LEPROSY IN NIGERIA

A REPORT ON ANTI-LEPROSY WORK IN NIGERIA WITH SUGGESTIONS FOR ITS DEVELOPMENT.

I. INTRODUCTION.

IT was suggested by the British Empire Leprosy Relief Association that their Medical Secretary should visit Nigeria, and, after studying the leprosy problem and the work being done at present with regard to this disease, should offer suggestions for the further development of anti-leprosy work.

This suggestion was welcomed on behalf of the Colonial Office by Sir Thomas Stanton and by the Director of Medical and Sanitary Services. The latter kindly drew up an itinerary and made arrangements for me not only to visit existing leper settlements, and colonies, but also to study general medical and public health work throughout the country. The writer has had considerable experience of leprosy work in India, but his personal experience of Nigeria is short and inadequate. He therefore puts forward the following suggestions with some diffidence in the hope that, after discussion by those better acquainted with the administrative, political, public health and other considerations in this country, an adequate long-sighted policy may be evolved.

The writer is at issue with those who hold that leprosy can be quickly eradicated from a country like Nigeria by means either of settlements or of treatment centres. Leprosy is bound up with the presence of other accompanying and predisposing diseases, with dietary deficiences and insanitary conditions, and with ignorance and illiteracy. Till these are dealt with, leprosy is likely to remain. But this is no reason for desisting from or lessening anti-leprosy work. We shall show that leprosy may be considered a *key disease,* and that in dealing adequately with it we can open up paths towards the solution of other problems.

The leper settlement alone does not get down to the root of the problem. The aim of the suggestions embodied in this report is to evolve a policy which, however long it may take to put fully into practice, will gradually control and eventually eliminate the disease.

The natural unit for dealing with leprosy is the province, and we suggest a scheme which aims at combining and co-ordinating in united effort all the provincial forces in any way concerned.

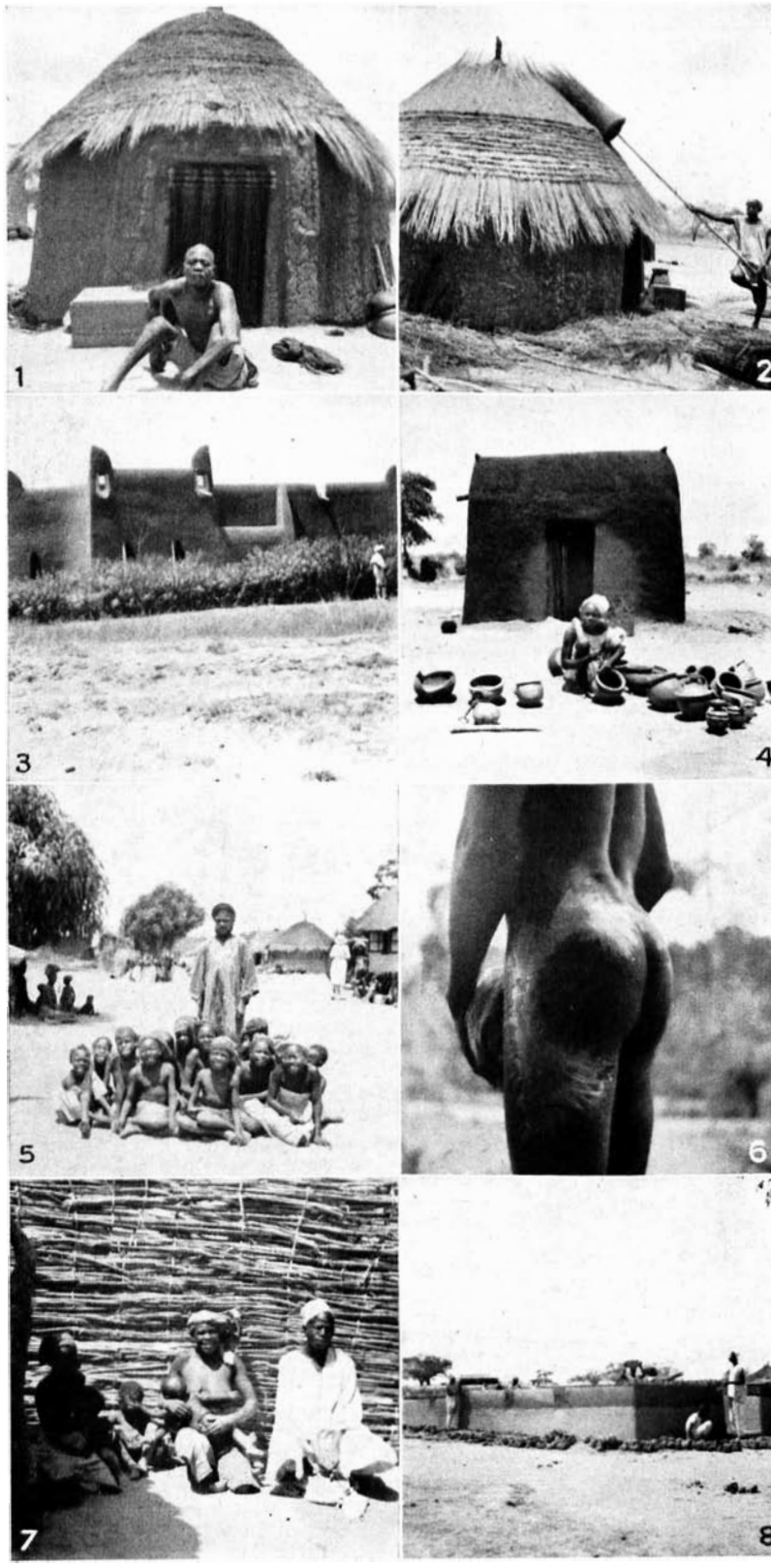
We have added a short report on the leprosy settlements visited.

II. The Leper Settlements and colonies and their respective populations are given in the last government medical Report as follows:—

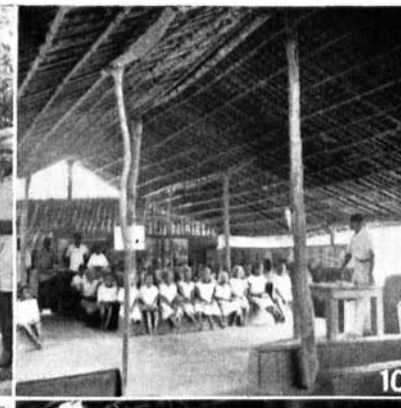
Government and Native Administration Southern Provinces and Colony.

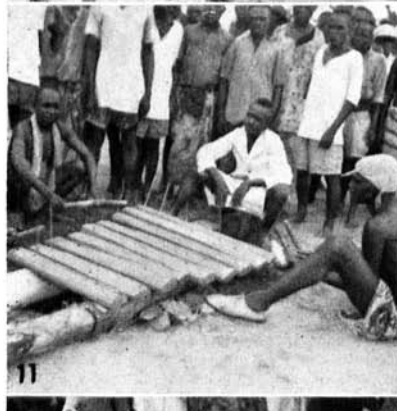
Place.	*Average Population.*
Lagos (Yaba) Colony	80
Ossiomo Farm Colony (Benin) ...	280
Uzuakoli Farm Colony (Owerri) ...	700
Onitsha Colony	105
Kumba Colony (Cameroons)	12
Bemenda Colony (Cameroons) ...	152
Abakaliki Colony (Ogoja)	62
Banso Colony	12
Northern Provinces.	
Zaria Colony	158
Ousau Colony	42
Katsina Farm Colony	278
Azare	26
Bauchi	40
Maiduguri	282
Medical Mission Colonies.	
Southern Provinces.	
Itu Farm Colony	1,500
Qua Iboe Colony	285
Ogbomosho	55
Northern Provinces.	
Garkida Farm Colony	450
Mkar	471
Vom	26
Diko	6

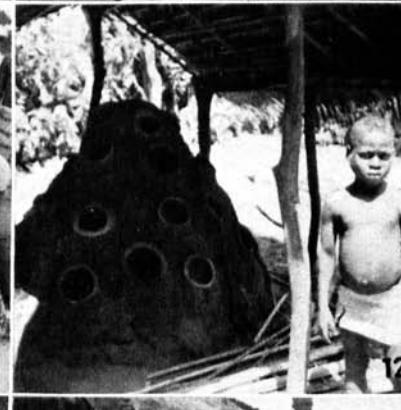
There are also the new Settlement near Kano with over 100 cases, the leper colleges near Afikpo, and small colonies connected with the hospitals at Kafanchan, Ilesha and other places. Several doctors carry on out-patient treatment of lepers at or near their general clinics. This makes a total of between 5 and 6 thousand cases in isolation. It is calculated that there are about 200,000 lepers in Nigeria, though some place the number at a higher figure. It would therefore appear that in spite of all the work and money annually expended, only one of every 35 to 40 cases is dealt with.

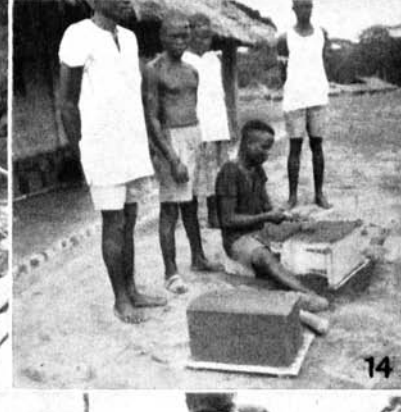


1. Hut in Leper Camp, Zaria, N. Nigeria.
2. Unrolling the thatch.
3. Mud built Hospital, N. Nigeria.
4. A leper potter, N. Nigeria.
5. Children of lepers in Zaria Camp, who should be isolated.
6. Scar after native treatment of leprosy with caustics.
7. A family in the leper camp, Katsina.
8. Lepers building a house with mud balls Katsina.









The lepers' market at the settlement.
A mahogany piano.
Leper weaver.
10. Leper children's school.
12. Juju house near the settlement.
14. Making mud blocks for building.

(9—14 are from Uzuakoli leper settlement, S. Nigeria.)

The first huts at the new Oji River settlement.
16. Clearing the bush at the same settlement.

III. TYPES OF SETTLEMENTS.

Out of some 24 leprosy institutions I was able to visit 17, omitting only the Qua Iboe and a few of the smaller settlements in the Cameroons and elsewhere. Several of the smaller settlements have been founded with the object of removing from the streets, and giving shelter to, disabled and disfigured cripples. The majority of the inmates of these institutions may be counted as ex-leprosy patients, who have formerly harboured the infection but are now no more suffering from active leprosy than a pock-marked person is suffering from small-pox. While sheltering and providing for these unfortunate people is to be highly commended as an act of charity, it is of little or no value from the public health point of view.

As an example may be mentioned the Maiduguri Settlement where, out of 240 inmates at the time of my visit, the great majority belonged this category. There were only about 50 definite cases of active leprosy, that is only about 20 per cent. In such a Settlement the whole atmosphere is influenced by the mental outlook of the majority, viz. that of dole receivers who are content to receive shelter and provision and have no desire to recover. In consequence the treatment of hopeful cases becomes exceedingly difficult. The Government Medical Officers who supervise these settlements have innumerable other duties to perform; but even if they had time to spare for the care of the lepers, they could do but little under existing conditions without entire re-organisation.

Of a totally different category are such Settlements as those at Itu, Uzuakoli, Garkida, Somaila (Kano) and Ossiomo. These are under the care of whole-time workers, and the whole atmosphere is one of activity and hopefulness. The two largest and best conducted of these Settlements are those at Itu, in the Calebar Province where there are some 1,500 lepers and at Uzuakoli in the Owerri Province, where there are some 850 lepers. But these Settlements, large as they are, and costing the Native Administrations annually a very large proportion of their total revenue, cannot deal with more than a small fraction of the total number of the infectious cases belonging to the provinces in which they are situated. Even supposing that they each isolated one quarter of the infectious cases in their respective province, (and it is questionable if they succeed in doing even this), the other three-quarters left at large would still continue to spread infection to a scarcely abated degree.

Nor can it be hoped to increase the number or the size of

such Settlements to an extent which would control at all effectively the spread of infection. The expense would be prohibitive. Some other method or methods must be sought which will supplement the efforts of these Settlements.

IV. PROVINCIAL LEPROSY UNITS.

For orderly and economical working I consider that anti-leprosy work should be organised on a provincial basis. The three parties concerned in the control of leprosy are Government, Native Administrations and Missions. Each of these can render in different capacities much service to the solution of the problem. But unless their respective efforts are co-ordinated the best results cannot be hoped for.

(1) I suggest therefore the formation in each Province of a *Leprosy Board.* Of this the Chairman should be the Resident, and the members consist of the Senior District Officer, one Government doctor in general practice in the province, one Medical Officer of Health in the province, the chairman or secretary of the Mission, the principal of one of the Institutes for Higher Education, two independent people chosen by the Resident. The Board should meet at least once a year, at the Provincial Settlement, if possible. Other meetings might be held at provincial headquarters. Minutes should be kept by the secretary who should be the Senior Medical Officer in charge of the Provincial Leper Settlement. Minutes should be forwarded, after endorsement by the Resident, to all members and to the Director of Medical Services through the Leprosy Expert, (if such is appointed).

This board would be responsible for the initiation, development and co-ordination of all anti-leprosy efforts in the province.

(2) In each province there should be a Provincial Leper Settlement which should be the principal centre for examination and treatment of patients, for training of anti-leprosy workers who would work throughout the province, and of training of workers in creches and Child-Welfare Centres. Such a settlement could not provide accommodation for more than a fraction of the lepers in the province, and its population would therefore be limited to certain types of cases, as described later. It would however form a centre of exchange for all the leprosy work of the province and would help to provide workers for Clan Settlements.

(3) As only a fraction of the lepers in each province can be accommodated in the Provincial Settlement, an endeavour should be made to form Clan Settlements. These would be

inexpensive and would provide for the majority of the lepers belonging to each Clan.

(4) In order to bring Clan Settlements into being it would be necessary to make a survey of the lepers within each clan. This work should be entrusted to Sanitary Inspectors attached to each clan. They might be assisted by ex-patients of the Provincial Leper Settlement, who had been thoroughly trained in the recognition and treatment of leprosy.

(5) In connection with the Provincial Settlements and the Clan Settlements, provision should be made as far as possible for the isolation of infants from infectious parents.

(6) With the aid of the educational authorities and other agencies the public should be educated with regard to leprosy, especially its prevention.

The above is a rough sketch of anti-leprosy work as it might be organised under the Provincial Leprosy Board. We now give in more detail suggestions for the organisation of each branch of the scheme under this Board.

V. CENTRAL PROVINCIAL SETTLEMENTS.

(1) *Nature of Settlements.* There should be one first grade leper settlement in each province where the incidence of leprosy is high.

This settlement should have accommodation for a population of between 500 and 1,000. As effective Clan Settlements (See Section VI.) are formed, the number might be diminished. There seems to be general agreement that such settlements are most efficiently and economically established and run by mission doctors, and it would be well to entrust this work, under the Leprosy Board, to one of the principal missionary societies in the province. The cost of establishment and support of the settlement should be borne by the Native Administrations in the province, each paying in proportion to the incidence of leprosy in its own area. The Native Administrations in each province should consider themselves jointly responsible for the upkeep of their Provincial Settlement. Their contributions may be supplemented by Government and other grants. Government grants might be given :—

(a) For capital expenditure for special purposes.

(b) To help in initiating colonies, money being given per head on a scale diminishing each year, as overhead costs are proportionately heavier when there are fewer patients during the first 4 or 5 years.

Patients from other provinces should be refused, and

those already admitted should be returned as soon as practicable for admission to settlements in their own provinces. In provinces in which the incidence of leprosy is less it may be more economical to have one settlement for two provinces.

(2) *Staff.* Preferably there should be two doctors on the staff, one of whom can organise preventive work throughout the province and relieve the other at headquarters during leave. Failing this, there should be a lay worker of practical ability and education who can help the doctor in part of the work. Two nursing sisters should be appointed who can organise the hospital work, train nurses and Infant Welfare workers, supervise Welfare Centres and relieve each other when on furlough. Failing two sisters there should be a second sister available from some other hospital for furlough relief and who could give part time to help in training, etc.

The subordinate staff may consist to a large extent of intelligent patients who have been trained to act as dispensers, nurses, medical assistants and laboratory workers; but there should be two or three non-leper Africans trained in laboratory work, etc.

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

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

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

(d) Healthy site, or one capable of being rendered healthy, with special reference to Malaria, Sleeping Sickness, etc.

(4) *Types of Buildings.* (a) Good permanent buildings for staff, hospital, dispensary store, laboratory and healthy children's home, which will not require frequent expenditure on repair.

(b) Cheap huts of mud and wattle with matting or thatched roofs for patients; these can be erected by the patients themselves at a very low expenditure. Schools and other public buildings can be erected of similar materials.

(5) *Types of patients to be admitted to Settlements.* (a)

There should, especially at first, be predominently hopeful cases who come voluntarily with the object of recovery. If the majority of patients are of the disfigured and disabled type, who have no hope of or interest in recovery, then the morale of the settlement will be rendered hopeless and development on the right lines be found utterly impossible.

(b) Early cases of the abortive type, that is to say those not likely to develop the disease in an infective form, should not be retained in the settlement to the exclusion of highly infectious cases, though to begin with the treatment and recovery of the more mild forms of leprosy will render the settlement popular.

(c) The main type admitted should be the highly infectious C2 and C3 cases, who, though harbouring a high degree of infection, are capable of being rendered physically strong and healthy and are able to undertake a fair amount of work.

(d) Leprous patients suffering from other and remediable diseases from which they may be treated in the hospital and settlement.

(e) Mothers of the infectious type may be admitted before child-birth with a view to isolation of new-born children.

(f) When Clan Settlements are organised the type of patients to be admitted to the Provincial Settlement would have to be reconsidered. Patients might be admitted temporarily to the latter and undergo thorough examination and treatment for accompanying diseases. After a period of training and instruction in personal hygiene, etc., many of them could be drafted to Clan Settlements where they could continue under treatment, thus making room for the admission of fresh patients to the Provincial Settlement.

(g) A certain number of intelligent young patients in the milder stages of leprosy should be admitted not only with the object of treatment, but also that they may undergo special training in the recognition, treatment and prevention of leprosy. Those may later be of value in treatment centres, in co-operating with Sanitary Inspectors in carrying out leprosy surveys in villages and in organising Clan Settlements and carrying out treatment and Child Welfare in these when formed.

(6) *Work in the Settlement.* One of the most important factors in the treatment of leprosy is healthy physical exercise up to the capacity of the individual. Without this no other form of treatment is likely to be of permanent value. Such exercise may be obtained by communal work in the

Settlement, such as making and repairing of roads and houses, bush clearing, industries and all other activities dependent on communal life. It can also be obtained by individual farming on land either given by the Settlement or rented by the patient himself from a neighbouring landowner.

Self-support should be aimed at as far as possible. Allowances in money and kind are necessary in the majority of cases to begin with; but patients who are physically strong should try to support themselves by their own efforts. Progress towards self-support will, however, depend on sufficiency of land for agriculture, the establishment of industries on a commercial basis, the finding of suitable markets for agricultural industrial produce. In proportion as these are lacking the patients must be subsidised to a certain extent.

(7) *Treatment in Leper Settlements.* The main part of the treatment is of a general nature and varies in each individual. It is necessary therefore to study each case separately. Accompanying diseases have to be dealt with, such as venereal diseases, yaws, malaria, helminthic infections, dysentery, etc. Correction of diet is equally essential. In some cases very careful, prolonged and repeated examination is necessary before debilitating causes can be found and corrected.

It must be emphasised that mass treatment with Chaulmoogra and other special drugs is not likely to give favourable results and may in many cases do considerable harm to the patients. A well-equipped clinical laboratory is essential, and the doctor should have a well-trained laboratory assistant who is able to relieve him of a large part of the routine laboratory work. There should be one settlement in Nigeria to which laboratory assistants can be sent for training (See Section X of this Report).

(8) *Settlement Schools and Training.* As the hope of recovery depends to a large extent on the intelligent co-operation of the patient, the educational work done in a leper settlement is of great importance. Patients have to spend as a rule several years in the Settlement, and it is important that children and adolescents and a certain proportion of young adults should attend school. After learning the rudimentary subjects they can be taught to help in treatment and trained in other useful subjects, especially rural hygiene. Above all they can be trained with regard to the treatment and prevention of leprosy so that when the disease becomes arrested and they return home, they may take an active part

in the campaign against leprosy in their own villages and in Clan Settlements.

VI. CLAN SETTLEMENTS AND VILLAGE PROPAGANDA, TREATMENT AND SURVEY.

It is obvious, considering the incidence of leprosy in Nigeria, that one settlement in each province, even if it be large enough to hold 1,000 patients, cannot remove more than a fraction of the infectious cases from the general community. Supposing that one quarter of the infectious cases in any province were effectively isolated in such a Settlement (and that would be more than could be hoped for under existing conditions), the other three-quarters would continue to spread infection, and but little advance in the control of the disease could be hoped for as the result.

A policy should be aimed at which will result in the effective isolation of *all* infectious cases. As isolation of all such cases in a Central Provincial Settlement or in a number of Provincial Settlements would be impossible on account of expense, some other method must be sought.

The Clan Settlements established some years ago in the neighbourhood of Afikpo seem to point to a possible solution. A native land-owner of the Edda Clan, himself a leper, established a leper village to which other lepers of this clan were gathered. There are now five such villages within a radius of some 3 or 4 miles from a central treatment centre at Usu, which is on the main road some 10 miles west of Afikpo. Treatment is given once a week by the medical missionary from the Scottish Mission at Uburu.

The Senior Health Officer of the Southern Provinces suggests that similar leper villages might be established by Clan chiefs, land being set aside for the formation of Clan Leper Villages. I consider that this suggestion is worthy of careful consideration. In India a somewhat similar method has been adopted in the Bankura District of Bengal, by the Propaganda-Treatment-Survey method (P.T.S.).

In order to carry out any such scheme a large amount of initial propaganda would have to be undertaken and a leprosy survey would be necessary. In India we have found that treatment centres are a necessary accompaniment to effective surveys and propaganda and to the establishment of voluntary isolation of infectious cases. Compulsion, when used, must be from inside the community itself, otherwise it is apt to lead to concealment of the disease. The Native Administrations might however bring a certain amount of

influence and pressure to bear upon Clan chiefs in order to get each of them to set apart land and isolate the lepers of his clan in leper villages.

With regard to the leprosy survey which must necessarily precede isolation, and the propaganda and treatment of cases, which, as mentioned above, must accompany a successful survey, these might be gradually carried out by the Native Administration Sanitary Inspectors attached to each clan section. In this work the Sanitary Inspectors might be helped by ex-patients from the Provincial Leper Settlement, who have, as described above, been trained in the recognition and treatment of leprosy. The Sanitary Inspectors would have to be given a thorough training in the recognition of leprosy. The actual diagnosis of leprosy would be in the hands of the Medical Officer of the Provincial Leper Settlement, to whom all cases in the Sanitary Inspector's lists would be sent by the order of the Clan Chief and the District Officer. An alternative modification is suggested by the Medical Officer of the Uzuakoli Leper Settlement. " Assuming there was one Sanitary Inspector to each clan, it might be more effective to have one dispensary accessible to each group of three or four clans, in charge of a key man, who would be either an assistant of the Leper Settlement Medical Officer or a specially trained sanitary inspector, and who would co-ordinate the work in the individual clans and give treatment. Is it not likely that without this key man the individual Sanitary Inspectors would find their energies disseminated in so many directions as to neutralise their effectivity? At one end there would be the Medical Officer of Health of the Province and at the other the Medical Officer of the Provincial Settlement. The Clan Settlement Surveys would be directed by the Sanitary Inspector attached to each Clan. The link between the Medical Officer of Health and the Sanitary Inspectors would be his senior men, between the Medical Officer of the Settlement and the Sanitary Inspectors, the key man."

Necessarily the most suitable plan would vary with the circumstances in each province and with the staff available, and small local units would have to begin work on an experimental basis in order to study the best methods.

The question of remission of taxes to lepers segregating themselves effectively might be considered.

Patients who had spent a period of time in preliminary treatment and training in the Provincial Settlements could be sent on to the Clan Settlements. Clan Settlements would require a certain amount of supervision, and should be visited

as often as possible by a Medical Officer of the Provincial Settlement.

A further suggestion is that each Provincial Settlement should be divided into two sections, one for infectious and the other for non-infectious cases. All healthy children living in the settlement should be strictly confined to the latter.

VII. INFANT WELFARE WORK.

There is general agreement among leprosy workers that the care of children and their isolation from infection is one of the most important items in the campaign against leprosy. Young children are particularly susceptible to the disease. Also those infected in early childhood tend to develop a more severe and infectious form of the disease than those infected in adult life; they therefore are chiefly responsible for spreading the disease to the next generation.

Leprosy is due to post-natal infection. Therefore children separated at birth from infectious parents, and kept free from infection, do not develop the disease. The best method of bringing up children thus separated from their mothers is a matter for discussion. At Itu Settlement the infants are kept apart from their mothers except at feeding time when special precautions are taken to prevent contact except between the child's mouth and the mother's nipple. At the Uzuakoli Settlement the children are artificially fed and do not come in contact with the mothers at all. This latter method, which at Uzuakoli has so far given uniformly satisfactory results, appears to be the safer of the two; though I do not think there is much danger of women infecting their children if repeated examinations have shown that they are bacteriologically negative.

There is also the question of the health of the mother, as the strain of suckling often weakens the mother and leads to an increase of leprous symptoms. Also skilled artificial feeding may be better for the child in some cases than the milk of a leprous mother.

Creches situated at the Provincial Settlements might be used as training centres for child-welfare workers chosen from among uninfectious girl lepers. These might perhaps later be used to conduct similar creches in connection with Clan Settlements and situated in the non-infectious section (See the last paragraph of Section VI).

VIII. CO-OPERATION OF EDUCATIONAL AUTHORITIES.

Leprosy is a disease which though difficult to cure, is easy to prevent.

superstition, crowding and insanitary conditions. Education of school children in public health and sanitation may include practical teaching regarding leprosy and its prevention. It is important that all school teachers should be given practical training in this latter subject and be taught to recognise leprosy and the means that are necessary to prevent its spread. They should be supplied by the educational authorities with a practical well-illustrated guide dealing with this subject, and their training should include practical demonstrations by a leprosy expert. A teacher thus prepared may then help in organising anti-leprosy measures in the village where his school is situated. I have met with considerable sympathy and promises of co-operation from educational authorities and principals of training institutes throughout Nigeria.

IX. LEPROSY AS A KEY DISEASE.

Anyone acquainted with the many diseases and public health and other problems of Nigeria, on reading the above suggestions will probably consider that the expenditure necessary to carry out this programme will be out of proportion to its importance relative to these other problems.

There is much truth in this criticism. Leprosy is not a fatal disease. Its mortality as compared with that of Malaria, Sleeping Sickness and many other diseases is negligible. But leprosy though not fatal probably causes during its long course more distress, physical and mental, than any other disease.

On the other hand, leprosy, if attacked along the lines suggested above, may be considered as a key disease which will open the way towards the solution of other public health problems.

The more intelligent young men trained in provincial settlements in sanitation, and the recognition, treatment and prevention of leprosy, may be found useful in introducing sanitary measures when they return to their own villages. Similarly young women trained in child welfare work may find scope in the villages. Action taken by clans to control leprosy may open the way to controlling other diseases.

The general dread in which leprosy is held is a driving force which when wisely directed may be used to bring about not only particular but also general village sanitary reforms.

X. TRAINING OF WORKERS AND SUPPLY OF DRUGS AND APPARATUS.

I found that in many settlements satisfactory laboratory

work was not carried out. Cases in which there were not even distinct sensory changes were sometimes diagnosed as leprosy without bacteriological examination. I found that syphilis and yaws are diagnosed in the settlements without the aid of seriological tests, and I suspect that signs attributed to leprosy are sometimes really due to yaws and syphilis. In India the Kahn test is widely used in leper settlements and clinics, and it is found to be fairly accurate even in the hands of dispensers who have been carefully trained.

In the various leper settlements I found various preparations of hydnocarpus oil in use. In some, expensive preparations such as moogrol are used; in others, esters prepared at Yaba are used. At Uzuakoli and Itu the esters are prepared locally from oil imported from India. In others the oil itself is used. In my own experience in India I have found the oil with 4% creosote, and the esters with 4% creosote equally effective. The latter has the great advantage of being very cheap. Its disadvantage is its greater viscosity and the consequent difficulty of injection. But, if it is heated to about 50°C at the time of injection, this disadvantage is overcome.

I found that injections were given chiefly intramuscularly and subcutaneously; but often with very little skill. I consider that the intradermal or plancha method is the most suitable in a large proportion of cases; and I found that this method is attempted in many settlements, but, as the technique had not been mastered, bad results are obtained. I demonstrated this method in several settlements using cresoted oil for this purpose.

In some settlements Alepol solution is used. But there is a general consensus of opinion that this preparation is not as effective as the oil or esters. In some places bad results were obtained with Alepol, and in one settlement several fatalities occurred with it due to lack of adequate supervision of insufficiently trained African workers.

The treatment of leprosy requires considerable skill. While in settlements with whole-time doctors treatment is carried out by the very best possible methods, in others, where the doctor can only spare a limited amount of time and the treatment is conducted by inadequately trained assistants, the methods and results are far from satisfactory.

Until hydnocarpus oil of Nigerian manufacture is available, it would be well to lay in sufficient stores from India to supply oil and esters to all the leprosy institutions in the country with the exception of those that prefer to order their own oil direct. Esters might be manufactured as at

present. I understand that only a limited amount of this can be manufactured at present; but this might be sent out to settlements asking for it in preference to the oil. I would suggest:—

(1) That all oil and esters be made up in bottles which are nearly full, as otherwise these preparations come in close contact with air and deteriorate more rapidly.

(2) That four per cent. creosote be added to both oil and esters and that both preparations be sterilised before being sent out, the creosoting and sterilising being clearly indicated on the label.

I think it would be well to have in stock Kahn test and Sedimentation Test apparatus. The standard form of the latter used in leper institutes in India might be ordered through the Leprosy Research Department at the School of Tropical Medicine, Calcutta. This would ensure uniformity of results with those using the test in India. These could be supplied to Nigerian leper settlements at cost price as required.

Various stains and other apparatus necessary for leprosy settlement laboratories might also be held in stock to facilitate the supply to those requiring them.

I think it would be well to have one leper settlement in Nigeria specially equipped for training. It would have a well-equipped laboratory where bacteriological examination methods, faeces, blood and urine examination, and various tests, such as the Kahn, sedimentation, leprolin, &c. are carried out. There would also be demonstration of the preparation and administration of drugs by the latest and most approved methods.

I consider it important that the doctor in charge of this training settlement should be deputed to India for an intensive course of training for 5 or 6 months. There he would study in Calcutta and other centres where research and field investigations have been conducted for some years. The Training Settlement would then form a centre of training both for doctors in charge of settlements and for African assistants. It might be well also for doctors who are not specialising in leprosy to pay visits to such a centre and acquaint themselves with this disease which is so prevalent throughout Nigeria, and enters to a certain extent into the work of every doctor.

XI. LEPROSY EXPERT FOR NIGERIA.

(1) If the above programme for dealing with leprosy is adopted in its broad outlines, considerable experimental work will have to be done and experience gathered before it can

be carried into practice; the more so as details will necessarily vary in different provinces and especially between the north and the south. These preliminary investigations would be considerably facilitated by the services of a suitable leprosy expert who would study leprosy in the different areas.

(2) Moreover in each Provincial Unit the co-operation of various agencies is essential especially of government and mission authorities. Both missionaries and government officials have repeatedly told me that co-operation between Government and missions and between the various missions, is not what it should be or what they would desire it to be. This lack of co-operation is due in large measure to viewing the same problem from different points of view. It could, I consider, be overcome by frank discussion; and one of the important results of Provincial Leprosy Boards should be to make possible and easy such co-operation. The appointment of a suitable leprosy expert who would be in close touch with Government officials, and at the same time with missionaries, as well as with Native Administrations, Sanitary Inspectors, etc., would also help considerably in this direction.

(3) A third benefit from a leprosy expert would be that he would be necessarily a man of wide experience, who had studied its various aspects. He would be free from routine work, would be able to spend some months in each province studying local conditions, initiating work, training Sanitary Inspectors, teachers and others who are in a position to help in the anti-leprosy campaign. The medical officers in charge of Provincial Settlements are themselves experts in leprosy, but they are to a large extent tied down by routine work, and their opportunity of studying the disease elsewhere is limited. The Nigerian Leprosy Expert would be able to help them considerably from his wider experience. He would be able to initiate and extend work in each province and stimulate effort, especially in those provinces in which little has so far been done.

(4) The Nigerian Leprosy Expert would necessarily be a man who had studied leprosy in other countries. He would be a man of ability and tact and one able to command the respect and co-operation both of Government officials and of Missionaries. He should be appointed *ad hoc,* and preferably be considered as the agent of the British Empire Leprosy Relief Association and its Nigerian Branch. His salary might be paid by or through that Association and its Nigerian Branch. The appointment might in the first place be for

five years, to be continued if thought suitable after that period.

Technical Expert. As farming and various industries form a very important part of leper settlement development, I consider that there is need for a technical expert who would not be permanently attached to any one settlement but would spend some months at each settlement in turn and initiate and develop farming, industries &c. His experience gathered in each settlement he visits would be of use to all. He could be of special value in initiating hydnocarpus oil production and other industries requiring special skill, and could help and advise regarding buildings, latrines, water supply &c.

Perhaps the British Empire Leprosy Relief Association —Toc H Committee, might consider the appointment of such an expert.

XII. LOCAL HYDNOCARPUS (CHAULMOOGRA) OIL PRODUCTION.

I visited the Sapoba Forestry Plantation of Hydnocarpus Wightiana trees, and discussed the possibilities of developing and utilising this plantation, both with Mr. Ross at Sapoba and later at Ibadan with Mr. Weir, the Chief Conservator of Forests.

The plantation is as follows:—

1927	2	400
1931-32	4.2	840
1935	7	1400
1936	10	2000
	23.2	4640

A certain proportion of the trees are males and will give no yield. But I think we may count on some 2000 trees being ultimately available from this plantation. The present yield of seeds from the 1927 trees is about 2 lbs. a tree, but this should increase as the trees grow larger. Some of the larger trees in South India yield many hundredweights of seeds. By cold extraction oil 1/3 the weight of the seed can be extracted. This oil is suitable for treatment of leprosy by injection. A further 1/6th of the weight of the seed could be extracted later by heating, this oil being used for inunction.

The growth of hydnocarpus trees and the extraction of oil might form a very useful industry at one or more of the leper colonies. Both Mr. Ross and Mr. Weir welcome the establishment of such an industry, and Mr. Ross has offered

to supply seedlings and to report on the suitability of land at one or more of the colonies for the growth of the trees. About 1,000 seedlings are at present available, which, planted at 200 trees per acre, 15 ft. apart, would be sufficient in the present year for 5 acres. The Ossiomo Settlement is the nearest to Sapoba and the Oji River Settlement, Usuakoli and Itu settlements are also possibilities. The months for planting are June and July, so that, if leper settlements plantations are to be begun on an experimental basis this year, arrangements will have to be made without delay. Both Ossiomo and Oji River settlements have expressed their desire to have such plantations formed on an experimental basis. A suitable press would have to be installed, and perhaps a government grant for this purpose might be made. If the press could be installed at the Ossiomo Settlement, about 50 miles from Sapoba, or at Oji River Settlement, about 120 miles from Sapoba, the seeds from the present yielding trees at Sapoba might be sent there for extraction. Information regarding the most suitable press and the method of extraction might be obtained through the Surgeon-General, Madras, from the Chemist at the Government Stores Depot, Madras, India, where the supply for the Madras Presidency and other parts of India is prepared.

An alternative would be to increase the plantation at Sapoba and send the seeds to Yaba, where esters of hydnocarpus oil are at present prepared. But I consider that possibly this industry could ultimately be more cheaply and favourably carried on at a leper settlement, and would afford employment to the lepers themselves. The oil could then be distributed to the various leper settlements and treatment centres.

XII. ACKNOWLEDGMENTS.

I wish to acknowledge with thanks the help of the Director of Medical and Sanitary Services in so carefully planning my itinerary, in making arrangements for my journey throughout the country and in helping me in innumerable other ways. The Residents, District Officers, Medical Officers, Forestry Officers and other Government Officials, by their hospitality and the time and assistance they gave unsparingly, helped to make my tour a success. I wish to thank them and also the missionaries who also gave me considerable help. Unfortunately the Medical Officers in charge of the Itu and Somaila Settlements were absent on leave. I received considerable help in framing the above scheme from the Senior Medical Officer of Health of the Southern Provinces and the Medical Superintendent of the Uzuakoli Settlement, who deserve my special thanks.