be carefully regulated. In the most successful leper institutions a patients' committee is formed to maintain discipline and organise the social and other activities of the patients. With this in view the British Empire Leprosy Relief Association sent out a Toc H worker about a year ago. Unfortunately he has not yet so far succeeded in this aim. It takes some time to alter the *prison spirit* which a compulsory institution is apt to assume. On a new site, with abundant facilities for agriculture to which most of the patients are accustomed, and with the houses arranged in the form of a model village rather than as a barracks as at present, it should be possible to organise the farm on modern lines. In this way the sting would be taken from compulsion, the farm would attract patients, and the need for compulsion with all its evils would gradually disappear.

The patients are at present given a *money ration* of one shilling a day. I consider that able-bodied patients should earn a portion of their ration by their work. Also, in return for the service rendered them by the institution, they should do a certain amount of work for the community such as road repairs, growing of communal crops, etc. They should have land allotted to them for their farms,

the produce of which they can eat themselves and sell the balance to the institution. Patients temporarily disabled from work should be removed to the institution hospital and actively treated till they are well. Specially prepared food should be supplied them in the hospital. Patients should be excused from work only on the doctor's certificate.

In addition to the exercise provided by work in the fields, there should be daily *physical exercises* for all who are fit. These should be carefully regulated so as to remove and prevent deformities and render the patients as physically fit as possible. These exercises should form a regular part of the treatment in the morning in the same way as the special treatment by injections, etc.

Many of the patients could be considerably improved by hospitalisation for the treatment of ulcers, and by operations for removal of bone. The treatment of eyes should be attended to; some are suffering from actual leprous infection of the eye, but a greater number from ectropion as the result of nerve leprosy, or from trachoma, entropion and trichiasis.

SUMMARY OF SUGGESTIONS

1. That the present leper farm be replaced by a new settlement on a suitable site.
2. That the present compulsory system be modified by making the settlement more attractive, and encouraging the patients to co-operate.
3. Improvements in treatment would also make the institution more attractive by hastening the recovery of patients.
4. A survey combined with an educational campaign should be carried out.
5. The necessary modification of staff should be made so that these measures are possible.