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CONTENTS.

Edited for the British Empire Leprosy Relief Association, 115 Baker Street, London, W.1, by E. Muir, C.I.E., M.D., Medical Secretary, to whom all communications may be sent.

INTRODUCTORY EDITORIAL NOTE

Two of the objects of the British Empire Leprosy Relief Association are to study leprosy as it occurs in the various territories of the Empire, and to advise Governments, missionaries and others concerned as to the best methods of dealing with the disease.

With this in view Mr. Oldrieve, the original secretary of the Association, made an extensive tour in Africa in 1927, and Dr. Cochrane, then the Medical Secretary, visited the countries of East and South Africa in 1930.

In continuation of these tours, and on the invitation of the Colonial Office and various Local Governments, the Medical Secretary of the Association spent over six months of 1938 visiting various countries, especially in East Africa. In each country visited there was an opportunity of discussing leprosy and related subjects with the medical, administrative and other authorities, as well as with missionaries and those engaged directly in anti-leprosy work.

The findings in each country, along with suggestions put forward, are embodied in separate reports, copies of which were sent to all directly concerned. A desire has been expressed by the Medical Adviser to the Colonial Office and by others who have read these reports that they should be published in book form, so that they may be more widely circulated and remain on record.

They have therefore been embodied in the current *East African Number*. The reader will find the reports arranged in the order of countries visited—Malta, Anglo-Egyptian Sudan, Belgian Congo, Uganda, Kenya, Tanganyika, Zanzibar, Aden, British Somaliland. Egypt was also visited in connection with the International Congress of Leprosy, reports of which have appeared in the last two issues of the *Leprosy Review*. The Malta and Aden reports, though not belonging to East Africa, have been inserted as these places were included in the itinerary. Some photographs taken during the tour have been added to illustrate matters mentioned in the text.

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Taking north east Africa as a whole and studying the countries referred to, the southern Sudan appears to be almost the only part to have escaped serious infection. This is possibly on account of the sparseness of the population, their nomadic life, the difficulty of communications and the consequently less close mixing of the people with one another. The diet of the nomad, with its milk

and occasional meat, has also been suggested as a cause of their comparative freedom from the disease. But perhaps as important a factor as any is the hard life they live which is against the survival of the unfit, the leper tending to fall out quickly before he can spread infection to any great extent.

An area of high endemicity centres in the North West part of the Belgian Congo and extends over the Equatorial Province of the Sudan, and the western part of Uganda. The most of the Buganda Province of Uganda is comparatively free from leprosy, doubtless on account of the intelligence, education and activity of the people. But again in the east of Uganda and the neighbouring Kavirondo District of Kenya Colony, round Mt. Elgon and the north-east shores of Lake Victoria, leprosy is very rife. Among the active natives of the Kenya uplands and mountains leprosy is not very common, but among the Wadigo and Wadaruma of the coast it again increases in amount. While leprosy is found in almost all parts of Tanganyika Territory, it appears to be most common in the Southern Province.

A curious phenomenon was noticed: the severity of leprosy in an area does not always correspond with its frequency. This is particularly remarked on in the Congo report. It would appear as if the promiscuity and insanitary habits of the people led to a very widespread infection, even those with higher degrees of natural resistance acquiring the disease, though in a comparatively mild and often abortive form; whereas in more sanitary surroundings and with less frequent and close contacts only the less resistant members of the community acquire the disease, and the proportion of severe cases is greater. An alternative explanation is that the Central African strain of leprosy bacillus may be of a milder nature than that found elsewhere. It would be interesting to know what proportion of mild cases prove abortive, and if there is a direct ratio between the proportion of mild cases and that of abortive cases. The repeated and extensive surveys of the Belgian *Croix Rouge,* made at intervals of one or two years, should bring out some important findings bearing on these two questions.

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As elsewhere, the bulk of anti-leprosy work is being done by religious missions, the funds being chiefly supplied by Government or Native Administrations. Among the exceptions to this are the excellent Government settlement at Li Rangu in the Equatorial Sudan, the well-run camp at Kakamega in Kenya, and the smaller camps at Msambweni (Kenya), Dar-es-Salaam, Zanzibar and Berbera (Somaliland).

The first essential for a successful leprosy institution in Africa is a whole-time expert enthusiastic worker, whether it be doctor, nurse or lay worker. The second essential is building up on a voluntary system an institution where cheerfulness, usefulness and hopefulness are the outstanding characteristics. The most striking instance of such work is that of Miss Laing at Kumi and Ongino.

The place of religious missions in anti-leprosy work is a most important one, as it calls for sacrifice, patience and high ideals. Wherever I went I was impressed by the selfless devotion of those who had given their lives to this work. On the other hand, occasionally religious bigotry and narrow self-interests were blighting, or at least hampering, work which would otherwise have been of the first order.

* * * * *

Much has been said for and against the leprosy *out-patient clinic*. Often too much reliance is laid on injections of chaulmoogra, as if this drug had a specific effect and would benefit the patient whatever his general health; whereas, if the patient is under-nourished or is weak with complicating conditions, the walk to the distant clinic or even treatment with injections may be positively harmful.

But under certain circumstances out-patient clinics may be of definite value: (a) when the patients are well-nourished and strong they may benefit from the walk to the treatment centre, and the injections may be beneficial; (b) when the clinic is used as a centre for the careful individual care of each case, complicating diseases being attended to carefully and only suitable cases being selected for special treatment; (c) when the primary object of the clinic is educational and it is used as a centre of exchange to get in contact with foci of leprosy, the patients being followed up to their homes and contacts examined.

At some of the clinics in the Masasi and Newala Districts of South Tanganyika the patients seemed to be in exceptionally good health. This was probably largely due to the absence of malaria and other complicating diseases in their waterless plateau, and the excellent soil and consequent good nourishment of the people. The results at these clinics were exceptionally promising.

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Compulsory segregation, at least in its most rigorous forms, has been or is being abandoned in all the British territories visited.

In the Belgan Congo compulsory segregation is enforced through the Chiefs, who set aside part of their territory for leper camps. The objections to this system as practised at present are referred to on page 30.

A comparison of the results on the leper island at Bunyonyi (p. 31) with those at Kumi and Ongino (p. 41) illustrates the difference between an institution partially compulsory in origin, and those begun and maintained entirely on the voluntary system.

The abandonment of compulsion in Zanzibar has been followed by a distinct improvement of morale among the patients and by no diminution of numbers. Steps are already being taken towards putting into force the recommendations in the Somaliland report, which include the subsequent transformation of the present system into one on a voluntary basis.

It must not be supposed, however, that the abandonment of compulsion implies relaxation of effort to control leprosy. On the contrary, the only justification for the voluntary system is readiness to set in train much more active, and possibly expensive measures, but working through friendliness and understanding and seeking to win the co-operation of the patients.

* * * * *

Occupational Therapy is now acknowledged to be of the utmost importance in the treatment of leprosy, as also in other chronic physical and mental diseases. In many of the institutions visited this was recognised to the extent of giving the patients land which they could cultivate if they wished. But with two or three exceptions there was little attempt at organisation of labour, encouragement to lead an active life, or training in industries and other forms of useful occupation.

* * * * *

Expert Advice to those in charge of leprosy work is much needed in East Africa. Much devoted work is being done, especially by missionaries, which is not bringing in a proportionate return, and this is often only for want of knowing clearly how to go about things. A leprosy expert for East Africa has been suggested, and the British Empire Leprosy Relief Association is willing to bear one-third of the expense involved if the countries concerned will supply the balance.

Education has an important bearing on the control of leprosy. As the population becomes leprosy-conscious, the disease tends to diminish. Much could be done by or through the educational authorities in teaching the public the nature of leprosy and the very simple precautions necessary for its prevention. The suggestion of Bishop Lucas regarding initiation rites (p. 79) is one worthy of trial.

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One of the most common objections put forward by public health authorities to an active campaign against leprosy is that leprosy will only disappear when amelioration of general conditions and improvement of the standard of living have taken place. Against this may be urged that an active campaign against leprosy may prove, as it is doing in Eastern Uganda (p. 41), one of the most potent means of raising the general life of the people.

(Notes on *Treatment*, *Education* and a *Leprosy Expert* are added at the end of the Reports (pp. 100-102), as these have common reference to several of the countries visited).

LEPROSY IN MALTA

INTRODUCTION

Sir Walter Johnson, during his visit of medical inspection in Malta, investigated among other matters the question of leprosy. On his return he consulted me as to what steps should be taken, and expressed a desire that I should visit Malta if an opportunity occurred. Later, Dr. Naudi of the Nigerian Medical Service seconded for special leprosy work in Malta, invited me to visit the island on my way to the East in March, 1938. My visit was also welcomed by Dr. Bernard, the Chief Medical Officer. Later I was present at a conference called together by the Lieutenant-Governor to discuss what steps should be taken. The following is a short report which I drew up as a result of my visit.

Leprosy should be regarded as a disease, just as tuberculosis is a disease. At present it is looked upon with fear and abhorrence quite out of proportion to its danger. Though an infectious disease, it is much less fatal and less easily acquired than tuberculosis. Not infrequently the disproportionate abhorrence with which leprosy is regarded leads to its dissemination, as the leper conceals his condition and thus, before he is recognised as a source of danger, mixes with his family and the public unchecked for many years. There is reason to believe that this is the case in Malta, as cases, when admitted to hospital, have already reached an advanced and contagious stage.

THE LEPER HOSPITAL

I visited this institution with Dr. Naudi and I have the following comments to make:—

(a) *Site.* The Hospital is situated on a very fine site. The buildings are ample and spacious, and there is abundant ground not only for the buildings, but also for cultivation and other activities of the patients.

(b) *Staff.* I was particularly struck with the large number of the staff in proportion to the number of patients. Their number is larger than I found in leper hospitals in other countries. It has been usual in most of the leper institutions with which I am acquainted for most of the work to be done by the patients themselves, under the direction of a comparatively small staff.

(c) *The Patients.* Of these, there are 56 males and 29 females—85 in all.* Some of these are cripples or are confined to

* Non-infectious patients are released from isolation, under the present law

bed with acute complications, but the majority are able-bodied persons capable of doing at least a moderate day's work. And yet they do little to help themselves or their fellow-patients, and there appears to be little attempt at cultivation of the available land. As it is now generally acknowledged that occupation therapy is the most important factor in the treatment of leprosy, I asked for the reason of their inactivity, and was informed that the patients are lazy and unwilling to work. This is the more anomalous as most of them are cultivators and accustomed to work, and I understand that £200 a year is expended on encouraging cultivation.

To the right is the Malta Leprosy Hospital, the poor-house to the left. In the foreground is Dr. Naudi (right) and the doctor in charge.

(d) *Compulsion.* There seems to be little doubt that the patients bear in their minds a grudge against the authority which has compulsorily segregated them, and that their reaction on account of their feeling of being wronged is one of non-co-operation. This is a natural reaction and one which is found wherever compulsion is used. To counteract it I understand that the patients are dealt with very generously, and that their diet per head per day amounts to six shillings, as compared with two shillings for the paupers in the neighbouring building.

Experience however shows here, as elsewhere, that such generosity tends to increase rather than diminish the feeling of grievance. It confirms the sense of what the patient regards consciously or unconsciously as infringement of his rights of liberty.

The feeling of grievance is not confined to the patient compulsorily detained in the leper asylum, but is sometimes shared by the patient's relatives and, possibly, by his neighbours. The result is non-co-operation in the community, and concealment of infectious cases of leprosy as long as they are not too conspicuous and can be hidden, while further as the co-operation of the patient is lacking effective treatment becomes impossible. In my opinion, at least 75 per cent of leprosy treatment is of a general nature, and has as its basis a cheerful co-operating patient, active and fully occupied in mind and body; and special treatment is much more effective and better tolerated when these are secured.

On the other side of the picture is the need for isolation of the infectious patient from the community, and especially from contact with children. If isolation could be effectively carried out without rigid compulsion, then there would be every chance of its giving better results through winning the co-operation of patients and the public.

SUGGESTIONS

I suggest that three objectives should be aimed at:— to make the hospital more attractive; to relax the present rigidity of the law and practice regarding segregation; to carry out an educative campaign, along with a leprosy survey and arrangements for treatment in the endemic areas. These three objectives should be carried out simultaneously.

(a) *Making the Hospital more attractive.* It is questionable if this will require increased expenditure. It must be clearly kept in mind that what makes the hospital unattractive at present is not lack of good buildings, good food, staff and land. But it is the feeling of grievance referred to above. As this is due to rigid segregation the first step in making the hospital attractive must be a change of the law and practice regarding segregation. How this may be affected I shall discuss later.

The second step in making the hospital attractive is, I suggest, the appointment of a suitable lay worker who will befriend the patients and organise their time and daily life. Such a man must be one with the missionary spirit, a man of sympathy, understanding and strong personality. He must be a whole-time worker who has been well trained in leprosy work. His duties would be to organise occupational therapy in the form of cultivation, industries, games, etc., and otherwise brighten the lives of the patients and help to keep them usefully and happily employed.*

NOTE. * I understand that this suggestion has not been approved on account of cost, but that it will be reconsidered.

Suggestions already put forward by Dr. Naudi for improving the diet of the patients should be of great value, and secure better nutrition and better value for the money spent.

At the same time, in the case of bread winners, provision should be secured, either directly or indirectly, that dependents are helped when necessary.†

(b) *Modification of the Segregation Laws and Practice.* These are at present, in my opinion, too rigid and, as stated above, tend to defeat the end for which they were instituted by leading to concealment of cases of leprosy long after they have reached the infectious stage.

The methods used for the control of leprosy vary in different countries according to local conditions. In England, though there are several infectious cases at large who have acquired the disease in the tropics, the infection, with the exception of some three known cases, has not spread, and compulsory segregation and notification are not in force.

In Paris recently it was found that six patients had acquired leprosy without leaving the country. The question of compulsory notification was raised, but was decided against in favour of attraction to leprosaria by persuasion, with the alternative of suitable domiciliary inspection by doctors and health visitors. However, as the standard of living and other conditions in Malta are different from those in England and France, I suggest that all cases of leprosy which are considered infectious and a danger to the public, should be isolated in the leper hospital.

As leprosy is an endemic disease it is highly important that its control should be centred in the hands of the Chief Medical Officer, as is the case of other endemic diseases. By the present law the control of leprosy is largely in the hands of a leprosy board, of which the Chief Government Medical Officer is not a member. Under the suggested method the existing board would not be necessary, but the Chief Medical Officer might be assisted by a small board of experts which he could convene in an advisory capacity.

(c) *Educative Campaign and Survey.* The third objective I would suggest is an Educative Campaign among the patients and their relatives and also the general public accompanied by a leprosy survey.

Village surveys carried out in India by expert doctors revealed the fact that for every infectious case of leprosy there were from two to four early non-infectious cases. While some of

† Dr. Bernard informs me that £900 was paid out to families of lepers last year, and that it is proposed to increase these grants.

these were abortive others passed on later to the infectious stage. In the Philippines, where a great deal of leprosy work had previously been done on the basis of compulsory segregation, it was believed that this finding in India was peculiar to that country. But later surveys carried out in the Philippines revealed a similar condition there. More recent surveys in Nigeria and other countries have shown that in endemic countries some such proportion of infectious and early non-infectious cases is to be expected. I consider it therefore advisable that a survey should be carried out, beginning in the areas from which the largest number of lepers have been admitted to the leper asylum. As mentioned above, this could only be done by first winning the confidence of the public in these areas.

Once the people realise that being diagnosed as a leper does not necessarily involve forcible removal to hospital, a certain amount of confidence and co-operation will be secured. Next, if local arrangements for the treatment of early and non-infectious cases are made either in a dispensary or in the people's homes, still further confidence will be gained and the tendency towards concealment from the medical authorities will be overcome.

Along with treatment, education regarding leprosy would be introduced, patients, their relatives and the public being enlightened as to the real nature of leprosy and how it can be avoided. Judging from experience elsewhere, it would probably be found that the disease is concentrated within families or comparatively small foci. It may possibly be traced back through several generations in a family or a village. Information regarding this would prove useful in persuading those concerned of the danger to themselves and their families and how it can be avoided.

In this way infectious cases could be found out by examining contacts before they spread the disease, and either isolated effectively at home or, if there are not facilities for this, or if it is considered by the medical authorities that isolation is not being carried out or likely to be carried out effectively, isolated in the hospital. The latter would be more easily accomplished on the basis that the hospital would have become a more attractive place—a hive of industry in place of the present den of discontent. Also early cases could be brought under treatment, and thus in many instances prevented from advancing to the more serious and infectious stage.

(d) *Staff for Educative Campaign and Village Control.* The organising of such a scheme as that mentioned above would require time and experience and, above all, keen interest. It would require a number of years to bring it gradually into effect, as any attempt to rush matters would defeat the end in view.

I understand that Dr. Naudi's services are only available for a comparatively short time. I would suggest that a qualified doctor who has had special training in India should conduct a special course on leprosy to be attended by doctors from the areas which experience has shown are leprosy foci. Later, under this officer's supervision local treatment of patients might be carried out. The local doctors would also keep in touch with all patients and report their progress to the leprosy expert.

CONCLUSION

The suggestion to cancel the present leper act involves a certain amount of risk. On the other hand, the scheme suggested offers a method which has been found successful elsewhere and which holds out the hope of abolishing the present highly unsatisfactory state of things. It aims at getting down to the root of the problem which the present system clearly does not. The question arises—does the end in view justify the risk involved? My own experience leads me to believe that the scheme suggested would be successful if carried out thoroughly and completely. Its success would depend chiefly on the personnel; the placing of control in the hands of the Chief Medical Officer; the appointment of a whole-time permanent leprosy expert who would spend his time in the hospital, and another who would carry out the organising of village control through education, survey and treatment in the villages with the help of local Government doctors; and the improvement of conditions in the hospital through a suitable lay worker. The success of the scheme will, in my opinion, be endangered unless carried out in its entirety.

I believe that the British Empire Leprosy Relief Association can supply a suitable lay worker, and I understand that two suitable medical men* would be forthcoming, who, after a course of special training in India, could effectively undertake the indoor and outdoor sides of the medical work.

Acknowledgments. I wish to express my thanks especially to the Government of Malta and Dr. Bernard, the Chief Medical Officer, and also to Dr. Naudi, for the facilities they gave me for investigation, and for all their kindness and hospitality during my visit.

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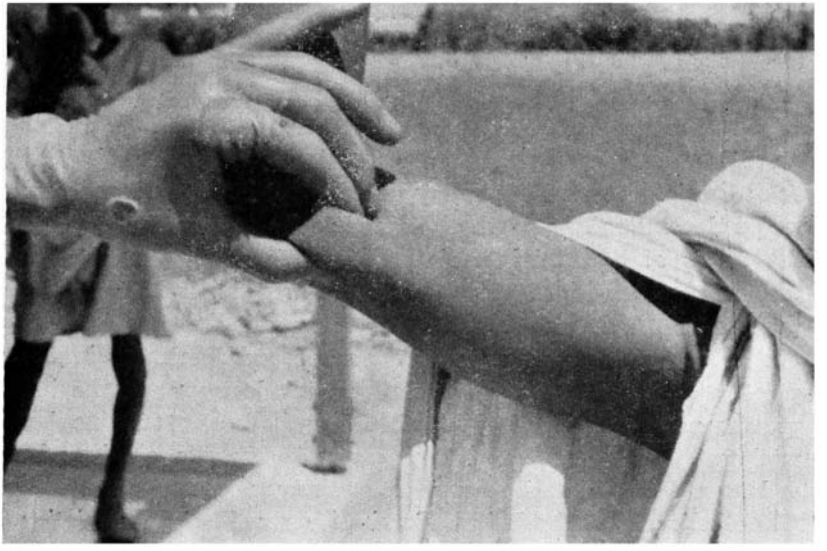
* I understand that a doctor has now been appointed for this work and sent to India for training.

ANGLO-EGYPTIAN SUDAN

NORTHERN SUDAN

On April 6th I arrived in Khartoum where the Director of Medical Services kindly arranged for me to see the various medical institutions and the methods of dealing with leprosy. Leprosy appears to be a disease of minor importance in the North of the Sudan. Cases are treated in the outpatient department of the C.M.S. Hospital at Omdurman. I had an opportunity of seeing several of these patients and of visiting others in their homes.



Abscess of ulnar nerve at C.M.S. leprosy clinic, Omdurman—the only case of this condition out of thousands of lepers examined during the tour.

It appears to me that the present methods of leprosy control are adequate, though I would suggest that it would be an advantage if the C.M.S. had a small ward with two or three beds for the treatment of lepers who need temporary hospitalisation.

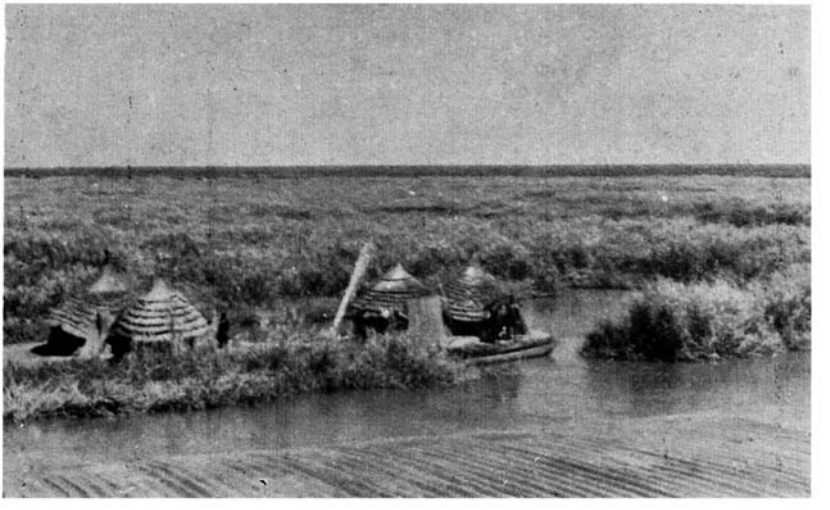
Owing to epidemic conditions, it was not found possible to visit Kordofan. I left Khartoum on the 9th and arrived at Terrekekka on the 21st April.

I had not an opportunity of visiting the small leper camp at Malek but discussed this with Archdeacon Shaw—I understand that leprosy is not a serious problem in this area. Possibly this may be partly the result of the hard conditions under which these people live and their semi-nomadic mode of life—these would

militate against the survival of infectious patients who would, under more favourable circumstances, live on and continue to infect others.

LI RANGU

From Terrekekka I was motored by Dr. Cruickshank (S.M.I. Equatoria) *via* Amadi to Li Rangu. Here I remained from the 22nd till the 28th and had an opportunity of studying leprosy as it is found in this large Leper Settlement. After examining with Dr. Woodman a large number of leper cases, I selected 39 for bacteriological examination with a view to establishing their classification and distinguishing potentially infectious from non-infectious cases.



A hamlet in the "Sud" by the side of the Nile near Malek (see p. 14).

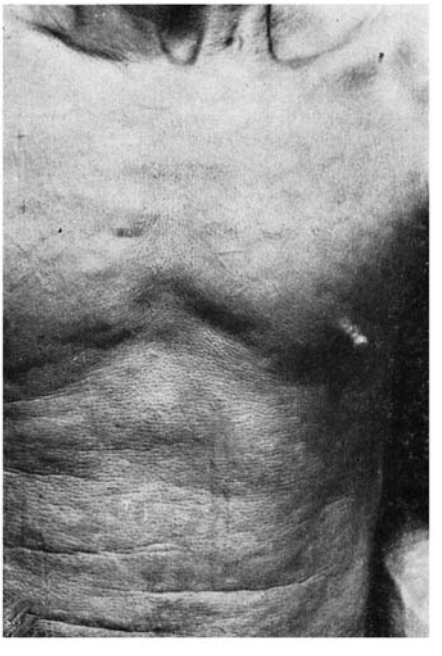
While there is a fair proportion of lepromatous and infectious cases the large majority are of the neural type, being either tuberculoid or secondary neural. A striking feature is the frequency of tuberculoid cases, a type formerly supposed to be uncommon except in North India, Japan, and a few other places. Treatment is given to selected cases. The chief reliance is placed upon injections of "Sodium Gynocardate" given once a week in a 3 or 4 per cent. solution intramuscularly.

Cases needing hospital treatment on account of complications, trophic ulcers, etc., are lodged in wards in the neighbourhood of the treatment room.

By way of occupational therapy, the lepers cultivate their own fields and give their labour one day per week on the common work of the settlement.

A separate area of the settlement is set apart for segregation. In this area, which houses some 200 patients out of the 1,200 of the whole settlement, the infectious cases have their huts, and

Above is a common form of tuberculoid lesion (S. Sudan).



A rapidly advancing lepromatous type becoming diffuse (S. Sudan).

there are also some disabled and deformed patients in whom the infection has more or less died out. The former help to attend to the latter.

The Li Rangu settlement represents what is in some important respects a unique experiment in the control of leprosy. This settlement, and that at Yubo, were primarily formed for lepers found during a complete Sleeping Sickness survey of the Zande tribe, which was made 7 years ago. The population of the settlement thus represents all types of leprosy in the proportions in which they occur in the area. This is in marked contrast to settlements in other places which contain larger proportions of certain types, such as nodular or deformed cases.

The aim of this wholesale segregation of the leprous population was to remove, as far as possible, infection from the area. To what extent this aim has succeeded may be judged from the fact that in 1937 there were 295 new cases admitted to the settlement, of which 63 were of the infectious or lepromatous type. It is difficult to account for these as patients already infected 7 years previously and in whom the disease has developed subsequently, although a few may belong to this category. The fact that so many have progressed to the infectious stage without previous detection is probably due to the insidious progress of the disease in patients with low resistance in whom early signs are apt to escape notice.

In contrast to this, the more resistant cases form more easily recognised early signs of a tuberculoid or of a trophic type.

There are also 2,558 non-infectious patients (early and arrested cases) in the Li Rangu area who are registered and live outside the settlement, but the majority of the 63 infectious cases admitted in 1937 were not from among these.

While much has been achieved by the Li Rangu settlement towards the control of leprosy, much more might have been hoped for if an adequate staff had been available. Dr. Woodman and the Sudanese Medical Officer have their hands full with the general medical work of the district and can only give a small proportion of their time to leprosy.

Bacteriological and other laboratory examinations of leper patients have been found impossible for lack of staff. For the same reason occupational therapy could not be developed to a fuller extent.

SUGGESTIONS

For the adequate development of the settlement I consider that there should be three full-time leprosy workers: a doctor, a general supervisor to develop the settlement and organise agriculture and industries, and a trained African laboratory assistant.

The general supervisor should, I consider, be a European expert in leprosy work, similar to those working under B.E.L.R.A. in West Africa. Even if the first two of these are not forthcoming the last should at least be supplied, as bacteriological and other laboratory examinations are urgently required.

With regard to *treatment* I would suggest :

(a) The further development of occupational therapy; but this however seems impossible without further staff.

TYPES OF LEPROSY IN S. SUDAN.

Leprous alopecia is common among the Mongolian races. Here are two out of several cases found at Lui, Southern Sudan. Below is a typical lepromatous case at the same place.

(b) The careful selection of suitable patients for treatment with chaulmoogra oil, injections being limited to patients who are physically fit and who are able to tolerate daily adequate physical exercise.

(c) The use of the pure oil of Hydnocarpus wightiana. This and the ethyl esters of the oil are generally acknowledged to be more effective than solutions of sodium salts of chaulmoogra. The oil must however be of a suitable nature such as that supplied by certain Indian firms. This oil, especially if ordered in bulk is exceedingly cheap. If kept free from air and stored in full bottles, it will remain pure and almost painless for over a year. (In this connection see the recommendations of the International Leprosy Congress, held at Cairo in March, 1938, *Leprosy Review*, Oct. 1938).

OTHER LEPROSY INSTITUTIONS

On April 29th I visited with Drs. Cruickshank, Woodman and Chacar the leper camp at Meridi. There were 89 patients whom we examined.

On the evening of the same day I went to Lui and on the following morning, along with Drs. Cruickshank and Casson, examined the 87 patients at the leper camp. Of these the majority were found to be cases in which the disease had died out. Twenty were lepromatous cases of more or less infectivity.

On May 2nd I also examined along with Dr. Cruickshank the patients at the leper camp at Yei, and also those at three of the dispensaries under Dr. Casson; some of the principle types of leprosy, especially the neural cases, appear to differ from those with which I am familiar in India and elsewhere, and would repay careful pathological examination.

GENERAL SUGGESTIONS FOR FURTHER DEVELOPMENTS

It is now becoming generally recognised that one of the most important factors in the control of leprosy is the employment of wisely-planned educational methods.

The spread of infection may be limited to a certain extent by compulsory or voluntary segregation in institutions, but in highly endemic areas control is difficult or impossible to attain until the people themselves realise the nature of the disease and its spread, and co-operate voluntarily and intelligently in taking the simple precautions necessary. Responsibility must accompany education in leprosy control if it is to be effective.

Dr. Cruickshank has put forward a plan for further development of leprosy work in the Equatorial Province which aims at

educating the people and throwing responsibility for segregation on local authorities. He proposes that :

(a) Chief's Courts be given responsibility to segregate in small camps all infectious cases of leprosy in their own areas.

(b) After the first survey has been made and infectious cases listed, the Chiefs and Elders be responsible for selecting infectious cases.

(c) Relatives be responsible for helping patients, but an allowance might be made in their support, at least to begin with.

(d) Relatives be allowed to pay occasional visits to the camps.

(e) Children as far as possible be handed over to healthy relatives.

(f) Where there is a Chief's dispensary in the neighbourhood the dispenser supervise the camp.

(g) Once a year a medical inspection be made, when cases that had become non-infectious might be discharged and accompanying diseases treated.

This scheme, which would supplement and not replace existing leper settlements, appears to be based on the right principles. Its success would depend on the intelligence and willing support of the Chiefs and their courts, and care would need to be taken in choosing the most suitable Chiefs' Courts for the initial experiment. It seems to me, however, that success would also depend upon the amount of European supervision available—especially at the beginning—and that a whole-time European's services would be called for.

He would make an initial survey of existing leprosy, and at the same time find out where local support would be most promising. He would then set about instituting the first Chief's Camp and, if successful, later form others in succession.

For this purpose a qualified medical practitioner would not be necessary. I would suggest a health worker of the right type who had already been trained in anti-leprosy work. Health workers of this kind have been sent out by the combined committee of the British Empire Leprosy Relief Association and Toc H to Nigeria and other places, and it is possible that this committee might be able to supply one for the Equatorial Province of the Sudan if requested to do so. It is generally acknowledged that men of the type already working in Nigeria are highly suitable for anti-leprosy work; they volunteer largely from altruistic motives, are carefully selected by the committee, and work on a sub-sistance allowance comparable to that given by missionary societies. Most of them are attached to leprosy institutions

which are financed chiefly by Government but conducted by missions : they are thus under the direct supervision of the mission doctors.

I would suggest that, if it is decided to adopt experimentally the above scheme, the most suitable location for a health worker would be in connection with the Church Missionary Society at Lui, for the following reasons :—

(a) Leprosy appears to be common in this area.

(b) This mission has in the past taken a deep interest in anti-leprosy work and has its present leper settlement and the good will of the people.

(c) The scheme of leprosy control might fit in with the system of dispensaries under the mission and be supervised by the mission doctor during his visits to the dispensaries.

If the scheme as modified above is approved the Church Missionary Society might be consulted as to their willingness to entertain a suitable health worker, and the British Empire Leprosy Relief Association as to whether they could supply such a man. If an appointment were made, it might in the first instance be for a short period, to be prolonged later if found to work well. Once the success of the scheme had shown itself a second health worker of the same type might be appointed to Li Rangu where he would act as general supervisor to develop the settlement and organise agriculture and industries (see suggestions above).

Acknowledgments. I wish to express my warm appreciation of the kind hospitality and help of Dr. Pridie, the Director of Medical Services, at whose invitation I came and who arranged my itinerary and facilitated my visits to the various centres. I wish also to thank the various officers, especially Drs. Cruickshank, Woodman and Casson, who spared no effort in making my tour a success.

BELGIAN CONGO

I arrived at Aba on May 3rd in company with Mr. Edgar of Toc H. We were met by Mr. Harrison, of the Heart of Africa Mission, who had kindly offered to provide transport. We inspected the small leper camp at Aba with Dr. Kleinschmidt. With one possible exception the 30 patients were of the neural type, with tuberculoid or simple macules and secondary deformities of hands and feet. Some appeared to be very anaemic and to be suffering from septic and other skin complications. General treatment and treatment of complicating diseases should improve these patients considerably, but due to lack of staff these have not been available. From the point of view of the control of leprosy in the district, such a camp appears to be of little value, as the cases segregated were apparently not of an infectious type.

From Aba we went, via Niangara, to Ibambi, the headquarters of the Heart of Africa Mission, where we were the guests of Mr. and Mrs. Harrison. On the way we visited two Chiefs' Leper Camps.

At the first of these, near Dingba, we saw 55 patients, of which 7 appeared to be lepromatous. Of the remaining 48 neural cases, 7 had distinct major or minor tuberculoid lesions. The rest showed secondary neural lesions and deformities, and many of them had simple macules. The patients were tended by a native dresser and visited occasionally by a doctor and a Catholic mission sister.

At the second camp we saw 76 patients, though we were informed that there were more on the other side of the river. Of the 76 cases, 4 appeared to be of the lepromatous type, and of the remaining 72 neural cases 15 showed distinctly tuberculoid lesions; the great majority had marked secondary neural deformities. Many of them were obviously anaemic and suffering from complicating skin disorders. Little appeared to be done for their treatment and we were informed that they maintained themselves by their own agriculture.

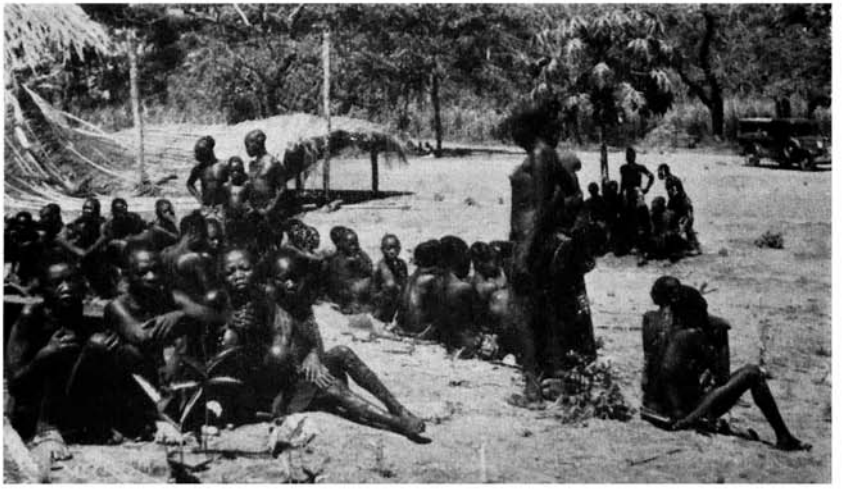
PAWA RESEARCH STATION

After two days stay at Ibambi we went to Pawa, the leprosy research station of the Belgian Croix Rouge. There we were hospitably received by Prof. Dubois and Dr. and Mrs. de Gotte. From the 7th till the 11th of May I had the privilege of making an intensive study of leprous patients under Prof. Dubois' expert guidance. Besides studying the patients in residence at the Pawa Centre we also visited two leper camps in the neighbourhood, at Ata Kobo and Bengwe.

A Congo Chief. Note the parrot's feathers, the government medals, the tree-bark kilt, and the stool.

The drum with which he calls his people.

Lepers "segregated" by a chief in a separate village. Note their expression and the fallen down hut.



I had already visited Ata Kobo with Mr. Harrison but had an opportunity of studying the patients in detail on this second occasion. Of 242 patients examined, 24 or 10%, were distinctly of the lepromatous type (L_2 and L_3), the rest being chiefly neural cases with marked secondary neural lesions. Sixty seven (27.7%) showed distinct tuberculoid lesions. There were also a few with diffuse lepromatous lesions (LD-1) with neither macules nor nodules.

At Bengwe, which we visited on May 9th, the types were very similar in nature and proportions to those at Ata Kobo, only that there were fewer with distinct tuberculoid lesions. This is probably due to the fact that the patients at Bengwe are under regular treatment, while at Ata Kobo no treatment is given.

At these Chiefs' camps one has an excellent opportunity of studying a cross section of the leprous population in each Chief's area as, at the orders of Government, each Chief segregates all cases of leprosy in his area. Doubtless some cases escape detection; but there are not likely to be many, as the Chiefs are expert at recognising the disease. In the Stanleyville Province (one of the six provinces of Congo Belge) there were 71 of these *villages agricoles* organised in 1936, with 7914 lepers.

One of the most valuable methods of research at the Pawa Centre is the repeated census examination of the whole population. At the first examination, which was carried out by an *agent sanitaire*, and not by an expert doctor, it was calculated that about ten per cent of the population was suffering from leprosy. However, later examination by Prof. Dubois and his colleagues showed that many with non-leprous marks mistaken for leprosy had been included, and that the actual number was round about four per cent., or, including slight, abortive cases, six or seven per cent. It was found that many of the distinct, but slight cases, were not progressive, their lesions remaining stationary over periods of years in some cases, and others clearing up spontaneously. Also cases which a year before had shown no recognisable signs appeared with wide-spread macular lesions, developing into lepromatous cases.

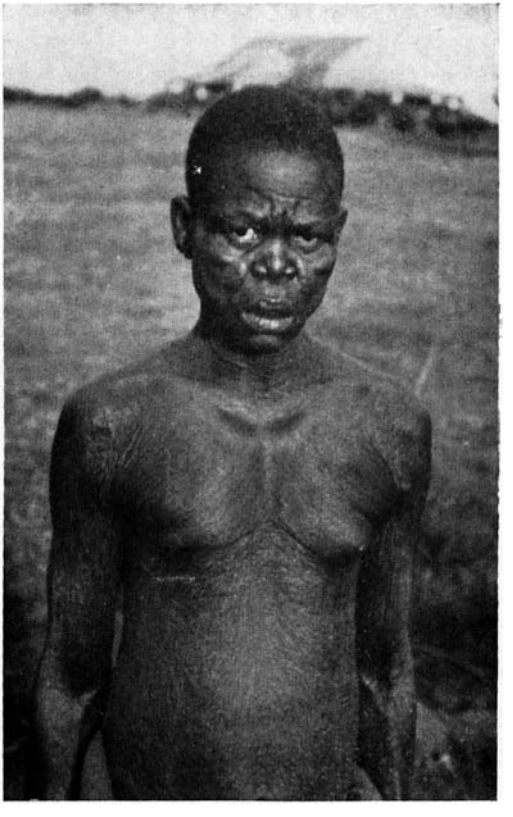
CENTRAL AFRICAN LEPROSY COMPARED WITH THAT OF N. INDIA

One of the most interesting features of the study of leprosy at Pawa, and also in the Equatorial Province of the Sudan, where the disease is very similar, is the marked differences noted between the types of leprosy there and those in North India. These are enumerated below:

(a) Absence of " lepra reaction " and of signs of sensitization to M. leprae. Out of the many hundred cases I examined in

Congo Belge and S. Sudan I found only one single case of this condition, which is comparatively common in N. India.

(b) The comparative infrequency of L_2 and L_3 cases. These were found to be about 10 per cent, compared with about 20 per cent or more in N. India. Also the proportion of lepromatous, as compared with neural, macules appears to be less than in N. India.



This man is the only case of *lepra reaction* seen out of many hundreds of patients in the Belgian Congo.

(c) Among the neural cases there appears to be a larger proportion with deformities of the hands and feet than in N. India. This may be the result of infection with jiggers complicated by septic infection.

(d) The deformities of the hand consist of shortening of the digits, but the wasting of the small muscles of the hand followed by *main-en-griffe* (claw hand) is seldom seen, or only in a mild degree; whereas in N. India these latter signs are as a rule present.

(e) In the feet the digits are similarly shortened, or have entirely disappeared, to a greater degree than in N. India; but, while trophic ulcers are present, these are comparatively superficial and slight compared with the deep perforating ulcers down to and involving the bone, which is such a common condition in N. India.

A shortening of fingers and toes in neural leprosy with little wasting of small muscles or deformity, probably caused by jiggers in anaesthetic fingers, followed by sepsis.

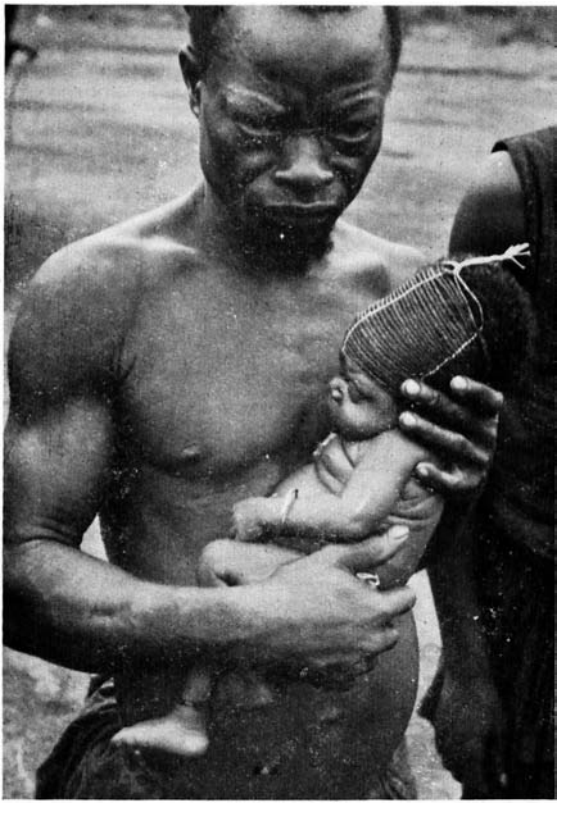
(f) The number of tuberculoid cases is perhaps almost as high as in N. India, but in these the presence of anaesthesia to light touch is much less marked than in the latter country. In confirming the diagnosis it is therefore necessary to rely more upon other signs such as analgesia on pricking with a pin, or anhydrosis.

(g) Thickening and tenderness of nerves is much less frequent and, when present, less marked than in N. India. I did not find a single case of nerve abscess (so common in N. India) among the many hundred cases I examined in Congo Belge and the S. Sudan. It is significant however, that I found one nerve abscess among the sixteen cases examined in the N. Sudan (p. 14).

(h) The proportion of neural to lepromatous macules is

greater than in N. India, simple neural macules being largely responsible for this larger proportion.

Lack of time and opportunity has made it impossible to support these interesting contrasts in type of leprosy with statistical evidence, and the whole question of differences in type in different



CONGO FASHIONS: Head-binding which gives an elongated head, does not interfere with the development of the brain, but as it also elongates the eye it may affect vision.

races, climates, and social, dietetic and economic conditions calls for careful and expert study.

It seems clear, however, that leprosy in the N.E. Belgian Congo and the adjoining S. Sudan is of a milder type than in N. India. This is evidenced by the smaller proportion of the more severe lepromatous type, and the absence, or at least extreme rarity, of " lepra reaction ". This mildness is also shown by less swelling and tenderness of the nerves, with consequent less anaesthesia to

light touch and comparative exemption of the small muscles of the hand and the less deep trophic ulcers of the feet.

The question arises as to whether M. leprae as found in Congo Belge and S. Sudan is of a less virulent type than that in N. India. Until a satisfactory experimental animal is available it will be difficult or impossible to answer this question.

Pigmies of the Ituri forest with an ordinary-sized man for comparison. A recent survey showed an incidence of 6 to 9 per cent. of leprosy, chiefly of a mild type.

Another puzzling question is why with such a mild type of disease leprosy is so highly endemic. It has been suggested that cases giving negative results on careful and repeated bacteriological examination may yet spread infection through some microscopically unrecognised form of Hansen's bacillus. The general agreement of leprologists is however opposed to this hypothesis. Infectious cases are commoner than might be supposed on superficial inspection. These are the diffuse cases described in N. India and supposed

by some authorities to be rare elsewhere. However, our inspection of cases at Pawa revealed a fair number of these. The absence of macules and nodules and the hiding of erythema by the darkness of the skin make these cases particularly difficult to recognise at first, until the eye has become accustomed to the skin marking peculiar to this form. Still even when the diffuse lepromatous case is added to the potential disease-spreader the number of dangerous cases is very small.

The danger of the spread of infection in a community is in direct proportion to the number of open cases, and to the opportunities which these open cases have of spreading the disease. In the area under discussion the open cases are apparently few; and it must be argued that the opportunities of spreading infection are therefore great.

It has been suggested that the high incidence of leprosy in this region results from dietary deficiency. We found little evidence of the truth of this suggestion. At a centre near Medje, where a complete census of the population was being carried out, we examined some 30 cases of leprosy found. These cases represented all forms of leprosy, and types were roughly in the proportions mentioned above. Leprosy was exceedingly common among the population examined but their physique was excellent and there was little sign of undernourishment or of weakening by accompanying or predisposing diseases. It was noticed, however, that almost all cases were suffering from scabies and septic sores of the skin; that these sores centred chiefly round the gluteal region; and that the majority of slight or early leprous lesions also centred round the same part of the body. It would appear, therefore, that septic sores of this nature are connected either with inoculation of leprous infection or with localisation of the infection once it has been acquired. This skin condition is said to be due to promiscuity with regard to the use of clothes, and especially to the use of unwashable bark cloth.

Another possible facility for the spread of infection may rest with the sexual promiscuity of these people. Not only is polygamy widely practised, wealth being reckoned in the number of wives, but wives are frequently changed. It is not suggested that leprosy is spread as a venereal disease, but promiscuous close contact forms the most favourable condition for transmission.

It must be remembered also that the extreme chronicity of leprosy as found in this area favours high incidence, as the lack of fatality leads to accumulation of cases, whereas in a more acute form the numbers would be more rapidly eliminated by death. Indeed I was informed, though I had not an opportunity of verifying the statement, that in southern provinces of the Congo leprosy

is more acute, but the number of cases found on survey was smaller.

SUGGESTIONS FOR CONTROL OF LEPROSY

The control of leprosy in the area under consideration is the matter of chief importance. In the Chief's camps all cases are segregated. Of these only about 1 in 10 appears to be a source of danger. Little attempt is made, however, to carry out strict isolation of infectious cases. Friends and relations come and go and mix freely with infectious cases. Obviously it would be more efficient to isolate only infectious cases and to isolate them more effectively from the general public. The greatest danger is to the early, slight cases who are segregated along with the most dangerous, no distinction being made. In institutions like that at Li Rangu in the S. Sudan, infectious cases are segregated separately; but I found no attempt at such special segregation in the leper camps I visited in the Belgian Congo. When I suggested that only open cases should be segregated, I was met with the difficulty that the Chiefs and the people could not distinguish between open and closed cases.

Under the present system this objection is of course a very real one. In fact effective leprosy control cannot be carried out without sufficient expert personnel. My suggestion therefore is that in place of, or perhaps in modification of, the present diffuse method more efficient concentrated work be undertaken by expert workers, doctors, *agents sanitaires*, etc., thoroughly trained in leprosy work. In such work missions might be asked to co-operate. Missionaries and their native assistants are acquainted with the people and are constantly visiting them. If they had the necessary training with regard to leprosy they might do much towards its control.

Before any such development could take place it would be necessary, however, to appoint a suitable medical expert in leprosy, whose duties would be to study leprosy control and to instruct doctors, *agents sanitaires*, missionaries and others with a view to their taking part in a campaign against leprosy. Without a well-planned educational campaign I question whether leprosy control can be carried out with ultimate hope of success.

In conclusion I wish to express my appreciation of the kindness and help received from Prof. Dubois, Dr. de Gotte and others at Pawa, and also from Mr. Harrison and his staff at Ibambi.

UGANDA

BUNYONYI LAKE SETTLEMENT

I arrived, in company with Mr. Edgar, at Kabale, headquarters of the Kigezi District, on May 16th. The Kigezi District forms the extreme S.W. corner of Uganda. On the following day Dr. Boase motored us to Bunyonyi Lake, where we visited the leper island of the C.M.S. in company with Dr. Symonds. We were shown round by Miss Gardner, the sister-in-charge, and Miss Nash, in charge of school work.

Site. The leper settlement is beautifully situated on an irregularly shaped island in the lake. About the middle of the island is the hospital on the crest of a ridge, behind which the creche for non-leper children stands on a separate hill. At the east end of the island is the school, and between it and the hospital on another hill is the residence of the European staff. There are three promontories extending northwards, and two southwards. The huts of the patients are placed along paths which crown the main part of the island and its promontories. The rest of the land is cultivated by the patients and their families, as is also a certain area on the mainland.

Patients. According to the report of 1937 there are 547 resident on the island. Of these 469 are lepers; 12 are non-leprous adults living in leper houses; 32 are infants living in leper homes because they are "under creche age"; 34 are children in the creche which have not shown signs of leprosy.

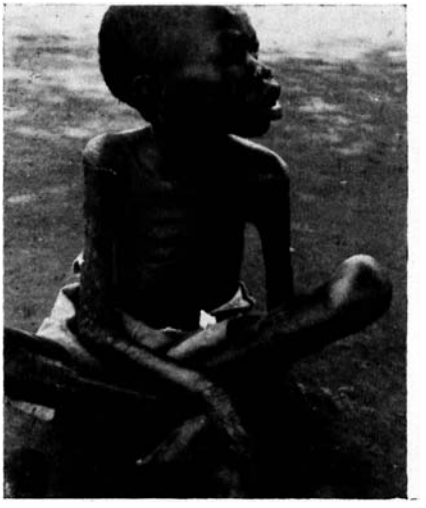
Of the 469 lepers there are 150 men, 136 women, and 183 children living in family huts.

Finance. In 1937 the expenditure on staff was about £700; on drugs and dressings £107; on general care of the lepers and food a little over £150; on buildings about £830; on repairs and up-keep £192. This expenditure was met from the following sources: Protectorate funds—including building grant—£1,260; Kigezi Administration £153; British Empire Leprosy Relief Association £50; Mission to Lepers £100; C.M.S. and other donations, etc., £417.

Types of Patients. On the 17th and 18th of May I examined 402 patients and divided them into five categories: (a) obviously open cases of the lepromatous type (L_2 and L_3); (b) diffuse leprous lesions suspicious of lepromatous nature, but requiring confirmation by bacteriological examination; (c) cases with distinct tuberculoid lesions; (d) flat lesions of the simple macular type, many of which were residual; (e) those who showed no definite

signs of active leprosy. The numbers in each of these categories were as follows:—

Types	Children	Male adults	Female adults	Totals.
L_2 and L_3	12	34	22	68 (17%)
Diffuse	7	15	15	37 (9%)
Tuberculoid	18	22	10	50 (12%)
Flat lesions	13	42	31	86 (21%)
No definite active signs	82	34	45	161 (40%)
Totals	132	147	123	402



Extreme form of leprosy and malnutrition in child (Nyenga).

The 132 children attend school together. The 82 children with no definite signs of leprosy (although a few of them have marks suspicious of leprosy) are allowed to mix freely with the 12 advanced nodular cases. This is permitted on the supposition that once the slightest signs of leprosy have appeared there is no danger of reinfection or superinfection. It is perhaps impossible to prove conclusively that this supposition is not correct, but there seems to be strong evidence against it. If we compare the sister disease, tuberculosis, it is generally held that the chief danger to the child is not from slight but from massive infections, and especially from superinfection. In leprosy the tuberculoid lesion has been considered to be a sign of increased, or at least of comparatively high, resistance or immunity. But these 82

children had no tuberculoid lesions. I therefore consider that contact of such cases with advanced lepromatous cases involves risk to the former, and that all children found to be bacteriologically positive on routine examination of the skin or nasal mucous membrane should be effectively isolated from the rest of the children.

Altogether there were 68 cases which could be considered as of a highly infectious nature, and 37 more were also considered possibly infectious, subject to bacteriological examination. Of the highly infectious cases 56 were adults, and many of these were the parents of the 82 children without definite signs of the disease. When I suggested that these children should be separated from their parents and lodged in a special hostel, I was met by the objection that in many cases the parents were dependent on the work of their children as they (the parents) were in a weak state. I believe however that many of the infectious patients are able to work, and that those who are infirm have generally a wife or a husband who is able to work. In this connection it is important to emphasise the fact that young children are more susceptible to leprosy infection than adults. If it is found impracticable for the reasons mentioned above to separate any children from infectious parents during the day, they might at least be separated at night; for it seems clear that infection is most likely to take place at night when promiscuous contact takes place at close quarters in dark huts.

I would suggest: (a) that all patients found bacteriologically positive be segregated in a separate promontory of the island;

(b) that their children be housed at night in a hostel, or with non-infectious families;

(c) that these children be allowed to come in contact with their infectious parents during the day only in instances of extreme necessity;

(d) that special help by way of food or assistance in cultivation be given to infectious parents when removal of children constitutes a difficulty.

Treatment. I would suggest the following: (a) Cases should be carefully selected before being given any form of special injections. I think it would be wise not to give injections of chaulmoogra to patients who are in bad general health, or to those with soft, flabby muscles. Many of the patients require treatment for skin diseases and other complicating conditions.

(b) Few of the patients without definite signs of present active disease are likely to benefit by chaulmoogra treatment, and these number 161, or 40%, of the whole. Of these, the 82 children

showed little or no sign of present or past leprosy, but many of the adults showed deformities as the result of previous active disease.

(c) The 50 tuberculoid cases, constituting 12%, are those most likely to benefit by treatment, as also many of the cases with flat lesions and those with diffuse lesions. In these I would recommend injections of pure chaulmoogra oil given intramuscularly and intradermally.

(d) Many of the 68 lepromatous (L_2 and L_3) cases would benefit by similar injections, but great care would have to be exercised in grading the doses, and only those should be selected who are physically fit and are taking sufficient daily exercise.

Extreme localisation of leproma in the form of pedunculated nodules (Bunyonyi).

(e) In an institution where economy is an important consideration expensive proprietary drugs are a drain on financial resources. At the recent International Leprosy Congress held in Egypt injections of pure chaulmoogra oil and esters prepared from that oil were recommended. Such oil can be obtained at a low price from India, and I would recommend its use.

(f) I would deprecate mass treatment. Every case should be studied carefully and treatment, both general and special, should be continued systematically. Above all, it is essential to win the co-operation of the patient. No good results can be hoped for where any element of compulsion enters in. As in tuberculosis, the chief emphasis should be laid on general treatment and improvement of the patient's physique, and special treatment should only be given when the patient is fully co-operating and leading an active, healthy life.

(g) I enquired into the diet of the patients and was informed that they took but little to supplement their staple diet of plantains,

Fish are abundant in the lake, and fowls, eggs, sheep are available. But to many of the patients these things are taboo, as is also milk. I was told that though many of the patients looked physically fit, they had very low resistance and easily became ill. It would seem as if many of the people were suffering from undernourishment although they live in a land of plenty. This can only be remedied by an educational campaign. Diet must form the basis of physical fitness, and therefore of the treatment of leprosy, and good results cannot be hoped for until these primitive taboos are overcome.

HOW LEPROSY IS SPREAD.
Notice leprosy on mother's arm and on child's loin. The widespread papules are due to scabies.

Creche. I visited the creche where some 34 children are cared for. Of these 6 were found to be children of infectious leper parents; the remainder were children of lepers with neural lesions. I examined these 6 children, but could find no signs of leprosy. The children in the creche are isolated from their parents when weaned, that is at about two years of age. In the case of parents with slight lesions or with only neural lesions, the contact of the children for the first two years of life may be fraught with little danger of infection. But the six children of open lepromatous cases must have received a severe infection. The reason for the delay in isolating the children is the unwillingness of the parents to part with them, and the difficulty of rearing the children apart from their parents. I think that an effort should be made to separate the children of open cases at birth. If this is done, and if all open cases are segregated in a special area of the island, then the chance of infection of children within the settlement should be very materially diminished.

Considerable care had been taken to keep the creche children separate from the leprous school children. I consider that if the

open lepromatous cases among the school children, some 12 to 19 in number, are removed there should be little danger in the creche children of school age attending the school and mixing with the other children, as the latter have either no signs of the disease, or only neural lesions. Many of the children, both in the school and in the creche, showed skin disorders probably partly due to avitaminosis. Possibly small doses of cod liver oil would be of benefit.

Both in the creche and in the settlement generally it is important to distinguish between open infectious cases and the

SAVE THE CHILDREN.
Children's creche on Lake Bunyonyi's leper island with the European and African staff of the Settlement. See the lake in the background.

other patients, who are of little or no danger as spreaders of infection. This will require a number of adjustments, but I consider that it is very important that these be carried out.

General Policy. Regarding the settlement itself and the general policy for dealing with leprosy in the Kigezi District, I have a few comments and suggestions to offer.

The site of the settlement has certain advantages and disadvantages. It is amongst beautiful surroundings, there is land for cultivation and abundant water is available. On the other hand, communication with Kabale is long and difficult. Leprosy is transmitted by close contact and is not of a highly infectious nature necessitating the banishment of lepers to a distant island. A site on the mainland nearer to Kabale might have been more convenient in many ways, without bringing the lepers into too close contact with healthy people.

I am told that the natives of Kigezi have little or no dread of leprosy, and that, therefore, lepers are not abhorred or driven out of their homes or villages, at least until deformities appear. In consequence, the lepromatous, highly infectious case has full opportunity for spreading infection. Apparently on this account a certain amount of compulsion has been used through the Chiefs in segregating the lepers and collecting them on to the island. While such a method gives quick initial results in removing at once a large proportion of the recognisable cases of leprosy from the community, it has the disadvantage that it makes it difficult to secure the full co-operation of the patients themselves. The leper naturally says: " You have brought me here against my will, you must therefore provide for me whether I work or not." But it is the general experience of those who have compared the voluntary with the free system that without the willing co-operation of the patient good treatment results are difficult to obtain, and under compulsion satisfactory discipline is hard to secure.

I understand that the settlement has now reached saturation point as far as land for cultivation is available. This might be remedied by discharging some of the adults in whom active signs of leprosy have been absent for a considerable time. This would make room for the admission of open lepromatous cases, if such exist in the district.

Comparing Bunyoni with other leper settlements, it appears to me that the community life of the lepers requires to be organised, occupation therapy initiated and the lepers taught how to lead a healthy life. The present European staff have their hands more than full and it would be difficult for them to undertake this essential side of settlement activity, which could be best initiated by a suitable European male lay-worker. This kind of work would make the settlement more attractive to the type of case requiring treatment and segregation.

I was unable to gather any recent reliable information as to the extent to which leprosy still exists in the district outside the settlement. A survey based upon examination of contacts with cases recently admitted to the settlement might give interesting results. If leprosy is found to be common an educative campaign might be conducted and infectious cases induced to enter the settlement voluntarily.

NYENGA LEPER SETTLEMENT

On May 27th, we visited the Nyenga Leper Settlement, in company with the sister-in-charge. Nyenga lies a few miles to the west of Jinja and in the east of the Buganda Province. The

settlement is supervised by the sisters of the Nkokonjeru Catholic Mission. The buildings and running expenses are supplied by the Native Administration, and by grants from the Protectorate Government through the Uganda Branch of the British Empire Leprosy Relief Association. The patients sleep in large dormitories and in round thatched huts, each of the latter accommodating four. The beds are composed of cement blocks and are vermin-proof. All the buildings are clean and tidy and the patients are very well looked after.

I examined 133 patients who may be classified as follows:—

	With deformity.	*Without deformity.*	*Total.*
Open lepromatous (L_3 and L_2) ...	11	18	29
Requiring bacteriological examination (possibly open lepromatous)	5	7	12
Tuberculoid	7	9	16
Flat Macules	33	31	64
No active signs	9	3	12
Total	65	68	133

Those patients who are able do a certain amount of work on garden and field plots. This side of the work needs further development. General treatment, and special treatment with chaulmoogra preparations, are given, and many of the patients show distinct signs of improvement. I suggested to the sisters some further lines of treatment.

The isolation of the 29 highly infectious cases and possibly some of the 12 patients in the second category is of value towards the prevention of the spread of leprosy outside the settlement. It is important, however, that further segregation of these dangerous cases within the settlement take place, or at least that such cases should not be allowed to live in the same buildings with slightly affected, non-infectious cases.

The settlement is visited periodically by the mission doctor. I am informed that leprosy is highly endemic in the eastern part of Buganda, and that some 200 of the school children are supposed to have the disease. A carefully conducted survey might show some interesting results.

BULUBA LEPER SETTLEMENT

On the afternoon of May 27th we visited the Buluba Leper Settlement in company with the Senior Medical Officer of the Eastern Province. The settlement is situated some 15 miles to the S.E. of Jinja in the Busoga District, and lies on the shores of Lake

Victoria. We again visited this settlement on the 28th and examined the patients. The care of the patients is entrusted to the sisters of the Catholic Mission at Nkokonjeru, and they have had 20 acres of land allotted to them on which are the administrative buildings and quarters of the staff along with dormitories for women and children. Adjoining land is allotted by the Administration to patients for cultivation on the basis of 4 acres per patient. The object of this is that the patients should support themselves by their cultivation. An allowance is made by the Administration to newly admitted patients during a period of six months, to maintain them until this land becomes productive. The period for allowance was originally three months, but as this was found insufficient the period has been prolonged.

The patients at present in the settlement are divided as follows:—

	Men	*Women*	*Children*	*Babies*	*Total*
On the mission land ...	—	17	31	3	51
On the allotted land	75	19	7	—	101
Totals	75	36	38	3	152

Of these, 30 are already independent through cultivation, and it is hoped that the majority of the remainder on the settlement will be independent by the end of the year. There are at present 14 tiled huts on the settlement, the rest of the patients living in mud-wattle-thatched houses. A tiled house has recently been erected to lodge new patients until huts can be built to accommodate them.

At the time of our visit 13 patients were absent on leave. Of the remainder I examined 152 men, women and children, who may be classified as follows, D indicating " deformed " and U indicating " undeformed ":

	Men		*Women*		*Children*		*Total*
	D	U	D	U	D	U	
Open lepromatous ... (L_2 and L_3)	2	8	3	6	0	1	20
Possibly open, requiring bacteriological examination	4	7	2	3	1	5	22
With tuberculoid lesions ...	5	8	3	6	4	5	31
With no active signs ...	3	8	2	1	1	8	23
With flat macules	14	12	6	1	1	4	38
Totals	28	43	16	17	7	23	134

There are thus 51 with deformities, but many of these are of lesser degree and do not preclude their working.

Two highly infectious women were found in the women's dormitory, and as there are three babies there it is highly important that these women be removed and that no other infectious cases be allowed to come in contact with these babies. Among the school children there was only one open case; he should be prevented from mixing with the other children.

Treatment is carried on with considerable skill by Sister Peter, and there was distinct evidence that many of the patients had made definite progress towards recovery. I cannot praise too highly the great devotion and talent with which the sisters, and especially Sister Peter, are carrying on this work in the absence of medical advice from a doctor. However, I was able to advise Sister Peter regarding the treatment of several of the patients.

Suggestions. The Buluba institution is a new experiment in the care of lepers and in the control of leprosy. It has some excellent qualities, but also some weak points and disadvantages.

Among the praiseworthy qualities should be mentioned the attempt to keep the patients in their natural surroundings, busy with farming and maintaining, as far as possible, their independence, while at the same time they are helped when necessary, especially at first. They are given medical aid and anti-leprosy treatment, and by their segregation sources of infection are removed from the general population.

Chief among the disadvantages is the dual form of control by the Administration and the Mission. The aim of the Mission is largely a desire to render physical and material help to a particularly unfortunate class of the community. It is felt, however, by the Administration that this object is sometimes prejudiced by a pre-occupation with the religious side of the Mission's activities.

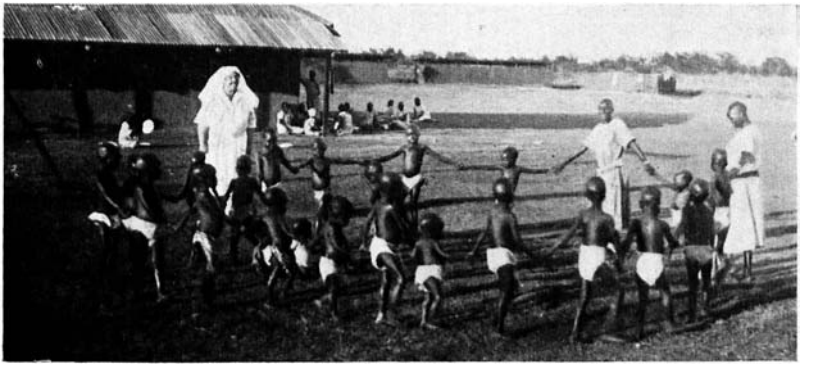
Leprosy is regarded by the Administration as one of many public health problems with which it is faced, and it is felt that other problems are of even more immediate importance than leprosy; they also consider that the ultimate control of leprosy is dependent on the general improvement of the education and hygienic condition of the people. They are therefore on their guard against spending a disproportionate amount on leper settlements. These and other divergencies of views have in the past caused clashes in the determination of detailed policy; but, as far as I was able to judge, many of the difficulties at issue are now in course of being satisfactorily settled.

It is difficult for the sisters to control the male patients. The chief has many other duties and, I am told, seldom visits the colony. The leper headman seems to have little personality and is not likely to be able to control the patients. I have suggested later in this report a method by which the social and occupationa

work of the colony might be organised and set on a satisfactory footing. This method would, I understand from the sisters, be welcomed by them.

KUMI CHILDREN'S HOME AND ONGINO SETTLEMENT

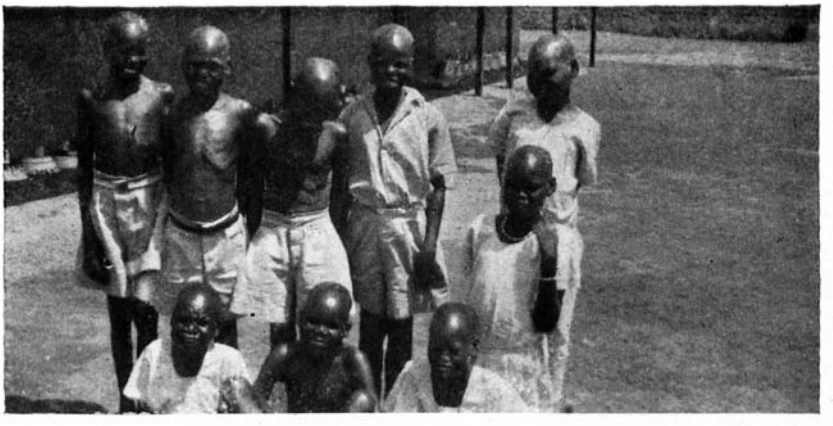
On May 31st I visited the Kumi Leper Home for Children, and was shown round by Miss Laing, the Superintendent. Here there are 315 leper children, of which 207 are boys and 108 girls. There are 26 children of various ages without signs of leprosy. The children attend school and are taught various industries such as tailoring, carpentry and building. Games, Scouts, Cubs and Girl Guides are well organised. The nourishment of the children



The healthy children's creche at Kumi with Miss Laing.

is carefully attended to, complicating diseases are treated, and intramuscular injections of chaulmoogra oil mixture are given; I suggested that in suitable cases intradermal injections would give quicker results. Almost all the children look strong and healthy and are making satisfactory progress towards recovery. There are a few advanced nodular cases who cannot be expected to recover, and these will be transferred to the Ongino settlement. All the children have been admitted voluntarily, and this and the genius of the Superintendent are chiefly responsible for the excellent results obtained. The buildings are simple, but adequate. They are arranged round a large quadrangle. There are separate dormitories for boys and girls, and the dormitories are again subdivided according to the types of cases.

Some of the children are being trained as nurses and others as teachers. At present Miss Laing, who is a missionary of the C.M.S. and a trained nurse, is the only European worker. She has an efficient African male assistant, and some of the lepers, trained in the institution, give valuable help in the dispensary and



Infectious cases at Kumi who must be segregated from the other children.

Kumi leper children's home—the open air school.

Ongino leper settlement—the tailoring class.

in the other sides of the work. I understand that the main running expense of the Children's Home is met by grants from the Mission to Lepers.

On the afternoon of May 31st, and again on the 4th of June, I visited the Ongino Leper Settlement in company with Miss Laing. Here are 400 lepers, all of whom, I am told, have come entirely voluntarily without any outside compulsion. Of these 300 are now self-supporting by their own agricultural labour, and 50 others recently admitted are being subsidised for the first six months. Only 50 of the patients are too weak or disabled to support themselves.

Some of the patients are still lodged in mud and wattle huts, but these huts are being replaced as quickly as possible by better houses of two types. The cheaper kind has cement floors and iron roofs, but the walls are built of mud. There are two adequately large rooms. There is also a kitchen, store and latrine. This type of house costs £12. There are twelve other houses similar in size, but built of cement blocks. These have also other improvements as compared with the mud houses. They cost £90 each. For their construction a grant of £900 was given by the Protectorate Government.

There is a large building for treatment and central administration. This is made of cement blocks and has an iron roof. It was built chiefly from a grant given by the British Empire Leprosy Relief Association. These buildings have been constructed by the patients under the supervision of the Lady Superintendent.

The chief difficulty in the settlement is the want of an adequate supply of water in the dry season. Water is collected from the roof in tanks but is not sufficient. Estimates for a bore-well costing thirty shillings and sixpence a foot have been received, and it is hoped to construct this with a part of the Native Administration grant, though this will involve delay in further house construction.

The discipline and morale of the patients is excellent. They are well nourished, and the physique of most of them is excellent. Many of them have already recovered, and even bad nodular cases are progressing favourably towards recovery. I was particularly struck with the good physique of partially deformed patients who, in spite of their deformity, are able to support themselves entirely by cultivation of their land.

Each patient is given at least three acres of land; and more when necessary. A herd of cattle and goats is kept, and meat is supplied to patients on payment either in money or in kind. The patients have been taught independence, and this reacts favourably on their physique and improves their chance of recovery.

The way in which patients are recruited to the settlement is

particularly interesting. The chiefs are occasionally asked by the District Commissioner to call lepers together to headquarters where they are addressed by Miss Laing, recovered lepers being demonstrated to show the effect of treatment. At both Kumi and Ongino out-patient clinics are held which are attended by some 250 patients. Some of these, who are unable to attend regularly because of distance, enter the settlement.

The children of non-infectious lepers are allowed to remain with their parents. Infectious lepers in the settlement are persuaded to place their children in the Kumi Children's Home.

Apart from the salary of the Superintendent, the running expenses of the settlement amount to £500 a year, which is met by a grant from the Native Administration. The money received is used most economically, the buildings being constructed at a surprisingly low cost, and the work of the settlement being done almost entirely by leper labour. This is carried out without compulsion, the lepers taking a pride in their own institution. Several grants have also been received for both institutions from the British Empire Leprosy Relief Association through its Uganda Branch.

Land allotment and discipline are carried out by the chief, who co-operates harmoniously with the Superintendent in this side of the work.

The Children's Home and the Settlement are able to help each other. The former supplies staff in the form of trained young men and women for working the Settlement, while the latter receives infectious cases from the Home and provides land for patients who have not recovered when they reach the age for leaving the Home.

In my opinion, both institutions are run on the best possible lines; and the methods used are worthy of careful study by those concerned with leprosy relief and control.

THE LANGO DISTRICT

From Kumi and Ongino I went north, via Mbale and Soroti, to Lira, where I stayed with the District Medical Officer for a day and a half and visited several dispensaries with him. In two of the dispensaries the number of lepers on the registers was high, especially at Kaberamaido near Lake Kioga. In 1930 a survey of four counties in the Lango District showed 650 cases among 40,000 people, that is 1.7%. On this basis it is calculated that there may be 2,500 lepers in the district. Formerly there was a small leper camp with 36 patients at Aduku, but this was dissolved in 1932 on the recommendation of the District Medical Officer.

I consider it advisable that anti-leprosy work be undertaken in

this district. I have suggested to Canon Laurence, of the Church Missionary Society at Lira, that if the Native Administration are willing to give land, houses and support of patients, and the Church Missionary Society to sponsor the staff, the British Empire Leprosy Relief Association might possibly be able to supply a trained worker. As a preliminary step, however, to making a leper settlement, I consider that it would be better to begin with voluntary

Leprosy's younger sister, florid yaws.

out-patient treatment to ascertain whether lepers would attend for treatment without compulsion, as they do at Kumi and Ongino. Such out-patient treatment carried out by a sympathetic and expert leprosy worker might lead on naturally to founding a permanent leper settlement.

I would suggest that the Church Missionary Society should approach the British Empire Leprosy Relief Association with a request that they should supply a sanitary worker already experienced in leprosy work. If such a worker is available he might first be sent to the Bunyonyi Settlement where, as mentioned in the former part of this report, he could organise occupation therapy and the social side of the work. After this he could spend some time similarly organising this side of the work at Buluba. Later he could, if the Government, the Native Administration and

the Church Missionary Society were willing, assist with out-patient leper treatment at various centres in the Lango District with a view to the formation of a leper settlement near Lira. In this later work Miss Laing would be able to supply trained native assistants from her Children's Home who would act as interpreters and otherwise help the sanitary worker.

If such a worker were supplied under the British Empire

Transport in East Uganda with the gourd hood up.

Leprosy Relief Association—Toc H scheme he would work (as in Nigeria and elsewhere) under the British Empire Relief Association and its Uganda Branch, and under the auspices of the local missions, to which he would be attached for this special work.

Acknowledgments. I wish to express my gratitude to the Director of Medical Services for his welcome to Uganda, and for the comprehensive arrangements for my tour. I wish to thank the medical officers, missionaries and others who have generously supplied hospitality, transport and every facility towards making my visit interesting, and, I hope, of some use.

NOTE. In the original report there were notes on *treatment* and some general remarks. As these apply equally to other East African territories they are omitted here and are dealt with on pp. 100-102.

KENYA

NORTH AND CENTRAL KAVIRONDO

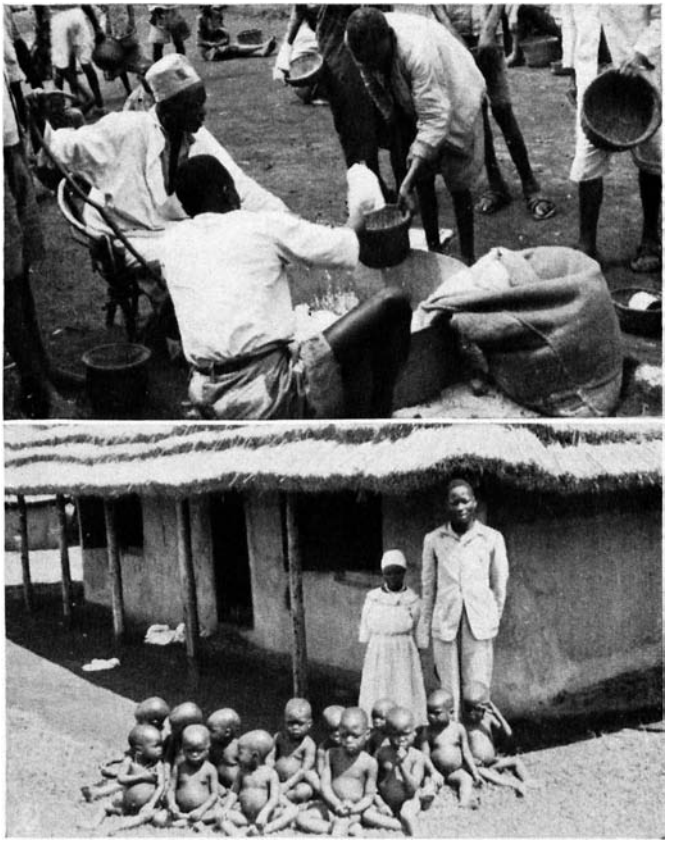
Kakamega Leper Camp. I arrived in Kakamega from Uganda on the 6th of June, 1938. On the 7th and 8th of June I visited the Leper Camp in company with Dr. Haines, and examined the patients and buildings. I found 170 inmates, 150 being patients and 20 children without signs of leprosy. I classify below the inmates under five categories, and subdivide these into men, women and children; deformed and undeformed. The five types were :—(a) open lepromatous (L_2 and L_3), (b) doubtful lepromatous requiring bacteriological examination to confirm, (c) with distinct tuberculoid patches, (d) with flat macules, (e) with no active signs.

Types		*Men*	*Women*	*Children*	*Totals*	
Open Lepromatous (L_2 & L_3)						
	(deformed)	9	2	—	11	
	(undeformed)	7	7	—	14	25
Doubtful Lepromatous						
	(deformed)	13	6	—	19	
	(undeformed)	10	3	—	13	32
Tuberculoid	(deformed)	13	4	—	17	
	(undeformed)	9	13	1	23	40
Flat Macules	(deformed)	12	13	—	25	
	(undeformed)	9	5	—	14	39
No active signs	(deformed)	6	5	—	11	
	(undeformed)	1	2	20	23	34
	Totals	89	60	21		170

One in six of the patients might be considered highly infectious. Probably one-third of the whole were infectious to a greater or less degree. Eighty-three were deformed and sixty-seven showed no signs of deformity. Many of the patients showed complicating skin diseases, such as scabies and tinea, the treatment of which would probably cause amelioration of the condition. The patients cultivate some of the surrounding land so as to supplement the diet supplied at the Camp. Some of them appear strong and healthy, especially those engaged in active work. Later in the report I have added a note on the treatment recommended. There are certain paid posts given to lepers in connection with the Camp : 1 dresser @ Sh. 15/-; 2 sub-dressers @ Sh. 7/6; headman @ Sh. 12/-; teacher @ Sh. 12/-; ayah for young children @ Sh. 5/-; 2 builders @ Sh. 8/- each; 1 dhobi @ Sh. 5/-; 6 labourers @ Sh. 2/-. The Camp is supported by a

Grant of £160 a year from the Local Chiefs' Council, and £330 from the Medical Department.

The daily diet allowance consists of mealie-meal 1½ lbs., chiroko bean 6 ozs., salt ½ oz.; there is also 8 ozs. of meat given twice weekly. This diet is supplemented by the agricultural produce of the patients.



At Kakamega leper camp: giving out mealie rations; the healthy children's creche and their faithful ayah.

Seventy of the patients have been in the Camp for 5 years or more, 31% of these have deteriorated, while 69% have improved or are stationary. The patients are housed in mud and thatch huts. The general sanitation of the camp is fairly good, though there appears to be a certain amount of overcrowding.

Of the 21 children, 8 are with their parents in their huts, and 13 are in a small creche where they are looked after by an African ayah. These latter appear to be remarkably healthy; they are from 2 to 4 years of age, and the ayah is to be congratulated

on her work. Only one of the children (that in the Camp) shows definite signs of leprosy—a tuberculoid lesion.

The Camp is situated within a few hundred yards of the General Hospital. This has the advantage of facilitating medical supervision, but it is too near the town and there is no room for expansion. I would suggest, for the improvement of the Camp as it exists at present: the treatment of complicating skin diseases; rubbing of the patient's skin with cheap bland oil, sulphur being added when necessary; encouragement of the patients to more frequent bathing; organisation of exercise and especially of various occupations; careful selection of cases for special treatment; the tuberculoid cases should do particularly well with intradermal injections.

Question of a new Settlement for North and Central Kavirondo. I went into the question of the adequacy of the present Camp for dealing with leprosy in North Kavirondo. Recent returns collected from chiefs give the number of lepers as 450 outside the Leper Camp, but this is possibly an under-estimate. According to these returns, leprosy is chiefly concentrated in the western locations, especially in Marach, Buhaya and Itino, which report respectively 42, 111 and 80 lepers, more than half the whole. I am told that while the eastern tribes of the district dread leprosy and drive out the lepers those in the west are more indifferent. This is a possible explanation of the relatively high number in the latter. I went, in company with Dr. Jobson, the Medical Officer, to Marach, where we met a number of Chiefs and members of the Local Native Council. I explained the nature of leprosy and, as an example of what might be done to control the disease, I described the methods adopted at Ongino in the Eastern Province of Uganda.*

Obviously, the present Leper Camp at Kakamega, though useful in segregating a certain number of infectious lepers, does not get down to the root of the problem. To do this it would be necessary to admit far more of the lepers in the district. The present Camp is more than full, and it would not be advisable to increase its present size because of its proximity to the town and the absence of sufficient cultivable land.

The most suitable plan seems to be to begin a new agricultural settlement on the lines of that at Ongino. Such a settlement, if situated between North and Central Kavirondo, could be utilised for the lepers of both districts, as there appears to be a considerable amount of leprosy in Central Kavirondo, though probably less than in North Kavirondo. In choosing a

* See the Uganda Report, p. 41.

suitable site, there are certain points to keep in mind:—(a) sufficient land for building and cultivation; (b) sufficient water; (c) a healthy site, especially as regards malaria; (d) easy accessibility; (e) sufficient distance from towns or large villages; (f) proximity to a mission which will supply or sponsor the superintendence of the settlement. To make such a settlement a success there must be a suitable, trained, whole-time European worker.

I discussed the matter with the Medical Officers and the District Commissioner at Kakamega, and later with the Provincial Commissioner, District Commissioner of Central Kavirondo, and the Senior Medical Officer at Kisumu. It was suggested that a suitable site might be available at Bukura, where the present agricultural training school is situated. It is understood that there is a proposal to move this training school to another site. If this takes place, several hundred acres of land, two permanent houses, and a large number of huts would be vacated, and might be available for a leper settlement. The site is healthy and only some 24 miles from Kakamega. It is about 10 miles from Butere, where there is a C.M.S. Station, with a teachers' training school, and is within reach of Maseno where the C.M.S. has a medical mission.

I suggest that, if this site is available and the C.M.S. Mission is willing to co-operate, the B.E.L.R.A. should be asked to supply a suitable trained European health worker, similar to those who are so satisfactorily doing this type of work in Nigeria and elsewhere. His salary, which would be on the same scale as that of a missionary, would be paid by the administration to the mission for this special purpose. The site is in North Kavirondo, but near the border of Central Kavirondo. The settlement would be available for lepers from both districts. The expenses would be met by the Local Native Councils of the two districts and by a grant from the central Government. The able-bodied patients in the Kakamega Camp would gradually be transferred to the settlement, only disabled patients being retained in the Camp. Once the settlement was firmly established and peopled with able-bodied, hopeful patients, some of the disabled patients might gradually be transferred, till the Kakamega Camp could be finally closed down, the present grants to that institution being transferred to the settlement.

In addition to its effect in controlling leprosy, I would point out the importance from a general sanitary and from an agricultural point of view, of a leper settlement such as that at Ongino, on the lines of which I suggest that a Kavirondo Leper Settlement be formed. This means a large community living in

hygienic houses as approved by the Sanitary Department, and farming the land under control as advised by the Agricultural Department. Many of the patients, after spending some months or years under these conditions, would recover and return to their own villages, carrying with them improved methods.

SOUTH KAVIRONDO

On June 11th I crossed the Kavirondo Gulf to Kendu in South Kavirondo. There I visited the Leper Camp attached to the S.D.A. Hospital, in company with Dr. Madgewick of that Mission, and Dr. Carothers, the Government Medical Officer. There are now only 12 patients in this Camp, 8 of whom are highly infectious cases of lepromatous type. Dr. Madgwick has suspended admission of new cases pending action by Government. I discussed the leprosy situation with the doctors and with Chief Paul Umbova of the Karachuonya Location. He had lately sent in 170 names of lepers in his location, which has a population of about 30,000, but he considered that there were many others, probably 500 in all, in the location. If the latter figures are correct, it would make an incidence of 1.7 per cent. The Chief is of the opinion that leprosy is spreading. He says that up to 25 years ago people dreaded leprosy and drove out the lepers; now, they no longer fear the disease to such an extent, and the lepers are allowed to mix freely with the people. To this he attributes the high incidence and the increase of leprosy.

I described the Ongino Settlement, referred to above, (see p. 41), and Dr. Madgewick said that his Mission would be willing to carry on work on similar lines if the expenses were supplied. A suitable site for a South Kavirondo settlement was discussed. It was considered that suitable land would be available about 30 miles from Kendu on a site lying south of the road to Kisumu, between Oyngis and Miriu River, and near the boundary between South Karachuonya and Kisii. I discussed the question of this settlement later with the Provincial Commissioner and the Senior Medical Officer. They agreed that suitable land might be procured in this position and that the site would be healthy and have sufficient water.

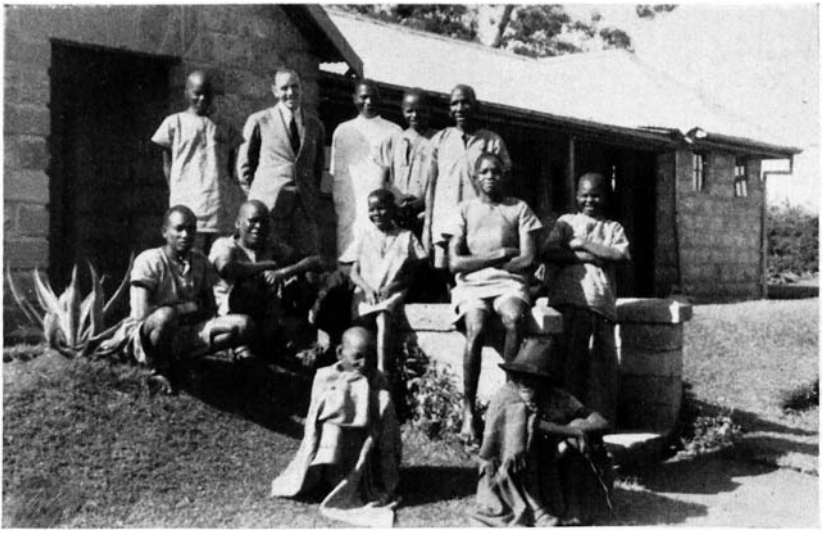
The opinion is held by all whom I consulted that the people of South Kavirondo would not be willing to go to a settlement in North or Central Kavirondo, and the people of the latter districts would likewise not be willing to go to a settlement south of the Gulf. Two settlements are, therefore, necessary to deal with the control of the disease.

For one in the north, there would be little need of capital

outlay at least at first, if the site mentioned can be obtained. But judging from the figures at the Ongino Settlement, an expenditure of about £500 a year in addition to £250 a year for the Health Worker, would be necessary.

For the southern settlement there would, in addition to a similar yearly expenditure, be the need for at least £1,000 of capital outlay for buildings, apart from any expense that there might be for acquiring the land.

As a stranger to Kenya, I feel diffident in putting forward the above suggestions. The opinion has been expressed that as the general hygienic condition of the people improves, such diseases as leprosy will gradually die out. Be that as it may it



The Church of Scotland leper hospital at Tumutumu.

will be a slow process and can be hastened, and I would suggest that the other view be carefully considered, whether the establishment of one or two well-planned leper settlements would not be one of the best means of improving general hygiene.

LEPROSY IN CENTRAL KENYA

I arrived at Nairobi from Kisumu on the 14th of June. In the afternoon I visited the Infectious Diseases Hospital with Dr. Martin. There are 8 lepers in this hospital at present, 6 of whom are advanced open (L_3) cases. They receive symptomatic treatment as required.

On the 16th I set out by motor to visit the Nyeri and Meru Districts at the foot of Mt. Kenya. At Tumutumu I visited the Church of Scotland Mission Hospital under Dr. Brown. There

is a leper ward at a short distant from the hospital with 12 lepers, of whom I saw 10. Of these 6 were advanced open (L_3) cases, and 2 showed Tuberculoid lesions. Only one was a woman. Dr. Brown had recently persuaded the patients to take more active exercise, cultivating the garden and keeping the roads clear of weeds, etc., The majority of the patients, however, looked as if they required more exercise. The patients are lodged in a neat stone building divided into several rooms, two patients being lodged in each room.

Geographic leprosy at Tumutumu (major tuberculoid).

The next day I went to Chogoria, where the Church of Scotland have a hospital under the charge of Dr. Irvine, There is a small leper camp at a short distance from the hospital. There I saw 15 patients, 5 others being absent on leave. Of these 20 patients, 9 were advanced lepromatous (L_3) cases, 1 was slightly infectious, 9 had tuberculoid lesions and 1 had no active signs. Dr. Irvine gives special as well as general treatment to the patients and several have already recovered and returned home. The patients are lodged in two buildings with separate rooms, the one building being used for infectious and the other for non-infectious cases.

Both at Tumutumu and Chogoria, one of the chief difficulties is to give the patients sufficient work and exercise, occupation therapy being the principal part of leprosy treatment. Their

arable land is at present not sufficient and more is difficult to obtain. It is hard to keep the patients actively employed without constant supervision, which it is difficult for the doctor, with his many duties, to supply. To make a leper settlement successful (as mentioned in the former part of this report) it is necessary to have a European whole-time health worker in charge, and to have the settlement sufficiently large (200 to 400 patients) to justify the employment of such a health worker.

The question arises whether there are in the Central Province sufficient lepers to justify the formation of such a settlement. Most

The Church of Scotland leper hospital at Chagoria.

of the medical officers whom I questioned were of the opinion that the incidence of leprosy in the Central Province is considerable, though less than in Kavirondo. I would suggest that a leprosy census be undertaken similar to that carried out in Northern Kavirondo. This could be done with the aid of the chiefs, medical assistants and others, and the missions could gather information by means of their medical assistants and school teachers scattered throughout the villages.

If the incidence is found to be sufficiently high, say some 2,000 cases, then an agricultural settlement similar to that recommended for North and Central Kavirondo, might be formed on a healthy site where sufficient arable land and water are available. The site would have to be central to the highly endemic areas and within reach of a Medical Mission which would undertake supervision.

THE COASTAL PROVINCE

Msambweni Leper Camp. On June 20th I went to Mombasa by train. The next day Dr. Proctor arranged for me to visit the leper camp at Msambweni, which lies about 34 miles south of Mombasa on the sea coast. I was shown round the camp by Dr. Wright, the District Medical Officer. It is about 2 miles from the hospital and is visited by the Medical Officer and Hospital Sister as required. A senior dresser, himself a leper, is in immediate charge. I examined the 42 patients and classified them as follows:—

		Men	*Women*	*Totals*	
Open lepromatous	(deformed)	16	2	18	
(L_2 and L_3)	(undeformed)	8	0	8	26
Slightly infectious (L_1)	(deformed)	1	0	1	
	(undeformed)	3	1	4	5
non-infectious	(undeformed)	0	0	0	4
With tuberculoid lesions,	(deformed)	4	0	4	
With flat macules	(deformed)	0	3	3	
non-infectious	(undeformed)	0	2	2	5
With no active lesions	(deformed)	1	0	1	
	(undeformed)	0	1	1	2
Totals		33	9		42

Seventy per cent. are infectious cases and 62 per cent. are highly infectious. Nearly two-thirds are deformed to a greater or less extent. At Kakamega only 16 per cent. are highly infectious. From this comparison one may surmise either that leprosy in the coastal area is of a much more severe type, or that the less infectious types of patient are not attracted to or not retained in the camp. Sixty-six per cent are deformed as compared with fifty-five per cent at Kakamega, which would indicate a more severe type in the coast region.

Nineteen patients were admitted last year, of which 6 were re-admissions and 13 new admissions. There were 9 deaths, 5 were discharged as non-infectious, and 4 absconded.

About half the patients are Waduruma. This, I am told, may be partly the result of the leper camp having been formerly in Waduruma territory. It may also indicate that leprosy is less common among the Wadigo, especially as the camp is now in Wadigo territory and the Waduruma have a considerably longer distance to travel. Almost half (20) of the patients are from outside the Administrative District, 8 being from Tanganyika Territory, the border of which is some 30 to 50 miles distant.

While a careful survey is necessary to ascertain with any certainty the extent and nature of leprosy in the district, the

indications from the above figures are :—

(a) That leprosy is a prevalent disease in this area.

(b) That it is of a severe type.

(c) That there are many lepers of types that spread the disease still at large among the community.

(d) That few early cases of leprosy seek admission to the leper camp.

(e) That the great majority of those who are admitted to the camp are patients who have sought shelter only when mutilated or disabled, after having been a source of danger in their homes and communities for many years.

Kaloleni Leper Camp. On June 23rd I visited Kaloleni with Dr. Clark, the District Medical Officer. This station is over 30 miles to the N.W. of Mombasa, with which communication is difficult on account of the nature of the roads. At Kaloleni there is a small leper camp in connection with the Church Missionary Society Hospital. Dr. Allen, the Doctor-in-Charge, was absent on leave, but we were shown round by Dr. Trant, who is acting as locum. Eleven patients are at present in the camp, all of them males. These may be classified as follows:—

	Deformed	*Un-deformed*	*Totals*
Open lepromatous cases (L_2 and L_3)	3	3	6
Slightly infectious (L_1)	1	–	1
With tuberculoid lesions	–	1	1
With flat macules	2	–	2
With no active signs	1	–	1
Totals ...	7	4	11

The spirit of the patients seems to be one of passive inactivity. Only two of the patients would at present benefit from special treatment. I understand that there is plenty of leprosy in the district. This was shown by the fact that a few years ago, during a time of famine, 100 lepers were admitted. I understand that more patients are not encouraged to come to the leper camp, partly owing to lack of funds; the expenses of the camp are met from private subscriptions alone.*

Discussion and Suggestions. I had an opportunity of discussing the question of leprosy control with the Provincial Commissioner and the Senior Medical Officer.

After studying the condition of leprosy in the coastal province as far as is possible during my brief visit, I would offer

* Dr. Allen tells me that he hopes to begin a new settlement on his return from leave.

the following suggestions. In my opinion, leprosy is a serious disease in this region. The two leprosy institutions at Msambweni and Kaloleni remove a certain number of the open cases from contact with the community, but this is not sufficient to control the disease to any great extent.

In the former part of this report I have recommended the formation of a central leper settlement for North and Central Kavirondo, to be conducted on certain definite lines. I suggest that a similar settlement be formed for the Coastal Province at some central and otherwise suitable place. The same requirements would apply as in the Lake Province.

(a) Sufficient good arable land; probably a thousand acres would be necessary for 400 patients, the number that should finally be aimed at.

(b) A healthy site, or one that could be rendered healthy especially as regards malaria.

(c) Sufficient water for agriculture and personal use.

(d) A whole-time trained European worker, similar to those sent out by B.E.L.R.A. and Toc. H. would be attached to a local Mission to undertake this work, and his salary, etc. (£250 to £300 per annum) would be met from Government or L.N.C. sources.

(e) Medical supervision by a Mission or Government Doctor; a visit once a week would ordinarily be sufficient.

(f) Self-support would be aimed at as far as possible, but adequate initial and recurring grants would be necessary.

In such a settlement great care would have to be exercised as to the types of cases first admitted. Patients should be attracted by the hope of recovery, and only hopeful cases, who would give active co-operation should be admitted at first. Only one of the present patients at Kaloleni, and a small proportion of those at Msambweni, would fall into this category. I believe, however, that suitable patients could easily be attracted from the outside leper population, and once the settlement had been established upon the right lines other patients from the two present camps could be drafted into it. The remaining patients in these camps would gradually die out, when they could be closed down.

For further details of the methods of running a leper settlement, I would refer again to the excellent work of Miss Laing in the Eastern Province of Uganda.

GENERAL REMARKS

I have recommended that the control of leprosy in Kenya be carried out by the formation and maintenance of a definite type

of agricultural settlement, under a whole-time trained European, working in conjunction with a local Mission. Three or four such settlements would be necessary, viz., two in the Nyanza Province, one in the Coast Province, and, if the incidence is shown to be sufficiently high, one in the Central Province. I would suggest that if funds for all these settlements are not at first available, a beginning should be made with two, one in the Nyanza Province and one in the Coastal Province. I would also suggest the formation of a Kenya Branch of the British Empire Leprosy Relief Association, similar to those in Uganda and Nigeria, which would co-ordinate any anti-leprosy activity throughout the Colony.

Acknowledgements. I would express my thanks to the acting Director of Medical Services for arranging my tour in Kenya, and acknowledge with gratitude the hospitality and help which I received from him and from Government Medical Officers, missionaries and others, who spared no trouble in making my visit interesting and profitable.

NOTE. In the original report a note on *treatment* was added, for this see page 100.

TANGANYIKA TERRITORY

INTRODUCTION

At the invitation of the Government I visited Tanganyika Territory, arriving at Dar-es-Salaam on 27th June, 1938. From this date until 20th July, 1938, I toured the Territory according to a general itinerary prepared by the Acting Director of Medical Services and local itineraries arranged by local medical and administrative officers. It was not possible to inspect all the leprosy institutions in the limited time available; indeed, in a country with such vast area and undeveloped communications, it would have been impossible to cover anything like the distances I did had not the Medical Department kindly arranged for air travel.

Account of Tour. In the course of the tour the following leprosy institutions were visited :—

(1) Infectious Diseases Hospital, Dar-es-Salaam.
(2) Leper Camp, Nungi, Dar-es-Salaam.
(3) Benedictine Settlement, Ndanda, Masasi.
(4) U.M.C.A. Camp at Lulindi.

(5-9) U.M.C.A. Clinics at Lulindi, Ndibwa, Masasi, Mpwapwa and Tandahimba in the Masasi and Newala Districts.
(10) Benedictine Settlement, Morogoro, Peramiho, Songea District.
(11-12) U.M.C.A. Settlements at Likuyu and Mngehe, Songea District.
(13) U.M.C.A. Clinic at Mbahawa, Songea District.
(14) C.M.S. Settlement, Makutupora, Dodoma District.
(15) Dr. Maynard's Settlement at Kolondoto, Shinyanga District.

In many of these institutions I had an opportunity of examining and classifying the patients. The results of these examinations, showing the various types, are given in tabular form on p. 61.

DAR-ES-SALAAM LEPERS

On June 27th I visited with Dr. Mackay the Infectious Diseases Hospital where I saw 23 lepers, and on the following day the leper camp at Nungi on the other side of the harbour, where there are 51 lepers. Reference to the table shows that the majority of these patients are advanced open lepromatous cases, 58 per cent being deformed. In the camp there is no one to look after them except the headman, himself a leper. We came across a striking example of heroic overcoming of difficulties. One victim is entirely without fingers and toes, but in spite of his infirmity he digs the ground and chops wood, tying on the instruments required to his stumps of hands in the most ingenious way (see p. 67).

I flew from Dar-es-Salaam to Masasi, via Lindi, where I had an opportunity of discussing leprosy with the Provincial Commissioner. I spent from the 30th of June till the 4th of July visiting the leprosy institutions of the Masasi and Newala Districts in company with Dr. Latham, the Medical Officer of the Southern Province. These are under the care of the Benedictine Mission at Ndanda and the Universities Mission at Masasi and Lulindi.

THE NDANDA SETTLEMENT

The Benedictines have a large agricultural settlement situated about one mile from the mission hospital at Ndanda. A whole-time sister is in charge, and it is frequently visited by Dr. Stinnesbeck, who is also in charge of the hospital. There are 343 patients in the settlement. Of these, 64 are children. The

majority of these children are early non-infectious cases who should not be allowed to mix with the others. I had not sufficient time to examine and classify the patients in detail, but many of them showed signs of improvement under treatment. The treatment consists of deparasitation, occupational therapy and injections of creosoted hydnocarpus oil. The patients are able to supply about half of their own food from their agriculture, the rest being supplied by the institution. The running expenses of the settlement, apart from that of European staff are about £700 a year, of which £192 was met last year by a Government grant. Houses are erected by the patients themselves and are of the native style. The executive buildings are of a permanent nature and were built from a grant made by the British Empire Leprosy Relief Association. There is a school for the children, and various handicrafts such as basket-making, pottery and carpentry are taught. One hundred and seventy-five lepers attend as out-patients. (For classification of cases see table).

THE CAMP AND CLINICS, MASASI AND NEWALA DISTRICTS

I visited the U.M.C.A. Leper Camp at Makaseka, near Lulindi. There are 50 inmates, 29 of whom are deformed cases. They live in separate thatched huts with bamboo walls. They cultivate the surrounding land and are able to provide in this way about one-third of their food. One of their number, a deformed but healed leper, acts as headman and fosters a communal spirit, the weaker lepers being helped by the stronger. The doctor, sister and dresser pay regular visits to the camp, which is about 1½ miles from the mission hospital. (For classification of cases see table).

The U.M.C.A. have 8 leper clinics, most of them conducted by Miss Shelley, a nursing sister, with the help of African dressers trained by her. At these and at the U.M.C.A. hospitals and dispensaries, 873 patients were in attendance at the end of 1937. The mission doctors also visit the clinics as required. I visited 5 of these and examined the patients present. In all of them, except Ndibwa, I was impressed with the good physique of the patients and the progress that the majority of them were making towards recovery. At Ndibwa, however, the physique was bad, apparently largely on account of the unfertility of the soil and the frequency of malaria and other weakening diseases. Clinics of the above type are of particular value in regions where the climate is good, malaria uncommon and the nutrition of the people above the average. This applies to the plateau round Newala on which most of these clinics are situated. Under these favourable circumstances lepers, once they have been deparasitised,

	Institution and Place	*Type (1)*		*Type (2)*		*Type (3)*		*Type (4)*		*Type (5)*		*Total*
		Def.	*Un-def.*	*Def.*	*Un-def.*	*Def.*	*Undef.*	*Def.*	*Undef.*	*Def.*	*Undef.*	
1.	Infectious Diseases Hospital, Dar-es-Salaam	2	9	3	2	2	4	1	—	—	—	23
2.	Leper Camp, Nungi, DSM. ...	13	10	5	1	8	3	4	1	5	1	51
3.	Benedictine Settlement, Ndanda	No time available to classify										343
4.	U.M.C.A. Leper Camp, Lulindi ...	6	14	3	3	7	1	9	—	4	3	50
5.	U.M.C.A. Leper Clinic, Lulindi	—	4	—	4	—	5	—	6	—	7	26
6.	U.M.C.A. Leper Clinic, Ndibwa	1	4	—	6	—	5	—	4	—	1	21
7.	U.M.C.A. Leper Clinic, Masasi	—	3	—	4		15	—	5	—	1	28
8.	U.M.C.A. Leper Clinic, Mpwapwa	4	3	—	10	1	10	2	9	—	10	49 men (& 24 women unclassified)
9.	U.M.C.A. Leper Clinic, Tandahimba	—	9	—	20	1	10	4	10	—	4	58 (& 39 unclassified)
10.	Benedictine Settlement, Morogoro	No time available to classify										1556
11.	U.M.C.A. Settlement, Likuyu ...	2	15	8	2	4	5	5	8	28	18	95
12.	U.M.C.A. Settlement, Mngehe ...	10	19	11	24	2	22	13	40	34	65	240
13.	U.M.C.A. Clinic, Mbahwa ...	—	10	—	15	No time for full classification						135
14.	C.M.S. Settlement, Makutupora	17	36	12	13	13	15	8	17	11	24	166 (& 19 not classified)
15.	Dr. Maynard's Settlement, Kolondoto, Shinyanga	16	19	21	14	6	5	4	2	5	20	112 (& 122 not classified)

Type (1) includes the open cases of the most infectious kind (L_2 and L_3), type (2) slightly open cases (L_1); type (3) patients with tuberculoid lesions; type (4) those with flat macules, many of which were residual; type (5) those without apparent signs of active leprosy. Each of these types is subdivided into deformed and undeformed cases.

tend to improve satisfactorily under out-patient treatment with hydnocarpus oil, and this applies even to lepers of the more advanced lepromatous type. I would suggest, however, that more effort be made in connection with the clinics to educate lepers in

Above is the leper clinic run at Mpwapwa by Miss Shelley (shown between the two doctors).

Water carriers on the waterless plateau of Newala.

hygienic principles and the methods of preventing the spread of infection, especially to children. (For classification of cases see table).

The incidence of leprosy in the Masasi and Newala districts appears to be high, and the same is also probably true for the Lindi and Mikindani districts. Among school children examined

in the Lindi district $2\frac{1}{2}\%$ showed signs of the disease, and the presumption is that it is even higher in the whole population. At the Ndanda school, among 200 children, 12 cases of leprosy were found. Sister Shelley estimates that there are probably about 10 per cent. infected in the Newala District. I think, however, that it is unlikely that the disease develops to any serious extent in such a large proportion of the population, and that 3 per cent. is nearer the actual figure.

On the whole I consider that a strong effort is being made by the two missions to deal with leprosy in the Masasi and Newala districts and that, with an increase of effort on the educational side, the disease in this area should be controlled in the course of time. I would like to commend especially the devoted service of Sister Shelley in the relief of leprosy.

The Treatment Room and Waiting Room at Morogoro Settlement, put up by a grant from B.E.L.R.A.

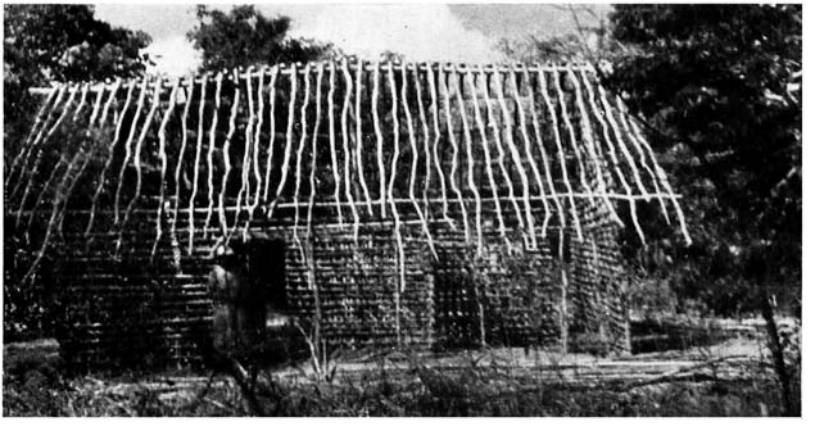
MOROGORO LEPER SETTLEMENT, SONGEA DISTRICT

From Masasi I proceeded by aeroplane to Songea on July 4th, and after consultation with the District Officer was motored out to Peramiho by the S.A.S. That afternoon and on the following three days I had opportunities of visiting the Morogoro Leper Settlement and studying the conditions there.

The Settlement is situated about three or four miles from the Peramiho Benedictine Mission, and is administered by a Sister from the Mission and an African superintendent. Mr. Gupto, the Sub-assistant Surgeon has in the past paid visits from Songea once a week during the dry weather, but is unable to visit for about six weeks during the rains. There are at present 1,556 patients, 1,158 of whom support themselves by their own agriculture on Settlement land, living in huts built by themselves; 178 are maintained entirely from Settlement funds; and 220 receive a half

allowance. Many of those unable to erect their own houses live in one of the 25 brick houses built by the Mission.

The annual expenditure of the Settlement, apart from the salary of the Sister-in-charge, two teachers and other Sisters and Fathers who help in the Settlement, is £472. This sum supplies



The simple hut of self-supporting lepers in S. Tanganyika made of branches tied together with bark rope. The grass thatch of the roof and mud plaster of the walls have still to be added.

The finished house, and its leper family with their hen coop.

food, oil, clothes and blankets, salaries of African workers, erection and repair of huts, making and repair of roads, etc. The £472 is partly met from a Government grant of £375, the balance being received from private sources. A permanent treatment hall and waiting room have been built with a grant given by the British Empire Leprosy Relief Association.

There are at present 100 open infectious adults under treatment, of which 76 live in the Settlement. Living with these 100 open cases are 75 young children. Forty of the 100 are self-supporting and 19 receive a half allowance. Seventy-five of them live in houses erected by themselves.

I examined 124 of the children in the Settlement and found 7 open infectious cases among them; 8 others were slightly infectious; 40 showed no active signs of disease. Seventy-eight of them had enlarged spleens. Most of them showed signs of vitamin deficiency, for which I would advise the administration of shark oil, cod liver oil, or palm oil.

Casava, from which tapioca is made, is one of the staple crops of Africa, and one which does not fail in famine years.

From 750 to 800 patients receive injections of hydnocarpus oil on Mondays, and 200 on Thursdays. The rest of the patients are irregular in attendance for treatment. The treatment given at present is popular with the patients and many of them appear to have recovered, while others are progressing favourably. I was present on the treatment day and demonstrated several improved methods, such as the intradermal method, heating the oil to make it less viscid, painting lesions with trichloracetic acid, the selection of various types of cases for different forms of treatment. With these improvements considerably better results should be obtained.

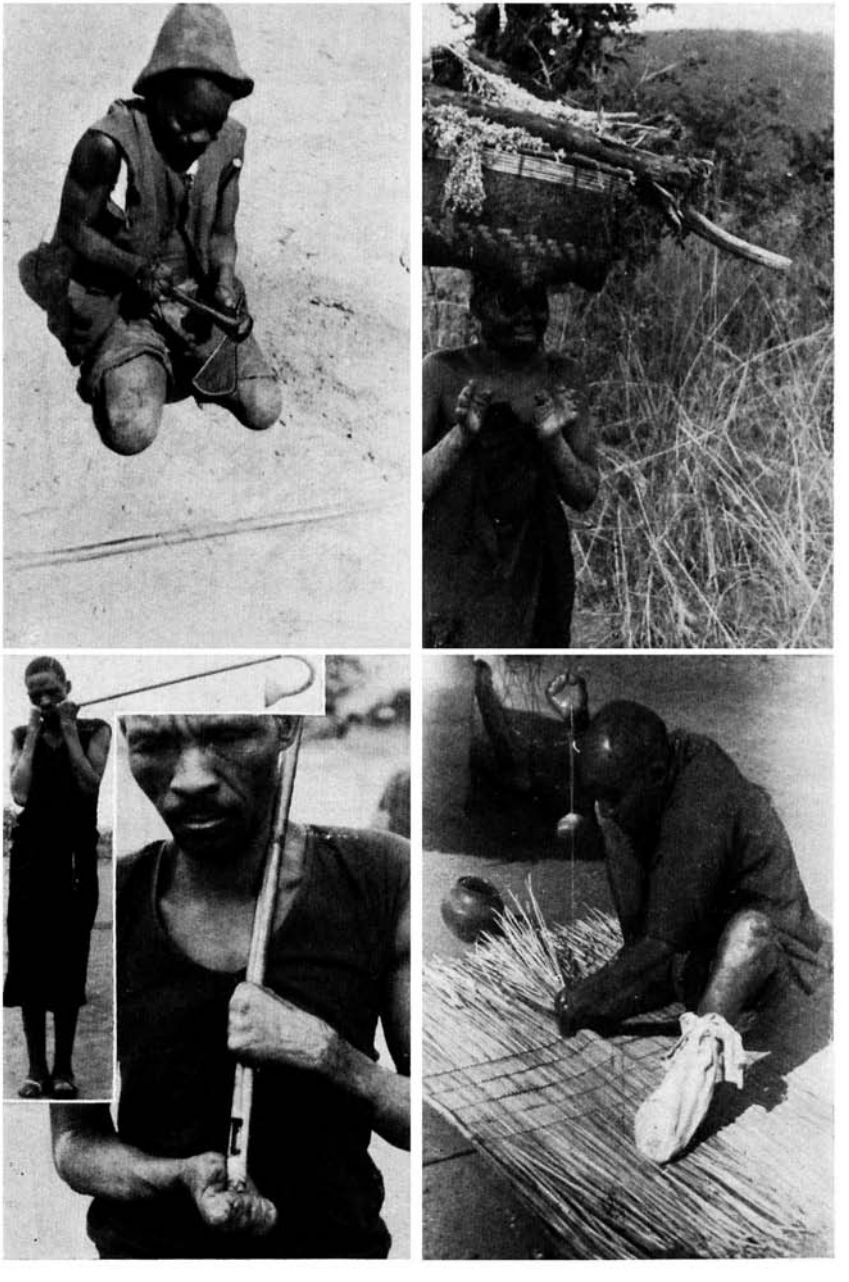
I inspected the houses and land of the Settlement. The land is extensive, but much of it has become exhausted by yearly repetition of the same crops of maize, millet, ground nuts, sweet potatoes and casava. New land has been granted by Government as the old became exhausted, and in consequence many of

the lepers now live several miles distant from the treatment centre. In addition to the 1,556 patients who have, or have had, leprosy, there are 65 men, 172 women, 194 boys and 163 girls living on Settlement land who have never shown any signs of leprosy. These are relations who either tend or are dependent on lepers. I found many ex-lepers on the Settlement whose disease has for long disappeared, as for instance the 40 children referred to above in whom all active signs of disease have cleared up. I consider that there may be considerable danger in allowing non-lepers, ex-lepers and lepers with only very slight infections to mix uncontrolled with open cases of the most contagious type, especially if the former are young children as these are particularly susceptible to the disease. It is important that these open cases should be controlled; that they should be segregated in a special part of the Settlement; that they should be kept separate when patients gather together for treatment or for any other purpose; and that the open cases among children should not be allowed to mix with other children.

It appears that the Settlement has grown to proportions which are far beyond the control of the present staff, that discipline is apt to be lax, and that many important functions of Settlement life are left to manage themselves. This is not at all the fault of the present staff. I consider that the Sister-in-Charge and the African Superintendent are both exceptionally devoted and able workers. They carry on treatment with striking results, and it is largely the treatment results obtained that have attracted the large numbers of patients to the Settlement. But their hands are more than full with treating the patients, tending those seriously ill, allotting land and the general conduct of the Settlement. Medical superintendence is badly needed. The S.A.S. at Songea is too busy with other work to attend to this; and the diagnosis, treatment of other diseases, treatment of leprosy and determination of recovery are left almost entirely to the Sister and Superintendent. Considering the scant oportunities they have had of studying the disease, I am astonished at the excellent results they obtain; but with more experience and training they could do very much more.

I find that one cause of considerable difficulty is the uncertainty as to who is in charge of the Settlement, and what degree of authority the agents of the Mission are justified in exercising. It might be well if this were clearly defined by Government. The following *suggestions* might be considered :—

1. That Government should appoint a local authority, either a chief or a committee, for the administration of the Settlement, with power to admit or dismiss patients and exercise discipline, its powers being clearly defined.



COURAGE AND USEFULNESS. Four fingerless lepers of Tanganyika. The first (Dar-es-Salaam) digs the ground and chops wood; the woman at Morogoro tills her farm; there also the bugle call on this home-made instrument is as clear and true as that of any bugler; most crippled but most wonderful of them all is the leper mat-maker at Shinyanga.

2. That a suitable lay brother be appointed who would organise agriculture, industries and the social life of the settlement. Such an appointment would be of great value to the patients, seeing that occupational therapy is now acknowledged as a most important feature in the treatment of leprosy. The appointment would be of value to the land, as the present haphazard system could gradually be replaced by systematic farming, tree planting, etc. As patients recover and return home, the knowledge of improved farming, etc., would be spread through the district.

3. That the patients should be carefully inspected by a leprosy expert, and recovered patients and others for whom residence in the Settlement is unnecessary should be sent back to their homes. This would reduce the present numbers and make room for other patients. A prolonged visit from a leprosy expert would also improve the treatment. I have advised the Sister and Superintendent with regard to treatment, but in the short time at my disposal have not been able to make more than a beginning in this direction. The question of the appointment of a Leprosy Expert for Tanganyika Territory is considered later (see p. 102).

4. The above three suggestions are the most urgent, but to conduct this Settlement with full efficiency there should be a full-time medical man; however I understand that there is little chance of such an appointment at present. Failing this, Cosmo Mango, on whom the weight of the treatment falls, should be given further assistance besides the two dressers at present at his disposal.

LIULI SETTLEMENT AND CLINICS

On the 8th of July I set out for Liuli on Lake Nyasa, the District Officer having arranged for the Rev. Mr. Sargent to motor me there.

On the 9th, 10th and 11th of July I visited, in company with Dr. W. C. Wigan, the settlements and clinics of the U.M.C.A. at Mbahawa, Likuyu and Mngehe. These institutions are conducted by sisters from the Liuli Hospital with the help of African assistants under the supervision of the mission doctor. The cost last year was £142, of which £125 was met by a grant from the Tanganyika Government. The expense of permanent buildings for treatment, stores, etc., has been met from a grant given by the British Empire Leprosy Relief Association. The boundary of the Mngehe

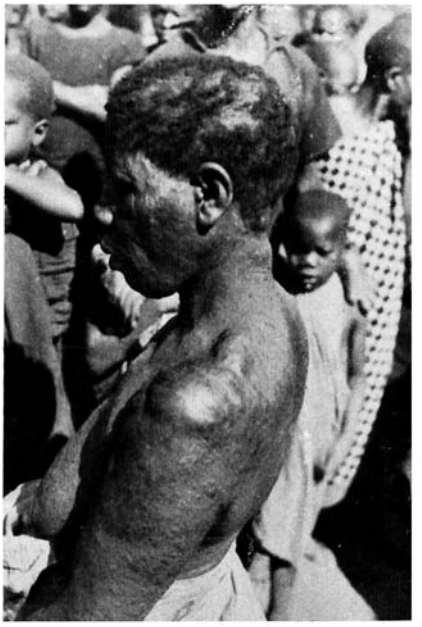
On the way from Songea to Lake Nyasa, held up while temporary bridges are erected.

site extends for about half a mile, and that of the Likuyu site for about a quarter of a mile, parallel to the lake shore. They both extend indefinitely inland. I think it would be well if their boundaries were clearly defined by Government.

At Mbahawa I demonstrated methods of diagnosis, classification, treatment, etc., to the staff, but had not time to classify the patients. At Likuyu and Mngehe I classified the patients as shown in the table.

The leper settlement at Mngehe on Lake Nyasa.

In many of the patients the disease appeared to have become arrested and others showed distinct improvement. Several of the lepers were suffering from scabies and tinea with septic complications, and also from ankylostomiasis. Many patients had localised tuberculoid and flat macular lesions which should heal up more rapidly if intradermal injections were given. Injection abscesses are not uncommon due to injecting hydocarpus oil at a low temperature and without dividing up the dose.



A "leper" at Mbahawa leper clinic who was found not to have leprosy, but another skin disease.

Here, as elsewhere, devoted work is being done by the staff, but errors are made and the treatment is less efficient than it might be for want of expert training and supervision.

Many of the patients who have recovered might be sent home with instructions to return for inspection at six months' intervals. This would make room for other patients. Dr. Wigan estimates that roughly one-half of the lepers in the shore area are under treatment.

Many Wamatengo lepers come down from their mountains to the lake shore for treatment. It would be well if a settlement could be formed for them in their own country. The Fathers at Peramiho suggested Tingi as a site for such a settlement. The Benedictine Mission has a station there, and there is said to be a

healthy site with plenty of land. Tingi is 22 miles from the Songea-Mwamba Bay Road and can be reached by motor.

The Liuli leper settlements and clinics are a part of a system of medical centres lying along the lake shore in Tanganyika and Nyasaland which were started and are supervised by Dr. W. C. Wigan. The widespread nature of this work precludes close supervision: but he and the sisters in immediate charge are laying a good foundation of improved health and better sanitation in this wide area, which should in turn lead to the ultimate eradiction of leprosy. The expenditure is exceedingly small in proportion to the work done, and I consider that everything possible should be done to encourage and make more efficient this excellent piece of work.

MAKUTUPORA SETTLEMENT

On July 14th I proceeded by aeroplane from Songea to Dodoma where I was met by Dr. Blackwood, the S.M.O. and Dr. Mackenzie, the M.O. of Morogoro. I had an opportunity of discussing the leprosy problem with them and the Provincial Commissioner. On the following day Dr. Mackenzie and I were motored by Mr. Langford Smith, of the C.M.S., to Makutupora, where there is a leper settlement under the supervision of the C.M.S. The staff consists of Dr. Wallace, who recently returned from a tour of special leprosy study in India, attending the International Leprosy Conference in Cairo on his return journey, and a lay worker, who has recently been sent out under the B.E.L.R.A.—Toc H scheme. There is also one non-leper dispenser, and there are four teachers who conduct an excellent school for the children.

The Settlement is situated on the edge of the escarpment of the Rift Valley, the doctor's house being above and a home for children lower down; below this are the treatment centre and store, and still lower the houses of the patients. The latter are of sun-dried bricks on a cement foundation, with iron roofs. When completed there will be be 50 cottages each costing £21, built from a grant given by the Mission to Lepers.

The water supply is from a spring situated a short distance from the patients' houses and near the foot of the slope. A cement tank has been made to catch the water from this spring, and water is conveyed to a distance by pipes for the use of the patients. At present there is a swamp caused by seepage from this tank, in which anopheles mosquitos breed. It would be well to remove the present tank and build a stone and cement foundation, arranging for the water to reach the fountain through a filter bed of small stones. Vegetable gardens might be developed

below the fountain which would be irrigated from the surplus water. The patients could then draw their water direct from the fountain.

There are 185 men, women and children on the register of the settlement. Of these I saw 166 and made a rough classification of them according to the types of disease as shown in the table. There are 61 (36 per cent.) with deformities of various degrees. Only three of the children showed deformity, but approximately half of the men and women were disabled to a greater or less extent.

Fifty-three patients are of the open nodular type (L_2 and L_3) which spreads infection, and 25 others slightly infectious (L_1). Nine of the 40 children in the Children's Home are of the open nodular type and five others slightly infectious; and as these mix freely with the other children, many of whom (10 out of the remaining 26) are free of all signs of leprosy, the danger of the spread of infection to the latter is very great. This is the more so as the children sleep in 3 rooms (2 for the boys and 1 for the girls) under very congested conditions. These dormitories were originally built for 18 children, for which they might be just sufficient, but they now house 40. It is urgently desirable that the 14 infectious cases be accommodated apart from the others.

Children born in the Settlement are removed to the home when they are 3 years old. There are at present 8 infants in the settlement. These children run a grave risk of infection during these years for, as is generally acknowledged, children are most susceptible in the early years of life. It is difficult to make other arrangements at present, but I would suggest that the parents be warned of the risk in which they involve their children, and taught how to diminish the risk as far as possible.

The patients are treated for accompanying diseases and are given injections of hydnocarpus oil and its preparations. They appear to be well nourished. This is the only leper institution I have visited so far in Tanganyika in which the skin of the patients is free from scabies and tinea. Many of the present patients have lost signs of active disease (20 in all of those examined) and several show signs of marked improvement.

Requirements. A small laboratory is urgently needed for microscopic and other examinations; so far this side of the work has not been developed.

Of the three most important requirements for a leper settlement—a healthy site, sufficient water and sufficient arable land—the third is the one which requires chief attention in this settlement. During the last few months a land survey has been made which

shows that the settlement has at present between 150 and 160 acres. Much of this is non-arable land. Much of the better land which was formerly cultivated by the lepers is now cultivated by non-lepers from outside, as the boundaries were not clearly defined. I consider that Government should if possible supply more arable land, so that the patients may be able to obtain healthy exercise in cultivation and the present expense in supplying food may be diminished. I would again emphasise that abundant healthy exercise, backed up by good nutrition, is by far the most important part of the treatment of leprosy.

The annual expense of the Settlement, apart from the staff and drugs, is £473. This is about 3 times as much per head as the Liuli Settlement on Lake Nyasa, mentioned in the former part of this Report. This might be considerably diminished if cultivation could be further developed. Government supply only £200 a year, the same grant that was given when the settlement was taken over from Government by the Mission in 1929, when there were only about 100 patients. The increased number is due to patients being sent in by the Medical Officer at Dodoma and by Chiefs throughout the Central Province. I would suggest that as the C.M.S., the Mission to Lepers, and B.E.L.R.A. are doing so much for the Settlement and the lepers in the Central Province, the Government grant be raised or/and that more land be granted so as to make the Settlement more nearly self-supporting. If sufficient land round the settlement cannot be made available, an alternative suggestion is to remove the deformed and untreatable cases to another camp, reserving the present settlement for cases likely to recover under active occupational therapy combined with special treatment. This is the only settlement in the Territory with a whole-time medical man, and a whole-time occupational expert, and Makutupora should with the facilities suggested above develop into a first class institution which may act as a model for the country.

African dressers could also be trained and later sent to other centres where leprosy is common, such as Berega (Kilosa P.O.) to carry on out-patient treatment under the superintendence of the Makutupora staff.

KOLONDOTO SETTLEMENT (SHINYANGA)

On July 16th I set out for Shinyanga in company with Dr. McKenzie, and on the 17th and 18th visited the leper settlement at Kolondoto under the charge of Dr. Maynard, of the Africa Inland Mission. The settlement is a few hundred yards from the hospital and is in the immediate charge of Miss Tilley, a nursing sister.

The patients live in houses of sun-dried bricks built on a cement floor and with iron roofs, 6 houses in a block. The houses are partitioned and hold two families or three single patients. They were built with a grant from the British Empire Leprosy Relief Association.

The blocks of houses are arranged to form three sides of a rectangle. Mud and thatch cook-houses are behind, but these are being replaced by more permanent buildings. The houses are by far the cleanest I have seen in any Tanganyika Settlement.

Out of the present 234 patients I had only time to examine 112 (see Table), but these form a fair cross-section of the whole; 46 per cent. are disabled to a greater or less extent. 31 per cent. are open nodular cases (L_2 and L_3), and another 31 per cent; slightly open cases (L_1). Thus the proportion of disabled and infectious cases is considerably higher than in the other institutions visited. In no other place did I find anything like the same number of large trophic ulcers of the feet; and this is in spite of the fact that nowhere else did I find the nutrition and general care of the patients so well looked after. This is difficult to explain. Two reasons suggest themselves : either leprosy is of a more virulent type in the area from which the patients come; or else the special care taken of the disabled patients and the widespread fame of Dr. Maynard attract these special types of cases from a wide area, while the earlier or slighter cases remain outside. The second suggestion is the more probable.

No attempt has been made so far to separate the open cases from the others. I think a good deal could be done in this direction by re-arranging the sleeping quarters without separating families.

There is no Children's Home; the children live with their parents. It is important that such a Home be founded and the children, at least of infectious parents, be separated as soon after birth as is found practicable. I can see no reason why the methods applied elsewhere should not be applicable here.

The Settlement has 130 acres of land, and many of the patients cultivate the fields and engage in other work for which they are paid wages which helps to support them; but the high proportion of disabled cases interferes with such activities. The cost of food, clothing, African staff, etc., is only £150 a year, a very moderate figure considering the high standard of the work.

The nutrition, physique and general health of the patients is above the average. This is largely due to the cheapness of milk and meat, which makes it possible to give the patients one pound of meat twice a week. Complicating skin diseases, such as scabies and ringworm, are absent except in new-comers.

The laboratory work needs development so as to distinguish open cases, indicate progress and make a clear diagnosis of complicating diseases. It might be well if suitable non-infectious patients could be trained, as elsewhere, to help in such work.

It would be well also if a census of the number and types of lepers in this area could be made; perhaps the teachers of the many schools could, with organisation and training, assist in this work. At Tabora I had an opportunity of discussing this question with Dr. Fairbairn, the S.M.O. The only information at present available is that 1 in 1,600 are exempted from taxes in the Tabora District on account of disablement from leprosy.

GENERAL REMARKS

After returning to Dar-es-Salaam I addressed on July 21st a meeting of medical missionaries and Government doctors at which some 30 were present. Various important problems connected with leprosy were discussed.

Leprosy Control. I had an opportunity of discussing with the Director of Medical Services, Dr. Maclean, Dr. Nixon and Dr. Lockhart, a Memorandum on Leprosy Control drawn up by Dr. Maclean (see Appendix I).

I am in agreement with the general policy of the Memorandum, viz. the development of an agricultural leper settlement for hopeful cases to be run on a basis as nearly self-supporting as possible; at the same time seeking to promote prophylaxis and the improvement of social conditions in the district through educative methods.

Regarding paragraph 3, it is possible to absorb a certain number of incapacitated cases in a large and well-conducted settlement without prejudicing the hopeful spirit of the majority of the patients. It is important, however, that in beginning a settlement only cases likely to co-operate and subsequently to recover should at first be admitted.

In order to make a settlement a success it is advisable to employ whole-time European staff and gradually increase the settlement to as large a size as the staff can conveniently manage. Three or four hundred should be aimed at as a minimum, with at least one whole-time European, preferably two. Thus the staff of Makutupora (a doctor and health worker) would be adequate for a first class settlement of 400 patients or more. Small settlements with only part-time supervision are seldom of a first-class order.

Regarding the care of children, it has generally been found

that a certain number of children of lepers cannot be placed satisfactorily with relatives, and that a children's home is essential; but the possibilities in this matter vary with different tribal customs.

Bishop Lucas has suggested that in a Christian community the chiefs should include in their initiation rites definite rules which would prevent the spread of leprosy, and bring those infected with the disease under effective treatment. This suggestion seems well worthy of trial (see Appendix II).

Acknowledgments. I wish to thank the Director and Acting Director of Medical Services for planning my itinerary, and for the excellent arrangements they made for my tour. I wish also to express my gratitude to the executive and medical officers missionaries and others who supplied hospitality and spared neither time nor trouble to make my visit interesting and useful.

NOTE. In the original Tanganyika report there were notes on *Treatment, Education* and a *Leprosy Expert.* As these subjects apply also to other countries, the three notes have been transferred to a separate section on pages 100-102.

APPENDIX I.

Memorandum on Leprosy Control

It is impossible with the funds at our disposal to attempt leprosy control throughout the whole Territory, and it proposed that in the first instance one or two districts should be selected in which to carry out systematic work.

2. In the area selected the following general measures will be adopted :—

(a) Land will be set aside for an industrial and agriculturial settlement in which specific treatment and treatment for intercurrent diseases will be carried out, and free issues of an animal or a vegetable oil and of fresh meat will be made.

(b) In the remainder of the area every existing treatment centre will deal with leprosy and measures will be taken to educate the public in leprosy prophylaxis.

(c) Special attention will be given to such measures as are practicable to improve social conditions in the district.

3. In the area selected a settlement is likely to be already in existence. Incapacitated cases in such a settlement, who are not being provided for by friends within the settlement, will be removed and unless they are provided for by relatives outside the settlement they will be placed in a hospital or camp for

incurables, maintained at the expense either of the local Government or the Central Government.

4. People already in the settlement who have healthy children will be strongly advised to have these children sent to healthy relatives. This will be done even in cases where parents are non-infectious because of the likelihood of the children acquiring infection from other persons in the settlement. There will not, however, be any compulsion.

5. Before any new person is admitted into the settlement, arrangements will be made, and these arrangements endorsed by the Native Authority, whereby some person or group of persons is made responsible for the patient's maintenance in the event of incapacitation. The responsibility may lie with the Native Authority itself, but without such an arrangement no new person is to be allowed into the settlement. The person admitted will be allowed to be accompanied by a wife or husband, as the case may be, and of infected children, but not of healthy children. If a healthy husband is admitted he will have to pay tax in the ordinary way. Only persons capable of supporting themselves at the time of application for admission will be admitted, unless accompanied by infected friends who can support them. A case that becomes incapacitated while in the settlement will be handed over to the person or persons who undertook his maintenance. These guardians would be informed of whether or not a case was infectious, and, if infectious, of the precautions that would have to be taken. The case will be visited from time to time to see that these precautions are being carried out.

6. In the settlement each individual or family as the case might be, will have its own piece of land on such conditions as will be laid down from time to time. In a normal year the settlement should be completely self-supporting in respect of food stuffs, except that Government should provide meat and either a vegetable or an animal oil free. A herd of cattle, sheep and/or goats should be maintained by Government for the purpose of providing the fresh meat. A store controlled by Government would be provided in the settlement and would supply the ordinary household needs of the population. Agricultural and industrial products might also be sold by the people themselves at the store. All able-bodied men in the settlement will pay a small contribution either in money or in kind towards its upkeep.

7. Visitors from outside, visiting by the patients themselves, and intermarriage will be discouraged, but not prohibited,

8. The actual administration of the settlement will be in the hands of a missionary (or Toc H worker) who will be responsible to a local committee.

9. The near relatives living outside the settlement of persons living inside will be examined from time to time.

10. In the district all the nurses, dispensers and dressers will be given instruction in the prevention and treatment of leprosy, and generally, treatment centres will not be more than 20 miles apart. They will treat on their own initiative leprosy cases for intercurrent disease. Ordinarily the cases should not get specific anti-leprosy treatment outside a settlement, unless continuity over a minimum period of three years can be assured.

11. The general policy of the Government should be to treat all the cases in the district that are suitable for treatment, and to educate the people in measures of prophylaxis. The actual form that propaganda for this purpose will take must depend on local conditions, and this part of the work will be entrusted to a local leprosy committee acting under the advice of the Central Government. The local committee will have the Provincial Commissioner as Chairman, with administrative officers, medical officers, agricultural officers, missionary representatives and representatives of the Native Authority as members. The committee will examine local conditions and advise on educative and administrative measures that should be adopted in respect of:—

(a) separating healthy children from their infected parents.
(b) isolation of infected cases.
(c) marriage and marriage dowries.
(d) disposal of the goods and houses of leprosy patients.
(e) inheritance of the families of leprosy patients, and
(f) in the case of the settlement itself, general administration. The Senior Medical Officer of the Province will be the department's expert adviser and he will direct all treatments.

12. If a policy of this nature is found to be practicable without any great increase in the expenditure that is being already incurred, it will be possible to extend it into some other districts in a few years. Until extension of the work on proper lines can be undertaken, expenditure in other parts of the Territory must be reduced to a minimum. The care of the incapacitated will devolve, whenever possible, on relatives, and where there are no relatives, on the Native Authority. Only care of cases who are quite adrift from their own tribes should be undertaken by Government. Specific treatment should not be attempted, except where skilled and critical medical supervision is available. Educationalists

and missionaries should, in the meantime pave the way for future work by teaching in a general way how leprosy is spread, and the stages at which the disease tends to be infectious.

APPENDIX II.

Rules of Right Conduct for a Leper (*see p. 76*).

1. Anyone with signs of leprosy on his body, even though he has no open sores as yet, sometimes is liable to infect other people, and if so, the discharge from his nose will be dangerous to others.

2. Anyone then who suspects that he is perhaps beginning to have this disease, should betake himself at once to a hospital, because if he receives treatment at once at the very beginning of the illness and does not weary of persevering with the treatment, he has good hope of being completely cured.

3. Similarly, if anyone suspects that perhaps his child is beginning to have this disease, he should take him at once to a hospital to be examined, in order to find out whether he has contracted the disease.

4. The rules of right conduct and things to be avoided by a leper during the whole course of his illness, until the doctor has certified that he is no longer in danger of infecting others are these :—

(a) He should have a house of his own and a place of his own for washing in, and a latrine of his own, and should not go into other people's houses at all.

(b) He should eat his own food by himself, not sharing the same plate with other people.

(c) In drinking he should have a *gouri-ladly* of his own and not use those of other people.

(d) He should have a mat and a stool of his own and his own bed, and not use other people's or sit on any other bed.

(e) He should wear his own clothes and not exchange clothes with other people.

(f) He should have his own hoe and axe and not use those of others.

(g) He should not crowd together with other people, but when with them should keep at a distance of five paces, and especially he must not come near children.

(h) The leper should abstain from intercourse with wife (or husband) unless the wife (or husband) agrees to observe all these rules for good conduct which the leper is

observing. The leper must abstain absolutely from adultery or fornication.

5. You will understand that these rules of conduct and prohibitions have a close relation to the rules and prohibitions imposed in the initiatory rite during first pregnancy. A leper who keeps these rules faithfully deserves the sympathy and help of others that he may persevere in his treatment, but a leper who does not keep these rules is in danger of being regarded as a menace and incurring general hatred.

6. When a leper dies his or her clothes and all belongings must be burnt or buried in the grave.

APPENDIX III.

Distribution of Annual Government Allocations for Leprosy in Tanganyika

1. Senior Medical Officer, Dar-es-Salaam.		Shs. 3,300	
Provincial Commissioner, E. Province.			
D.O. Bagamoyo	2,300/-		9,282/-
,, Mahenge	1,600/-		
,, Morogoro	550/-	5,982	
,, Rufiji	250/-		
,, Mafia	1,282/-		
2. Provincial Commissioner, Central Province.			
D.O. Dodoma	4,000/-		7,000/-
,, Singida	3,000/-		
3. Senior Medical Officer, Lake Province.			
for Dr. Maynard.			300/-
4. Provincial Commissioner, Southern Province.			
D.O. Kilwa	2,400/-		19,500/-
,, Masasi	7,100/-	10,500	
,, Newala	1,000/-		
Sub-Assistant Surgeon, Songea.		9,000	
5. Provincial Commissioner, Southern Highlands.			
D.O. Iringa	180/-		3,030/-
,, Njombo	250/-		
,, Tukuyu	2,600/-		
6. The Senior Medical Officer, Tanga.			
D.O. Tanga	5,000/-		8,000/-
,, Lushoto	3,000/-		
7. Sleeping Sickness Officer, Western Province.			300/-
8. Health Officer, Moshi (Northern Province.)			400/-
			47,812/-
	Vote Shs.		50,000/-

ZANZIBAR

HISTORY

From 1921 up to the beginning of 1936 lepers in Zanzibar and Pemba were compulsorily segregated in a settlement on Funzi Island, lying off the West Coast of Pemba. Power to enforce this policy was derived under the Public Health Decree, and after 1926 under the Leprosy Decree, the latter aiming at a policy of rigid segregation. After a visit from Dr. Cochrane, of the British Empire Leprosy Relief Association, in 1930, Dr. Welch was sent out by that body to carry out a survey of leprosy in the two islands. Unfortunately this survey was not carried out and Dr. Welch's services were withdrawn.

In 1935 it was realised that the policy of compulsion was not successful, and also that Funzi Island was unpopular with the lepers and unsuitable for the settlement.

In the beginning of 1936 a new settlement was begun at Makondeni, in Pemba, and patients were admitted on a voluntary basis, Funzi Island Settlement being closed down.

Before 1936 hopeless patients and those in whom the disease had healed up with deformities, were transferred to the poorhouse at Walezo, 4 miles from Zanzibar town. In 1936 a new settlement for lepers was begun adjacent to the poorhouse. Thus there are now two settlements, both voluntary : at Walezo for lepers in Zanzibar Island, and at Makondeni for those on Pemba Island; though patients can, on their own desire, be sent to either of these institutions.

So far the adoption of a voluntary system appears here, as elsewhere, to have been fully justified. The number segregated has not diminished in spite of the fact that some of those on Funzi Island were repatriated to the mainland. Moreover, the patients are more contented, and better results are obtained in the recovery of patients.

PRESENT INSTITUTIONS

Walezo Settlement. On the 24th of July, 1938, I visited the Walezo Settlement in company with Dr. Webb, the Director of Medical Services, and Dr. McCarthy. The settlement is situated on sloping ground separated by a natural barrier from the adjacent poorhouse. Permanent buildings consist of a treatment centre and hospital wards. The patients live in mud and thatch huts scattered throughout their cultivated fields. Daily rations are given to the patients, along with a small monthly allowance

of money which they can spend in a shop within the settlement. They supplement their rations with the produce of their cultivation.

The patients appeared well-nourished and happy, many of them showing good physique. I examined 46 out of the present 53 patients and classified them under 5 headings : open nodular (L_2 and L_3), slightly and doubtful open cases (L_1), cases with tuberculoid macules, those with flat macules, those with no apparent active signs. Unfortunately I was not able to obtain notes of bacteriological findings, though I understand that these are carried out at the Government bacteriological laboratory. The types were also subdivided according to whether they were deformed and disabled, or not :—

Open nodular (L_2 & L_3) ...	Deformed	8		
	Undeformed	13	21	
Slightly & doubtful open (L_1)	Deformed	6		
	Undeformed	2	8	
With tuberculoid lesions ...	Deformed	4		
	Undeformed	2	6	
With flat lesions	Deformed	2		
	Undeformed	1	3	
Without apparent active signs	Deformed	5		
	Undeformed	3	8	
				46

Thus 25 were deformed and 21 undeformed; 21 were open nodular and 8 slightly open, making a possible total of 29 infections, as compared with 17 non-infectious cases. Some obvious complicating diseases were tinea, scabies and entropion, but these were found only in a few of the patients. The patients are fortunate in having the devoted attendance of Sister Frieda Bertha, who also looks after the inmates of the poorhouse and tuberculosis wards. The settlement is under the supervision of the Medical Officer, assisted by a Sub-Assistant Surgeon.

Makondeni Settlement. Unfortunately time did not permit a visit to Makondeni, but I add a few notes on that settlement gathered chiefly from the 1937 Medical and Sanitary Report.

The patients live in huts, and employ themselves, as at Walezo, in cultivation of the land, of which plenty is available. Unfortunately malaria is rife (parasite index almost 50%), but it is hoped to investigate the cause in the near future. There is a hospital building with 6 beds, but patients prefer treatment in their own huts and do not favour the hospital. The water supply is from a well and catchment tanks. At the end of 1937 there were 63 lepers. The District Medical Officer visits from Wete, 4½ miles distant, once a week, and the Nursing Sister two or three

times a week. A trained dispenser on a salary of £72 a year lives on the settlement.

The following table gives the number of patients at the beginning of the year, the new admissions and the deaths for the last five years in the two existing settlements :

Year	*No. 1st Jan.*		*New Admissions*		*Deaths*	
	Funzi	*Walezo*	*Funzi*	*Walezo*	*Funzi*	*Walezo*
1933 ...	92	—	14	—	11	—
1934 ...	93	34	15	8	12	11
1935 ...	91	29	3	18	6	8
1936 ...	53	39	12	23	8	9
1937 ...	63	52	10	18	4	9

The following is the expenditure at the two settlements for the last four years, including the erection of buildings, but excluding the expenditure on staff, drugs and appliances :

Year	*Funzi*	*Walezo*	*Total*
	£	£	£
1934	955 ...	210 ...	1,165
1935	870 ...	281 ...	1,151
1936	1,395 ...	501 ...	1,896
1937	1,189 ...	552 ...	1,741

I am informed that once the necessary buildings and other permanent works are completed, the expenditure will diminish to about ten or twelve hundred a year.

DISCUSSION AND SUGGESTIONS

I was pleased to learn that in both institutions the main emphasis in treatment is laid upon attention to complicating diseases and causes of malnutrition. I know of no other institutions in East Africa where anything approaching the generous expenditure of the Zanzibar Government is reached, being in the region of £10 per year per patient, in addition to free land, house, attendance and drugs. The facilities for exercise in the form of farm work is another excellent feature. At Makondeni " despite the fact that no treatment with chaulmoogra derivatives was given during most of the year, three cases have become bacteriologically negative, clinically arrested, and fit for discharge. Of these, one preferred to remain, and the other two were discharged, However, of the latter, one returned 10 days after leaving the institution and requested re-admission, not because she was ill, but because she said she was happier at Makondeni."

Of the patients I saw at Walezo, very few were suitable cases for special treatment with chaulmoogra or other similar drugs. In most of them the disease was too far advanced, either because of

their massive infection or because of crippling and disablement. Besides this, an indispensable requirement for successful leprosy treatment is a state of mental and physical activity, with hopefulness and independence. As far as I could judge, this spirit appeared to be absent from the institution, and any attempt at active treatment could not be expected to meet with much success.

Judging from the types of cases at Walezo, either the leprosy of Zanzibar must be different from elsewhere, or else there must be considerable numbers of the earlier and milder forms of leprosy outside the settlement. Also, judging from the advanced state of the disease on admission, many patients must have an opportunity of spreading infection in the population before they present themselves.

However, there are three important difficulties in the way of taking more active measures for dealing with leprosy in Zanzibar.

1. Leprosy is only one out of many difficult health problems, and a greater expenditure than that at present would be out of proportion to its comparative importance, considering the funds available for public health.

2. The bad effects of the former compulsory system have not yet entirely subsided, and lepers are still suspicious of any active means for controlling the disease.

3. Zanzibar has a mixed, and, to a large extent, a floating population, very ignorant, prejudiced and conservative, and till education has made more headway public health measures will remain hampered.

The now voluntary system has not yet had time to be tried out fully. I would suggest that the present settlements be made progressively more attractive, in the hope that they will draw more and more voluntary patients; and that, at the same time, the patients be encouraged to cultivate their fields better and support themselves to a greater degree by their own labour. It should thus be possible to admit at least double the number of patients without any increase of expenditure. In proportion as the spirit of independence and hopefulness increases, special treatment might gradually be introduced in suitable cases.

Later, out-patient treatment might be introduced for suitable cases, and educational preventive methods might be included in the general public health propaganda, as elsewhere.

Acknowledgments. I wish to thank the Director of Medical Services for his kindness and for the opportunities he has given me of studying leprosy in Zanzibar during my brief week-end visit.

ADEN COLONY & PROTECTORATE

Leprosy appears to be absent as an endemic disease from the Colony of Aden, only one doubtful case of infection being known within its boundaries in recent years.

The extent to which it is endemic in the Protectorate is not known at present, no survey having been made; but that it does exist is shown by the fact that a small proportion of cases in the Sheikh Othman Leper Hospital are admitted from that area.

The Leprosy Hospital. On August 5th, 1938, I visited this hospital in company with Dr. Buchanan, the Senior Medical Officer, and Dr. Napier, of the Keith Falconer Mission of the Church of Scotland. The hospital is superintended by the Mission Doctor and Nurses under a Board consisting of the Senior Medical Officer, the Mission Doctor, the Superintendent of Sheikh Othman, and a leading local Arab. The patients are housed in two buildings, a larger one with upper and lower storeys for the male patients, and a detached ward for female patients. The hospital expenditure for the last year was Rs. 5591/-, apart from the attendance of the doctor and nurses, which is given free. Of this sum Rs. 3000/- was given by the Government for upkeep, and Rs. 300/- for repairs; Rs. 1200/- by the Settlement; and the remainder by the Mission. This works out at a little less than £15 per patient, a liberal allowance as compared with Mission-conducted leper hospitals in India and Africa. There is no water for cultivation. The patients are supposed to work for about 2 hours a day, chiefly at digging sand, but it is difficult to supply them otherwise with adequate exercise. I examined the patients and classified them into 5 types : open nodular (L_2 and L_3), slightly open (L_1), those with tuberculoid lesions, those with flat or residual lesions, those without sign of active disease; I sub-classified each group into deformed and undeformed cases :

	Types	*Men*	*Women*	*Totals*	
L_2 — L_3	D	0	0	0	
	U	11	2	13	13
L_1	D	2	0	2	
	U	2	1	3	5
Tuberculoid	D	0	0	0	
	U	1	0	1	1
Flat and residual lesions	D	5	0	5	
	U	2	0	2	7
No active signs	D	2	0	2	
	U	1	0	1	3
		26	3		29

Compared with leprosy as found in other institutions, the proportion of open nodular or lepromatous cases is remarkably high, and the proportion of deformed and disabled cases low. There was only one case with tuberculoid lesions and these were tending to become residual.

The great majority of these patients come from Yemen, over 100 miles distant, a distance which it would be difficult for disabled cases to travel. Dr. Napier says lepers generally come because they are feeling unwell, or because they have anaesthesia of the limbs, and, as a result, tend to get blisters and injuries to the hands and feet. Few of them seem to know they have leprosy, or to be aware of what leprosy means; when questioned as to whether they have come in contact with other lepers, or whether there are other lepers in or near their homes, they do not know. It would therefore appear as if the people are not yet leprosy-conscious, that is to say they are not familiar with leprosy as a disease occurring in its various forms. If the home contacts of these patients were examined it is likely that the usual proportion of less severe cases, with tuberculoid and other mild lesions, would be found.

A recent rough survey made by Dr. Storm (Leprosy Review, Vol. VIII, No. 1, Jan. 1937) in different parts of Arabia, showed that the principal foci were in Yemen and Hadramaut, especially the former. A still more recent and particular survey by Dr. Petrie in Yemen shows numerous foci in that country.

Continuation of the Leprosy Hospital. An important matter for consideration is whether, in view of the danger of spread of infection by patients coming to Aden from regions outside the Protectorate, the beneficial work of the leper hospital out-weighs this danger to the people of the Protectorate and Colony.

The considerations against continuing the Hospital are as follows :

(1) Of the 29 patients in the hospital, about half may be regarded as potential spreaders of infection. The most of them travel about once a year to and from their homes, spending at least 12 nights on the journey, and probably sleeping on hired beds which will be afterwards used by non-lepers. By a rough calculation one might expect that some 200 to 300 beds in common use are in danger of being infected every year in this way.

On the other hand, the chief danger of the spread of this infection is to young children. Statistics show that there are only 5 to 8 per cent. of conjugal infections, whereas there are 40 to 50 per cent. of child infections by leprous parents. It is unlikely that infectious lepers travelling between their homes and the

hospital would come into direct or indirect contact with children. On the whole, therefore, the danger of their spreading leprosy, and especially the severe form of the disease most commonly arising from transmission to young children, is probably not very great.

However, this danger, such as it is, should be kept in mind; and all information as to present foci, and especially new foci, in the Protectorate should be carefully collected and considered. I would suggest the use of a spot map on which all the present and past cases in the leper hospital are plotted out, along with any relationship between cases. Important foci found in this way might be worthy of a special visit for the examination of contacts and the special local conditions.

(2) Against continuation there is also the comparatively unsatisfactory progress made by the patients towards recovery. This is probably largely due to the difficulty in providing sufficient healthy outdoor exercise, and the fact that the patients go home again after a few months in hospital. If and when they return to the hospital they are generally found to be in a bad state of general health due to complicating diseases and malnutrition. In fact, the hospital has the great disadvantage of being far removed from the chief foci of infection.

In favour of continuing the hospital are the following considerations :—

(1) The need of supplying treatment for cases in the Protectorate. For this purpose it is impossible to suggest a more suitable place than the present hospital.

(2) The fact that in any case a certain number of lepers will come to Aden for treatment because they know they are ill, and they will come whether they know that this illness is due to leprosy or not. Also most lepers are at the same time suffering from other complicating diseases such as malaria, schistosomiasis, etc. They will continue to come for the treatment of these diseases, and they cannot be admitted to general hospitals; a leprosy hospital is necessary for their treatment.

(3) The care of the patients in the leprosy hospital, as also in the general hospitals of the Aden Colony, is having a most valuable general effect in educating and civilising the populations scattered over the distant areas of Southern Arabia, which are otherwise cut off from modern culture and civilisation.

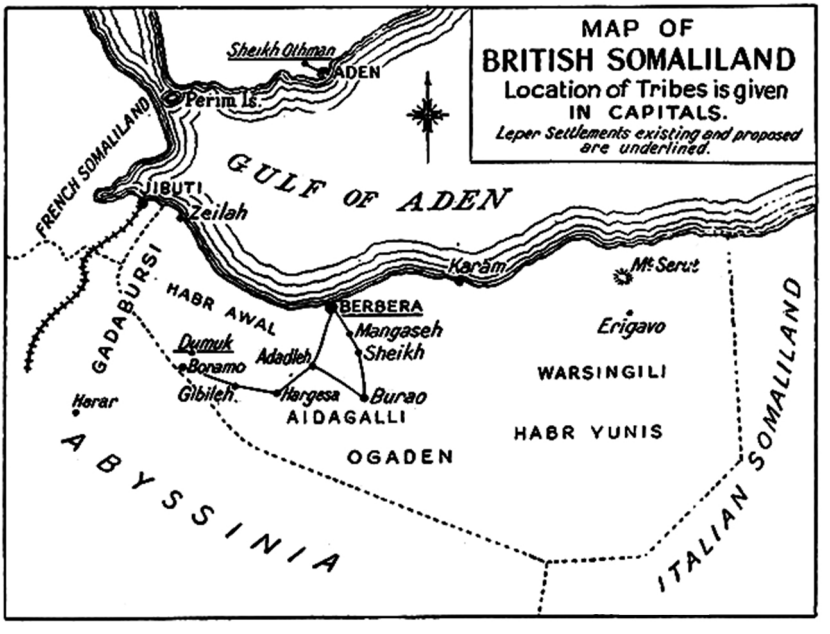
On the whole I consider that the possible dangers in continuing the hospital are distinctly outweighed by the advantages.

An effort should be made to make the treatment more

effective. The time of the patients should be, as far as possible, organised so that they get more exercise also they should be given careful and repeated instruction in the nature of leprosy as regards both the requirements for recovery and the mode of the spread of infection. Arrangements might be made to carry out gradually a survey of the incidence of the disease as suggested above. Possibly later a more active campaign against leprosy may become possible in Yemen, which appears to be the chief focus of the disease in Southern Arabia.

I consider that the Government are very fortunate in being able to entrust this difficult and often disappointing work to the Keith Falconer Mission, and that the duty of caring for these unfortunate people could not be entrusted to more willing and devoted hands.

Acknowledgments. I wish to thank the Senior Medical Officer for his kindness and for the facilities he has given me in making this brief study of leprosy as found in this area.



BRITISH SOMALILAND

The leprosy problem in British Somaliland is a peculiar one. The 344,700 inhabitants are almost entirely nomadic. Experience elsewhere shows that leprosy is a very rare disease among nomadic tribes. And yet there is evidence that leprosy is not a rare disease in British Somaliland. This Report discusses the reasons for this and suggests methods of dealing with the problem.

I was asked by the Colonial Office to include a visit to this country in my tour of East Africa, and I landed in Berbera on August 8th, 1938.

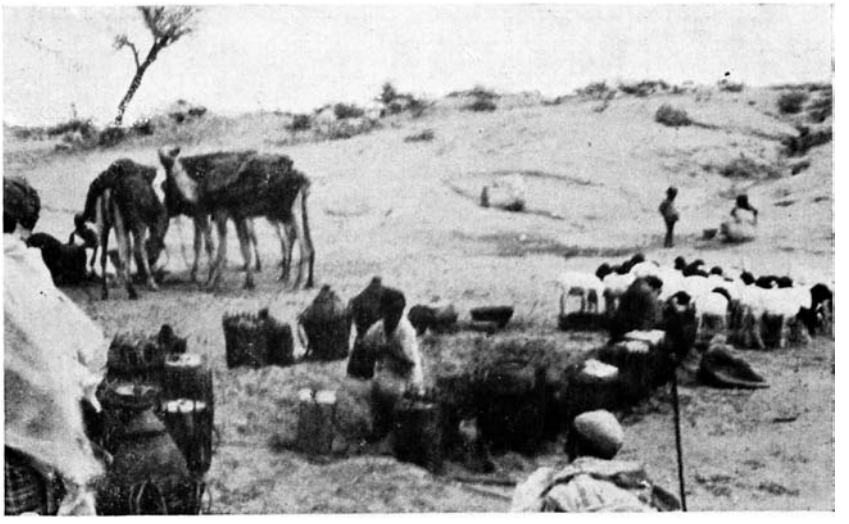
THE BERBERA LEPER CAMP

On the following day, in company with Dr. Bell, the Senior Medical Officer, and Dr. Clarke, the Medical Officer, I visited the leper camp in the outskirts of Berbera. There were 29 men and 14 women. Of the 43 patients, 25 are open nodular cases, the remaining 18 being open cases with diffuse and inconspicuous skin lesions.

The present leper camp at Berbera.

The latter are perhaps the greatest source of danger, as no one without making a careful examination would suspect the disease in 14 of their number. We have no proof that there are not many similar unrecognised cases at liberty mixing freely with the population. I have never before seen such a large proportion of lepers with this infectious yet inconspicuous form of leprosy, generally known as the diffuse type.

Only 7 of the 43 lepers are deformed or disabled, and these chiefly in a minor degree. This is a surprisingly low number. Physically, the patients are soft and flabby, the best developed being those who have been the shortest time in the camp. This is due to the want of physical exercise, there being little or no work for them to do. In fact I was impressed with the appearance of mental and physical deterioration. The most important part of treatment in leprosy is mental and physical activity: cheerfulness and abundant healthy outdoor exercise, backed up by good nutrition. Special treatment with injections of chaulmoogra, etc., is of secondary importance, and only of use when the former is in force. Under the circumstances, therefore, treatment cannot be expected to be satisfactory. There is no reason, as far as the



A water hole in the Somali desert.

health of the majority of the patients is concerned, why they should not do a good day's work. I expect, however, that compulsory segregation and the dole which many of them have enjoyed for years would be found to have made them unwilling to work, even if work were available.

The patients belong to the following tribes:—Habr Awal 24, Dadabursi 10, Habr Yunis 4, Aidegalla 2, Ogaden 1, Midgan 1, Hawaiyeh 1. Thirty-eight of them come from Hargeisa, Gibileh and Borama and have all spent some time at Jigjiga, Harar or other places in Abyssinia. Three come from Burao, one from Adadleh, and one from Erigavo. It is thus round Hargeisa and the Abyssinian frontier that leprosy is most common. I am informed also that the disease is very common over the border in the region of Harar, as well as in other parts of Abyssinia.

The present location of the leper camp appears to me to be unsuitable for the following reasons:—

1. It implies removing the patients a long distance from their homes to a warmer and less healthy climate, and one to which they are unaccustomed.

2. It is impossible for want of water to employ them in agriculture, the most suitable form of outdoor exercise; and thus, for want of suitable employment and exercise, a most important element in treatment is wanting.

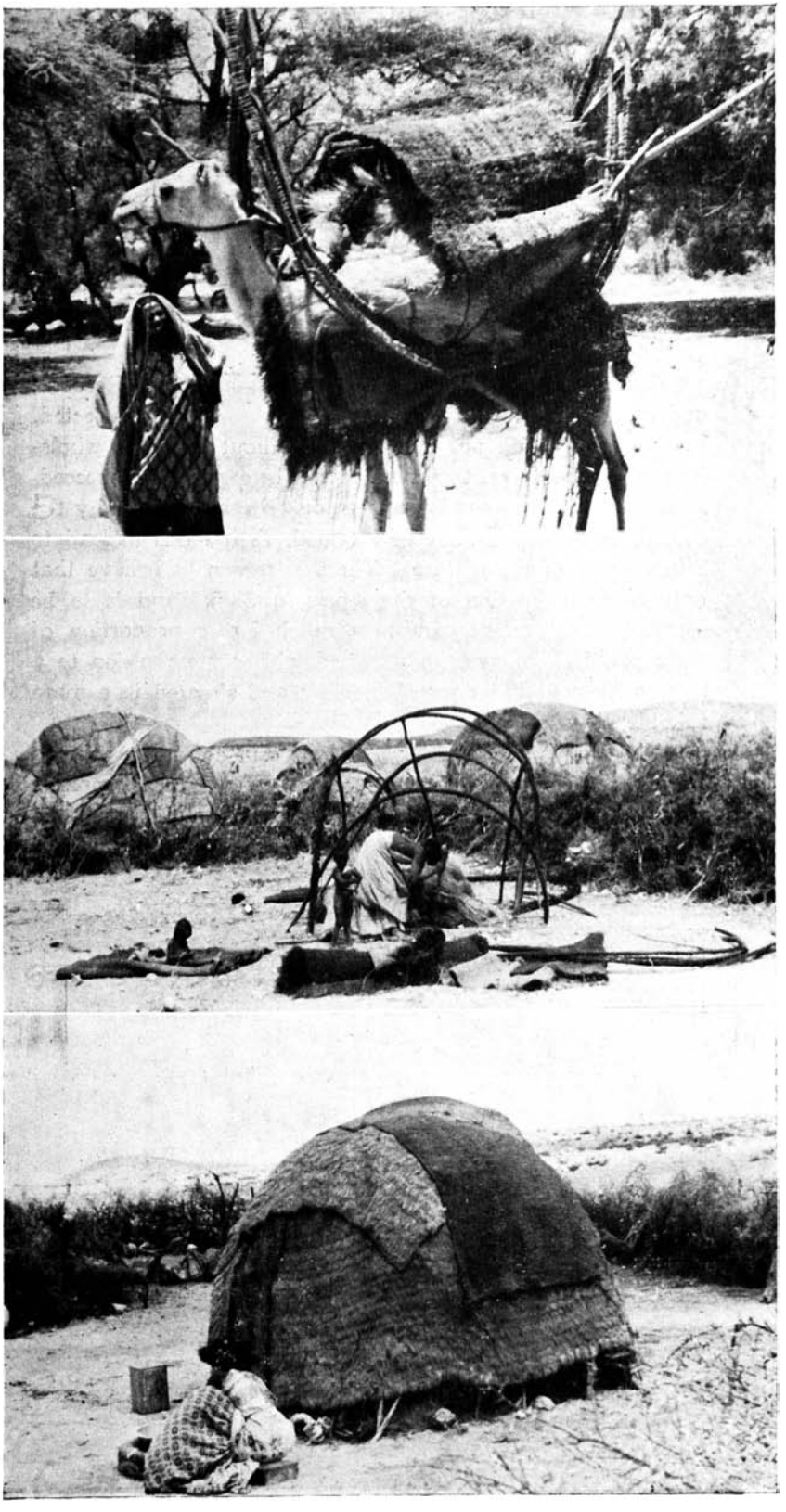
3. Compulsion is necessary to bring the patients to Berbera; under external compulsion improvement cannot be expected, as the patient will not co-operate; without full and whole-hearted co-operation, treatment cannot be expected to succeed. Moreover, under compulsion from outside the community the control of leprosy cannot be attained, as it tends to lead to concealment of the disease. There is reason to believe that only a small fraction of the lepers in Somaliland is to be found in the present camp; a much larger proportion of them could, I believe, be attracted without compulsion to a leper settlement run on modern lines and situated in a more suitable place.

4. The present camp consists of 5 rooms and the average cubic space available per person is 400 cubic feet, as compared with the 2,000 cubic feet which is a desirable minimum. The doors are locked at night and the patients shut the windows, creating an atmosphere which must be appalling and certainly is not conducive to the treatment and cure of any infectious disease.

It seems to me that for the control of leprosy in British Somaliland, and for the proper care of those suffering from this disease, there are two main primary essentials: co-operation with the Abyssinian Government, and the formation of a new leper settlement in a suitable place and run on the right lines.

CO-OPERATION WITH ABYSSINIAN AUTHORITIES

Seeing that leprosy is chiefly found in the regions of British Somaliland bordering on Abyssinia, and that leprosy is reported to be very common on the other side of the border, any steps which may be taken to deal with the disease on this side of the border alone would tend to be countered by coming and going between the two countries, which would lead to the spread of infection. Moreover, if an attractive leper settlement were established on the British side of the border it would tend to attract lepers from the other side.



Nomadic life is against leprosy. The *gurgi* (Somali tent) on trek; gurgi pitching; pitched.

I mentioned that leprosy is elsewhere considered to be a disease which is not common among nomadic tribes. To this I should add that it is most common where primitive tribes are beginning to settle down in villages and take up agriculture. As there is some likelihood that agriculture may be gradually introduced, and that the Somalis who are at present nomadic may in future tend to settle down in villages, there is a likelihood that the conditions favourable for the increase of leprosy may increase on both sides of the border unless timely precautions are taken.

I suggest therefore that steps be taken to negotiate with the

A dry land. Somalis begging water by the roadside.

Abyssinian authorities, and that if possible joint action be taken to deal with this disease which is of common and urgent importance in both countries.

NEW LEPER SETTLEMENT

The other step which I consider of primary importance is the formation of a new leper settlement in a suitable place and run on the right lines.

The *location* should be:

(a) within easy reach of the most important foci of the disease;

(b) in a healthy situation free from such diseases as malaria;

(c) where there is abundant land available;

(d) where there is sufficient water for cultivation as well as for personal use;

(e) not too near to any large centre of population, and yet where communications are sufficiently easy.

I visited, in company with Dr. Bell, a possible site at Haleya, about 7 miles from Hargeisa. Test crops have not yet been planted, so it is difficult to judge of the fertility of the soil. It is by the side of a large *tug* (seasonal river) and there are several water holes at present in use. I am informed that plenty of land is

The proposed site of the new settlement at Dumuk.

available. The annual rainfall at Hargeisa averages about 15 inches.

I also visited, in company with Dr. Bell and Mr. Walsh, the District Officer, a site at Damuk, about $4\frac{1}{2}$ miles from Borama, which was formerly used as a temporary camp for Abyssinian refugees. The land is flat and the soil appears good. There are gardens not far away. There is a good supply of water and plenty of land is available. The average rainfall at Borama is about 20 inches.

Of the two sites the latter appears to be the more suitable. There is more flat land, more water and a better rainfall. The climate is cooler, and, while it is far enough from Borama to ensure that patients do not stray into the town, it can be easily reached by motor or bicycle.

Personnel. (a) Next to the location the most important item is the personnel. To make the settlement a success there should be a suitable whole-time European Superintendent. He need not necessarily be a doctor, indeed, it would probably be impossible to get a whole-time doctor for such work unless the settlement were of a far greater size than is likely to eventuate in British Somaliland. In many countries this type of work is best done under the charge of Missions; but I understand that the Government would not favour such a scheme. The British Empire Leprosy Relief Association in co-operation with Toc H has in recent years sent out a number of young men who have volunteered for this type of work, chiefly to Nigeria but also to other countries. These sanitary workers, specially trained in leprosy work, are not open to the same objection that may be raised to Missions, and yet they are giving most valuable service especially in running leper settlements and developing occupation therapy through agriculture and industries. I suggest, therefore, that a Superintendent of this type be appointed by the Somaliland Government, if and when a suitable man is available. The salary would be on the scale of a Sanitary Superintendent—£480—20—540.

(b) Two African assistants would be necessary who would have some knowledge of English, and at least one of whom would be a compounder. They would be trained in leprosy work by the Superintendent. Their cost would be: for a compounder £50 a year; for an interpreter £30 a year.

(c) The work of the settlement would as far as possible be done by the lepers themselves. Training in agriculture, industries, sanitation and medical assistance would form an essential part of the activities of the settlements. For this the Superintendent would be responsible in consultation with the administrative, medical, educational, agricultural and veterinary officers of the Government.

The question of payment for labour is a matter for consideration. If the patient is paid for his labour, he should pay for his treatment and everything else that he gets. It is only in the case of those who are judged unfit for work, and in so far as they are unfit for work, that free allowances or other forms of free help should be given.

Admission of Patients. The patients would be gradually admitted on a voluntary basis after careful selection, so that admission would be counted a privilege. Few of those at the Berbera Camp would be found suitable for admission at the

beginning. A spirit of hopefulness, a desire for self-support, and active and willing co-operation are essential to the success of a leper settlement. Once a large enough nucleus had been formed of such patients, more patients from the Berbera Camp might be gradually transferred to the settlement, until at last the Camp might be closed down. Self-support should be aimed at as far as possible; though complete self-support, even apart from the expense of staff and other overhead charges, has never been found possible or advisable in a well-administered leper settlement.

At the Berbera Camp there are at present 43 patients, all of whom are open cases, only that type being admitted. In other countries the proportion of open to closed cases is generally 1 to 5 or 6. We are safe in concluding that there are at least 200 lepers in the country. But as lepers are as a rule only discovered when they become conspicuous cases and are noticed by a Government official, or when they come under the inspection of the Medical Officer for some other complaint without knowing that they have leprosy, it may be surmised that there are many more lepers than the above figures would suggest. Unless British Somaliland is different from other countries in which the voluntary system has been given a thorough and fair trial, it should soon be found that far more lepers are brought under control in this way and that the control is of a far more efficient kind.

The change over from the present compulsory to the voluntary system should not be too abrupt. It will be safer and easier to abolish the compulsory retention of those in the Berbera Camp once the voluntary system in the new settlement has been demonstrated in practice. Probably a period of two years should elapse before the present law is changed; but its application could be suspended as far as new patients are concerned during that period, except at the discretion of the Senior Medical Officer in the case of particularly dangerous and refractory patients. The bringing in of the new system might temporarily leave some infectious cases at large who would have been segregated under the old system, but any temporary disadvantage in this direction would be more than compensated once the new system was in full swing.

I would therefore advise that the number of patients arranged for be 200, though it might take some time to work up to that number. The confidence of patients has to be won, a confidence which may have been undermined by the present compulsory system. It would, however be well to make arrangements so that the settlement might later expand to 300 or 400 if necessary.

Buildings. A number of temporary buildings for staff, administration and the first patients would have to be erected so as to start off the institution. For this purpose a sum of £200 would be necessary, and, in addition, a sum of £50 for latrines.

For the patients *gurgis* would probably be best at the outset, and the manufacture of mats for the *gurgis* could form one of the industries in the settlement. Also, possibly, the grass for the mats might be grown in the settlement. If *gurgis* were found too expensive, simple huts of a type that can be kept clean and free from vermin might be used. It has been found in the most successful leper settlements that the usual type of dwelling in the country, improved as far as possible from the sanitary point of view, is the most suitable. Each individual would occupy one separate dwelling, a larger one being allowed for a patient accompanied by his or her family.

Once the settlement has become established, the following central buildings should be erected, as estimated for by Dr. Bell:—

	£
1. Administrative building, including treatment rooms and drug store.	500
2. Food store	50
3. Quarters for attendants	480
4. Quarters for Superintendent	700
5. Hospital wards	365
Total	£2,095

Also the type of dwellings for the patients should be improved to more permanent ones—cement base with mud walls and iron roof. It would, however, be a mistake to introduce such buildings at the beginning until the patients had been trained to the use of them. Patients could be taught to erect such buildings and could then occupy them.

Agriculture. As the people of Somaliland are not accustomed to agriculture they would have to be taught and gradually accustomed to cultivate fields. At least one acre per family would be necessary. The field could be enclosed with euphorbia, prickly pear or other forms of hedge. Provision would be necessary for grazing ground outside the area of cultivation.

The new settlement would require the almost complete support of the inmates for the first year until the crops are reaped. Allowing for 20 patients this would cost about £170 at £8 10s. 0d. each—including food, clothes, etc. An initial sum of £100 would be required for ploughs and other instruments.

I began this report by mentioning the fact that leprosy is uncommon among nomadic tribes. It is significant that the disease appears to be commonest in the garden areas between Hargeisa and Borama, where agriculture has been introduced, and where the people, though still living in their nomadic Gurgis, are to a certain extent tethered to their cultivation and live in closer contact with one another.

It might be urged from this that agriculture will lead to the introduction of disease and that it should therefore be discouraged. It would be better however to argue that the introduction of agriculture marks a natural and inevitable stage in the history of a people. Instead of discouraging agriculture it is surely better to take precautions, so that the dangers of disease accompanying the abandonment of nomadic life may be countered by better and more advanced sanitary safeguards.

I would add that a leprosy settlement such as is described above would be of value not only in the control of this disease but also in the introduction of sanitary reforms and agriculturual improvements, and the general civilization of the country.

SUMMARY AND SUGGESTIONS FOR PROCEDURE

1. The most important change in the system of dealing with leprosy recommended in this Report is the adoption of the voluntary as opposed to the compulsory system. This has been found successful in other countries where it has been given a fair trial, whereas the compulsory system leads to concealment and makes both treatment and control of the disease impossible. Whether the voluntary system will be a success in Somaliland remains to be seen, but I think it should be given a thorough trial.

2. If patients are admitted voluntarily to a settlement, they can be controlled within the settlement much more effectively than when they are compulsorily admitted. Thus, if they refuse to work or require discipline, the fear of dismissal or the stopping of treatment can be used as a punishment or an inducement to co-operate. In other words, the patient is admitted and treated and trained as a privilege and not as a punishment. To those who have seen and compared the two types of leprosy institutions—the voluntary and compulsory—there can be no doubt which is the more successful.

3. The present position of the leper camp is unsuitable and the new site should be accompanied by the new policy, a voluntary being gradually substituted for a compulsory system.

4. A different type of institution is advised, in the shape of

an agricultural settlement located in a suitable site and supervised by a suitable whole-time health worker, expert in leprosy.

5. Patients would be attracted to such a settement in hope of recovery and would lead a cheerful and active life which, along with good nutrition, is the most important requirement in the treatment of leprosy.

6. As leprosy in British Somaliland is largely bound up with the disease in Abyssinia, where it is apparently still more prevalent, it is important that steps towards control be taken, if possible, in consultation and co-operation with the Italian Government.

7. In carrying out the policy detailed above, I would suggest the following sequence of procedure:—

(a) The appointment of a suitable health worker, as already mentioned. Some time might be required for his training, say in one of the larger leper settlements in Nigeria, unless an already trained man is available.

(b) His first duty would be to visit the Berbera leper camp and find out which of the patients would be willing to co-operate if transferred to a voluntary settlement. He would also gather particulars of relations and contacts of the patients in the camp, so that he could follow these up and examine them with a view to offering residence in the camp to any new cases found to be infected.

(c) Two suitable African assistants would be appointed with a knowledge of English. One of these would act as interpreter to the health worker, and the other would be left in charge of the settlement when the health worker was absent.

(d) A suitable site would be selected for the settlement and a few temporary huts (*arish* or *gurgi*) erected. As soon as a few patients were available, either from the present camp or from among contacts—some 15 to 20 would be sufficient—the settlement would be begun with these as a nucleus.

(e) Temporary huts would be used for administrative buildings to begin with. The permanent buildings mentioned above would not be erected until experience had shown: (a) that the voluntary system was attracting patients, (b) that the site chosen was a suitable one. The Superintendant could, during the initial stage, live in a tent or temporary building on the site, or in a house at the district headquarters. Proceeding on these tentative lines would be wise, as the methods advised, although successful in other countries, are in the nature of an experiment in Somaliland, where immediate success has to a certain extent been prejudiced by the present compulsory system.

(f) Once the settlement was begun the Superintendent (health worker) would spend his time chiefly in the settlement, but would also continue to pay visits to endemic centres with a view to examining contacts and educating the people in the nature of leprosy and its prevention.

(g) While the above means are being taken to deal with leprosy, attempts should at the same time be taken to co-ordinate efforts at leprosy control in British Somaliland and Abyssinia. This might be attempted by local meetings of administrative and medical officers of the two countries, and also by negotiations through the respective Central Governments.

Acknowledgments. I wish to express my gratitude to His Excellency the Governor of British Somaliland and to Dr. Bell, the Senior Medical Officer, for the opportunity they have given me of studying the problem of leprosy in this country, and to thank the other officers who have, by their hospitality and help, facilitated my visit.

SUPPLEMENTARY SUGGESTIONS FOR TREATMENT, EDUCATION AND A LEPROSY EXPERT

TREATMENT

The following suggestions may be of use with regard to treatment.

(1) The importance is not yet fully recognised of *abundant healthy exercise backed up by adequate nutrition* in the treatment of leprosy. This is considerably more important than any special remedies yet available, and without it special remedies are not likely to be of much value and may even be detrimental. In leper settlements it is necessary therefore to see that patients are adequately nourished with suitable food, and that other diseases which interfere with nutrition are diagnosed and treated; also that occupational therapy, especially in the line of agriculture, is developed as fully as possible. For this adequate arable land and organisation of labour are necessary.

(2) Those in charge of leprosy treatment must be able not only to diagnose the disease and its complications accurately, but also to discriminate the type of disease and its degree of infectivity, and above all to estimate the patient's resistance to

leprosy and the state of his general health. Treatment valuable in one type may be detrimental in another. In patients with high resistance and good physique the special treatment may be pressed; in others it should be withheld or given only in minute doses. Great skill may be necessary in diagnosing and treating accompanying diseases and complications. Tuberculoid lesions often yield rapidly to intra-dermal injections and painting with caustics such as trichloracetic acid.

(3) Expensive preparations of hydnocarpus oil, and preparations which are comparatively ineffective are often used as special remedies. I would advise the use of pure oil of *Hydnocarpus wightiana* or *H. anthelmintica* as supplied from India or Siam. One firm supplies this oil in 2 lb. tins at a cheap rate, and this is particularly suitable for importation into Africa. When the tins are opened the oil should at once be transferred to bottles of suitable size according to the number of patients to be treated. Oil becomes irritant if kept in opened or half-filled bottles, so they should be filled to the neck and carefully corked. After bottling the oil and adding creosote to the proportion of 4 per cent, the drug should be sterilised by raising it to 120°C for half an hour in an oil bath or autoclave, or by heating in a boiling water bath for an hour on each of three successive days. Oil should be stored in as cool and dark a place as possible.

(4) I would suggest that the Medical Department should buy this oil in bulk at the prices quoted to the British Empire Leprosy Relief Association, that they should bottle and prepare it in bottles of suitable sizes, and that they should supply it free as required to all charitable institutions which are doing well-controlled leprosy work throughout the Territory, together with instructions and a small pamphlet describing its use.

(5) In injecting the oil intra-muscularly and sub-cutaneously the dose should be divided, not more than one cubic centimeter being injected at any one point. This may be done by pointing the needle in different directions without withdrawing it through the skin. Intradermal injections are particularly useful in tuberculoid cases. The oil should always be injected at a temperature of at least 40 degrees centigrade, so as to diminish the viscosity and enable it to infiltrate the tissues.

(6) *Hydnocarpus wightiana* trees might be grown on a scale which would make manufacture of the oil worth while. This might form a useful industry at a leper settlement such as Morogoro.

(7) Further information may be had by application to the Medical Secretary of the British Empire Leprosy Relief Association at 115 Baker Street, London, W.1.

EDUCATION

Leprosy is a difficult disease to cure, but an easy one to prevent. One of the main reasons for its persistence is the ignorance of the people. A great deal could be done with the co-operation of educational authorities to spread knowledge regarding leprosy through the medium of schools.

With this in view, an illustrated booklet entitled " Control of Leprosy " has been published in English by the British Empire Leprosy Relief Association for the use of school teachers. This booklet has already been translated into two African languages, and I suggest that the Medical Department should arrange for its translation into Swahili and its widespread circulation to schools in East Africa. I understand that the Medical Department of Tanganyika are willing to arrange for this translation.

LEPROSY EXPERT FOR BRITISH EAST AFRICA

In my tour of leprosy settlements and clinics in East Africa I have found a great deal of devoted work being done by European sisters and African assistants with, in many instances, a minimum of medical supervision. Valuable results are obtained as shown by the improvement and recovery of many of the patients. The crowds which continue to attend voluntarily prove the value of both in-patient and out-patient work. I consider, however, that very much better results could be obtained if these workers were trained and advised by a Leprosy Expert who would visit the various institutions and spend a few months or weeks at each in turn. Wherever I have gone doctors and those in immediate charge have expressed a strong desire for such expert advice.

I suggest therefore that a suitable doctor should, if possible, be appointed to undertake this work. To make such an appointment a success it would be necessary to find a doctor keen on leprosy work, with considerable experience of the disease in its various aspects, and who had first-hand knowledge of the methods used in other countries. It might be difficult to find a doctor already possessing all these qualifications, but an otherwise suitable candidate might be sent for a tour of study in India and elsewhere.

The expense of this scheme might be met by grants from the British Empire Leprosy Relief Association and from the various countries who would benefit from the appointment, the latter contributing according to the proportion of the Expert's time that they would utilise. The Association has agreed to give a grant of £350 for five years if the scheme materialises.