LEPROSY REVIEW.

VOL. II. No. 1. JANUARY, 1931.

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Editorial.

WE are glad to bring to the notice of our readers a very important article written by Dr. James Maxwell on the menace of leprosy in Manchuria. The state of affairs depicted by Dr. Maxwell is not altogether surprising. As a result of the serious internal conditions of China, famine and disease have swept the land, and a large number of people have migrated from the more disturbed areas, chiefly from Shantung and Kiangsu, into the less troubled province of Manchuria. Among these immigrants there must have been a large number of lepers, and because of the serious economic conditions prevailing, the disease seems to have spread to an alarming extent. The position is so serious that we trust immediate action will be taken. Whether this will be done we cannot say, but we are glad to do what we can by giving this article wide publicity, and we shall bring it to the notice of the proper authorities.

In this number we are publishing the first of a series of articles on the Leprosy situation in East and Central Africa, as there have been requests from various sources that the material in the Secretary's Report on his recent tour should be given a wider publicity.

" Leprosy in India " from time to time contains articles which are of more than local interest. We intend, therefore, to have an Indian section of the REVIEW which will consist of original articles from Indian workers, and reprints of the more important contributions contained in the quarterly publication of the Indian Council of the Association.

We have pleasure in bringing to the notice of our readers an important international conference to be held at Manila, under the auspices of the Leonard Wood Memorial Fund. At this conference, to which only those taking an active part in leprosy work are being invited, the whole field will be discussed, and an attempt to standardise methods of treatment, classification and prevention will be made. The Secretary of the Association has been invited to attend, and we hope to publish in the near future a note on the findings and the result of the Conference.

This issue marks the anniversary of the REVIEW, and we have decided to increase it slightly in size and to publish illustrations. We therefore shall welcome photographs accompanying articles, and we trust our contributors will assist us in this matter.

We should like to thank all our readers for their help in the past year, and to wish them all success in their work for the forthcoming year. Perseverance and pertinacity, we suggest, are the key words to success in this most difficult problem, and we trust 1931 will see yet another step made towards its ultimate solution.

The Menace of Leprosy in Manchuria.

JAMES L. MAXWELL, M.D.

THE province of Manchuria constitutes the largest province of the Republic of China, with an area of some 363,700 square miles. The population is estimated at 24 millions, being but 66 to the square mile.(1) The country is rich in minerals, and the soil in many parts is very fertile, the province thus proving a great attraction to immigrants from less favoured parts of China. Immigrants have indeed come to Manchuria in a steady stream for many years, but the flow has been greatly intensified in the past three years owing to famine and anarchy in other parts of the Republic. The bulk of these immigrants come from Shantung and the Northern part of Kiangsu, and so great has their volume been that this constitutes one of the largest movements of population on record. The numbers are estimated at something like three million persons during the years 1927-1929.(2)

One of the dangers of such mass movements of population is that diseases common in the regions from which the immigrants come, and which are yet absent from the lands in which they settle, shall be carried and spread by them in the new country. Of such diseases leprosy is one of the most serious.

Manchuria has been regarded up to the last year or so as practically free from leprosy, but the danger of its introduction from without in connection with these mass movements of population has been fully recognised by those interested in the problem of this disease in China.(3, 4)

To say that leprosy has been absent from Manchuria in the past is not strictly correct. For thirty or forty years one of the largest hospitals in that province has noted an occasional case. Such cases have, however, never amounted to more than two or three in a year, and have been confined to persons entering Manchuria from other provinces. A possible exception to this is a small, very limited area on the Korean border of the province, where leprosy is said to be indigenous. Final proof of this statement has, however, not been forthcoming.

The mass immigration of the past three years has come mainly from the province of Shantung and the northern part of the province of Kiangsu. Both these areas are well recognised as heavily infected with leprosy, and the disease in Shantung dates back for at least many centuries. The immigrants enter Manchuria mostly from the south, and while small numbers remain in the southern and central areas, the bulk of them move up to the more empty lands of the north of the province.

Moukden, the provincial capital, lies in the southern district, and is thus less affected by the stream of immigrants than are other areas. It is here, however, where the largest and most progressive modern medical institutions are to be found, and where an excellent Mission Medical College with large hospitals and a very extensive out-patient work is situated, and from which alone at present reliable statistics are to be obtained.

On a recent visit there the writer was enquiring into the leprosy situation, and the following information was obtained from the dermatological department :—

During the past few years the maximum number of lepers seen in this department was three or four, all old cases in visitors to Manchuria. During the first nine months of the current year (1930) between thirty and forty cases of leprosy had come to the department. It was doubtful, however, whether any of these were natives of Manchuria, though no special attention had been paid to this side of the question. The bulk certainly were immigrants from Shantung or North Kiangsu, except in the case of one or two children in whom the symptoms of the disease had manifested themselves some time after the families had settled in their new homes.

From this statement two deductions may fairly be drawn :—First, that leprosy is now to be found in southern Manchuria on a scale never before known. For if this

number appeared among casual visitors to the dispensary, it is certain that the actual figures for lepers must be very much higher in this region ; second, that in view of the fact that only a very small proportion of the mass of immigrants settle in the Moukden region, the vast bulk of them taking up land further north, it is practically certain that in the northern part of Manchuria the present incidence of leprosy must be relatively high.

It is of course uncertain how far the disease will continue to spread among the newcomers and as to how far it may develop among the original inhabitants of the province. In view, however, of the history of leprosy in other lands, it is at least safe to say that the present position in which neither treatment nor control of leper immigrants is being carried out constitutes a very serious menace to the province. This is particularly the case in that over 80 per cent. of the immigrants are men(5), and therefore intermarriage or concubinage on a large scale is certain to take place.

The situation evidently calls for very careful consideration, and for the carrying out of at least some simple steps for the control of the disease.

It might be possible to prevent the entry of further lepers by the institution of preventive measures at the points where immigrants enter the province. This, we fear, however, would be little more than locking the stable door after the horse has escaped. There is already this year (1930) a very rapid decrease in the stream of immigration, and this decrease would appear to be a progressive one.(6)

A survey of the present situation is, however, urgently needed, and methods of treatment and, in certain cases, of segregation ought immediately to be instituted. Whether the authorities can be stirred up to take such steps, and whether, in view of the enormous costs of military enterprises to which the province is committed, enough money can be found to meet the urgent need is, we fear, at least doubtful.

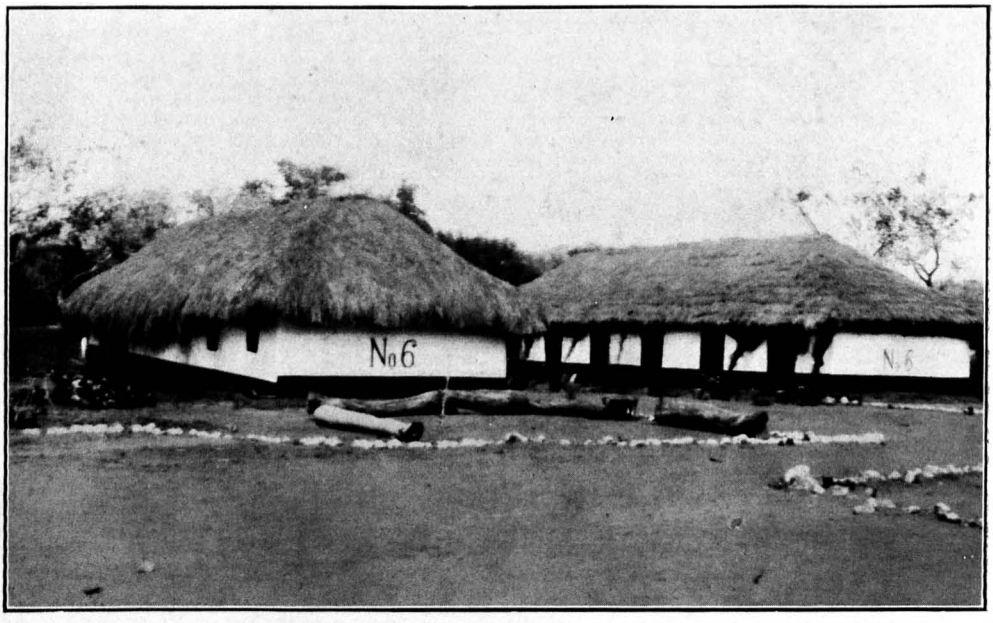
REFERENCES.

(1) *China Year Book*, 1929-30, p. 3.
(2) *Chinese Economic Journal*, vii, p. 755.
(3) Fowler. *Leprosy in the Far East*, 1929, p. 39.
(4) Maxwell. *China Medical Journal*, xliv, p. 802.
(5) *Chinese Economic Journal*, vii, p. 755.
(6) *Ibid.*, vii, p. 754.

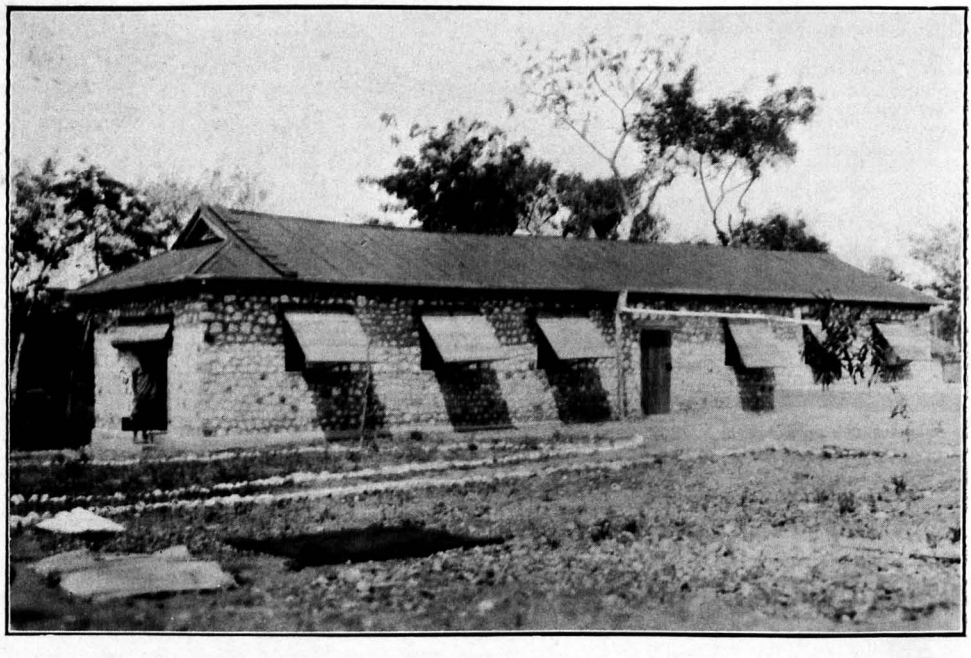
History of the Ho Leper Settlement.

F. H. COOKE.

I CLAIM no credit for the foundation of this settlement. The people themselves, more or less, forced my hands, by flocking into Ho for treatment. I will warrant, that any medical officer in any district in the Gold Coast, if he went to the trouble of having huts erected in his area and treated lepers, he would soon find himself in the position I was in, in 1926, for the modern treatment of leprosy, especially in the early cases, undoubtedly paves the way for cure. The people of this colony are not averse to the method of treatment, but they are averse to any system of " lock up." I have heard it said, by a medical man, that the segregation and treatment of leprosy is not as important as tuberculosis. With the African, a cough is just a cough, which he treats with native medicines until a time comes when he cannot get any relief and loses his night's rest. At this stage he consults the medical officer, who diagnosis tubercular disease of the lungs, but, bear this in mind, at this stage his case is hopeless, there is not the smallest chance of his recovery, and he dies within two years. If he is a leper, he knows it at once, he has no doubt about it, and if he can get a room to stay in near his medical officer, he will stay, take his treatment and very possibly be cured. If he cannot be housed and treated, he will linger on for a number of years, a source of danger to anyone coming in contact with him. One is a source of danger for two years, the other may be for 30 years—which is the greater evil? Furthermore, leprosy is no respecter of age, there are many affected children living in the settlement from three years to twelve years old. Are these to be neglected because tuberculosis is " more important ? " In the early months of the year 1926, four or five lepers were attending the out-patient department at the Hospital, Ho, for intramuscular injection of moogrol. After a month or so, these lepers had derived some benefit and apparently spread the news to their folks in the areas they came from, as more lepers came in for treatment. During this period, they resided within the villages of Ho, and naturally the chiefs were none too pleased. Out of pure necessity I had a hut of five rooms erected outside the hospital compound as a residence for these lepers. As time went on, the influx of lepers kept increasing, and to house them more huts were erected, until the area became very congested, the majority living in small huts erected by themselves.



LEPERS' HOUSES.



THE HOSPITAL.

Some of the 480 Leper Inmates.

A Compound.

It was perfectly obvious that something definite had to be done for these people, so a permanent settlement on a suitable site was the natural consequence. Land was acquired $1\frac{1}{4}$ miles east of Ho, and the first foundations were laid in June, 1927. The types of building which appeared to be most suitable were swish-built houses, consisting of six rooms to each house, with grass roofs, and laid out in compounds of four houses each, the kitchen being in the centre of the compound. As a compound was completed it was occupied. By December 31st, 1928, three compounds were occupied, the rest of the lepers were moved over to the permanent site, put into temporary huts, and the old site was destroyed by fire. Building progressed steadily, and on March 31st, 1930, all the compounds, eleven in all, were occupied by 436 lepers. Compounds Nos. 6 to 9 are not in compound shape, but the huts are placed in line, two huts facing two huts—this alteration in design was made with the idea of improving the appearance of the general layout. Besides these compounds the following permanent buildings of stone and cement were built, *viz.*, (1) the office building, consisting of a store, office, dispensary and waiting shed ; (2) a hospital of two wards, each 29 feet by 18 feet, with a store room between 18 feet by 18 feet. This building has, like the office building, a concrete floor, but in addition, has a ceiling of bever boards. Between the offices and hospital, is a reinforced concrete tank holding 12,500 gallons of water. On the north side of the offices is a market shed 34 feet by 16 feet, on the south side a smaller shed for the shoemakers and wood carvers, on the south-east side is a fine carpenter's shop and above this a shed 50 feet for weavers. All these sheds are permanent, being floored with concrete, and covered with corrugated iron sheets, except the weaving shed, which has an earthen floor. The Superintendent's house is on the eastern boundary of the settlement, and is also a permanent building. South-east of the settlement, and on the other side of the main road, two houses have been built as Rest Houses, for the parents of those lepers who are unable to fend for themselves.

The inmates are, with a few exceptions, natives of British Togoland and that area of the Gold Coast Colony lying east of the Volta River, and accommodation is only available for these people.

They are allowed a maintenance allowance of 6d. a day, but in the month of March, 1930, this allowance was reduced to 3s. for every eight days, thereby allowing every inmate to receive a share. A large area of new land, about

70 acres, has been plotted out for farming purposes, each compound is allocated a certain area, depending on the fitness of the inmates. The produce reaped is sold to the inmates of the settlement, and after deducting the cost of seeds and seedlings, the balance will be returned to general revenue against the vote for maintenance allowance. It is therefore hoped, that in the future, the settlement will be more or less self-supporting. Of the trades, weaving, carpentry, shoe-making and wood carving are carried on and encouraged—of the weavers, they are nine in all, two weave excellent Keta cloth. The cloths are thoroughly sterilised before they are sold. Monies obtained from the sale of these trades are, after deducting cost of material, put into general fund for the benefit of the inmates.

Discipline.—The superintendent is directly responsible for the general behaviour of the inmates, but there is also a system of Headmen. Each compound has a headman, who is responsible for the cleanliness and order of his compound. So also with the women, they have a headwoman or Djipola, and over all is the headman or Amega of the settlement who controls all the labour. He is elected to position by the inmates, and with the compound headmen hears all complaints and adjust any differences that may arise, reporting to the medical officer and superintendent whatever decision he arrives at. I have never interfered with any of his findings, as in every case both sides have abided by his decision.

SUMMARY FOR YEAR 1929-30.

Remaining on 31/3/29	418
Admitted during year 1929-30	169
Discharged cured	22
Discharged on Parole	50
Died	5
Ran away	11
Remaining on 31/3/30	499
On maintenance allowance	436
Out-patients (not on maintenance but residing in temporary huts within the settlement)	63

Anticipation.—Is this to be the only settlement on a large scale in the Gold Coast? The present one, is only for those Africans residing east of the Volta River, but within this settlement are natives of Accra, Winneba, Sohun, Kwahu, Kumasi, and Ada. If the Government at any future date considers the advisability of founding another such settlement, these inmates could form a nucleus.

There is no doubt in my mind that very many lepers in the early stages of the disease wander over the countryside undetected, and as a result of partial civilisation and our protection are a grave menace to the rest of the community.

I have good grounds for making this statement. Before the advent of the white man into this country, a leper, in the early stages, was compulsorily segregated by his own people, but nowadays, they have developed a spirit of independence, that allows them to wander unmolested from place to place.

Krabao in Siam.

A. KERR.

THE seeds of species of *Hydnocarpus* (including *Taraktogenos*) have been used in the treatment of leprosy in India and China for some hundreds of years.

India obtained her supply of these seeds from Assam. The history of this supply, and its derivation from *Hydnocarpus* (*Taraktogenos*) *Kurzii*, is well known. The origin of China's supply is, however, not so well known, though the chief facts have now been ascertained.

It is true that it has long been known that Siam supplied China with these seeds, the Chinese designation for which is ta-feng-tzu, but it was not known from what species they were derived. Daniel Hanbury had some seeds sent to him, and he figures them in his " Notes on Chinese Materia Medica " (1862), where, after stating that the seeds were imported from Siam, he remarks that " the plant affording these seeds is not well ascertained." He goes on to point out their resemblance to those of *chaulmoogra odorata*, but decides that they belonged to a different species. Later writers on the subject were not always so circumspect. B. E. Read, however, has since demonstrated (China Medical Journal, 1922) that the seeds imported into China are those of *hydnocarpus anthelminthica*.

The word " krabao " is used in the title of this article, rather than " chaulmoogra," in order to avoid confusion with the true chaulmoogra, *Hydnocarpus* (*Taraktogenos*) *Kurzii*. Krabao is a name applied, both in Siam and Cambodia, to *hydnocarpus anthelminthica*, as well as other species of *hydnocarpus*. The seeds of krabao are known in Siam as luk krabao ; in China as ta-feng-tzu or ta-fung-chi.

So many forms of, and combinations including the word krabao have been used that it will be well to consider a few of these before going further. One of the first references to the seeds of krabao is in the best known of the Chinese pharmacopoeias, the Pen t'sao kan mu, completed in 1578,

whose author mentions that they come from Siam, and gives a Siamese name for them, which has been rendered lu-brako. Other variants of the name that have appeared in various works are, lucrabau, lukrabao, lukraban and cukraban. Another name, used by some authors is mai krabao. The word mai means tree, so the term mai krabao is simply the krabao tree.

Hydnocarpus anthelminthica is widely distributed in Siam and extends eastwards to Cambodia, Laos and Annam. Recently it has been reported from Myitkyina in Upper Burma. In Siam it is found here and there all over the country, except in the extreme south, its southern limit being about Lat. 8°, 50 N. The species is most plentiful in central and eastern Siam. Its favourite habitat is the immediate vicinity of rivers and creeks running through level, low-lying country. These situations are liable to be flooded at intervals during the rains, while in the dry season the river may shrink to a sluggish, nearly stagnant stream, or a series of unconnected water-holes. The soil in such situations is practically always a sandy loam. Occasionally the tree is found in another, and very different habitat, on mountain slopes and valleys, but in such places it is not so abundant as along water-courses in the plains. About January seems to be the general flowering time, but it is not at all uncommon to find trees in flower at other seasons. The rather small pale green flowers are sweetly scented, emitting a refreshing fragrance which pervades the atmosphere in the neighbourhood of flowering trees. The flowering stage of the tree has a special name " ka long," or " the infatuated crow," presumably meaning that the fragrance will even appeal to a crow. The male and female flowers are distinct, but both are produced on the same tree, the male in far greater abundance than the female. The fruit ripens about August and September.

In a good year the trees may bear quite heavy crops of fruit. Some years ago the crop on a medium sized tree was carefully picked and found to contain 648 fruit. Such a crop should yield seven or eight litres of ethel esters, sufficient to treat 50 lepers for one year. It would, however, be unsafe to regard this as an average crop for a single tree. In any one year there are always to be seen some trees which have not fruited at all ; while in certain years, particularly when the rainfall is deficient, the whole crop is poor. The mature fruit is more or less globular and measures up to about 47 cm. in circumference. It contains on an average 60 seeds, embedded in a mealy pulp.

Though *hydnocarpus anthelminthica* is so widely spread in Siam, only a comparatively small area has been tapped for the export of seeds. If the demand increases the crop can be obtained from a much wider area. The trees in these areas are so plentiful that there is no temptation to pick other seeds as adulterants, nor are there any other seeds at all resembling them in such localities. The danger to be guarded against is old seeds; if the market is not good the seed merchants are apt to keep the seeds over till the next year, when many of them will have their kernels discoloured and rancid. In Bangkok, the Siam Medicinal Oil Works, of which Mr. H. Olesen is the proprietor, expresses the oil, with modern machinery, from carefully selected seed. The most convenient way, no doubt, is to buy the oil rather than the seed, and save weight on useless shell. The oil, too, keeps in good condition much longer than seeds will.

Though "Lukkrabao" have been exported from Bangkok for centuries, it is for only comparatively recent years that figures of the amount exported are available. The first year for which returns have been seen is that of 1899, when 251 piculs of seed were exported to China. A picul is approximately ·06 ton, or 60 kilogrammes, so that 251 piculs represents about 15 tons. The estimated value of this was Ticals 300. The early exports recorded remained below 1,000 piculs a year, till the year 1907-1908, when the export was 1,320 piculs. Since then the annual export of seeds, though fluctuating considerably, has only dropped below the 1,000 picul mark on four occasions, and, in 1919-1920, has reached as high as 8,965 piculs, or about 533 tons, valued at Ticals 38,031. In the five years ending March 31st, 1930, the average annual export of seeds from Bangkok was 3,777 piculs, valued at Ticals 16,971; this represents about 219 tons valued at £1,520, taking the tical at its present rate, 1s. 9½d. The estimated value per picul of the seeds fluctuates within wide limits; in the past five years it has varied from Tcs. 2·70 to Tcs. 6·52; though within that period the value of the tical, which is now on a gold exchange basis has remained steady.

The bulk of the export of these seeds goes to Hongkong, and other Chinese ports, a small amount occasionally going to Singapore; but in recent years there has been a small export to other countries, such as the British Malay States, India, Philippines, Union of South Africa and Portuguese South-east Africa. Though Japan rarely appears in the custom's returns as getting shipments of Krabao seeds, it is known that she does get her seeds from Siam, but indirectly

through China ports. Possibly other countries get indirect shipments in a similar way.

While in China the seeds are chiefly used in the treatment of leprosy and skin diseases, this does not seem to have been the case in Siam, at any rate in olden times. In looking through several old collections of Siamese prescriptions it was rare to find luk krabao mentioned in connection with either leprosy or skin diseases ; though they are frequently mentioned in prescriptions for other diseases.

Various other parts of the tree are also used as drugs. A modern work on Siamese medicine gives the medicinal uses of the different parts of the tree as follows :—

Leaves for incised and penetrating wounds.
Flowers for skin diseases.
Seeds for leprosy and ulcerations.
Bark for mucous discharges.
Heartwood for nasal discharges.
Root for foetid mucous discharges.

The different parts of the tree given above may be used internally, chiefly as decoctions and pills, or externally, as ointments and lotions. The prescriptions for these always contain a large number of other ingredients besides krabao.

The name *anthelminthica* would suggest that some part of the plant is used as an anthelmintic ; but no such use of it has been heard of in Siam.

Fish eating the fruit that fall into the water are said to be poisoned, and when so poisoned, they are not fit for food. A similar property is recorded for the seeds of *hydnocarpus venenata* in India.

The pulp of the fruit is edible, but rather dry and tasteless. When eaten with coco-nut milk and sugar it is considered quite palatable. On occasion, it is said, outlaws and persons lost in the forest, have been able to subsist for several days on this pulp. Only the pulp of quite ripe fruit can be eaten. The pulp of unripe fruit, when freshly opened, has a distinct smell of prussic acid.

Several other species of *hydnocarpus* are found in Siam, but, with one exception, they need not be considered here, as they are not at present of commercial importance.

The exception is the true chaulmoogra, or *hydnocarpus* (*taraktogenos*) *kurzii*. It has been found in several provinces in the north of Siam and also in a few places in the Peninsula. Unfortunately, most of the places where it grows are rather inaccessible, and it is usually not in great abundance in these localities. One of the best forests for it is near where

the southern boundaries of the provinces of Lampang and Prê meet. In this forest it is estimated that there are some 5,000 mature trees, which might yield a crop of 100 piculs, or six tons, of seeds in a year. This tree is also called krabao in Siamese, but sometimes the word dong (virgin forest) is added to distinguish it from *hydnocarpus anthelminthica*.

In conclusion it may be said that the annual crop of seeds yielded by trees of *hydnocarpus anthelminthica* in Siam is sufficient to treat a very large proportion of the lepers in the world ; that the seeds are easily obtained, and that there is at present no fear of adulteration. It would, however, be more economical to have the seeds pressed in Bangkok, and only the oil shipped.

Work Among Tanganyika's Lepers.

JANET MURRAY.

THE part of East Africa where our work is carried on is in the Shambala, Bondei and Zigua districts which lie to the north and west of the port of Tanga, which is about 150 miles north of Dar-es-Salaam.

There was a small Government settlement built about six years ago, and about twenty patients were usually in residence. Their lot was very cheerless and lonely ; except for the visits of the doctor or nurse, there was nothing to brighten their lives. Their very faces shewed their hopeless outlook on life.

The impetus to further development of the work was given by an African leper who begged to be allowed to build his own hut, promising at the same time that he would attend the dispensary for treatment regularly if he were not compelled to live at the settlement. The writer of this article, to whom the request was made, realised that this might be the means of getting in touch with many lepers, most of whom never shewed themselves for fear of compulsory segregation. It was decided to start an out-patient leper clinic. The African clergyman gave the scheme his full support, He not only gave out a notice in Church, but he also impressed on all his hearers that it was the duty of those suffering from leprosy to attend for treatment, this being the only way to check the spread of the disease. The clinic was to be held weekly.

Four patients came forward on the opening day ; within

a few months the numbers had grown to nearly thirty, and in a year's time the numbers on the book exceeded a hundred. Several clinics have now been opened, each station having a " leper out-patients " day. Hundreds attend each week. We have also a leper settlement where infectious cases can be dealt with.

The African is able to recognise the disease in its very early stages, and is now willing to come forward and declare himself. Our teachers help us greatly in this work. As soon as a child is discovered to be suffering from leprosy the teacher will visit the child's home and explain to the relations how necessary it is to start treatment at once, impressing upon them all the fact that the disease is curable if taken in time. Having obtained the consent of his relatives he will see that the child attends regularly for treatment, and also carries out the directions given him by the doctor or nurse.

Many of our " dispensary boys " who are trained in our hospitals and dispensaries have had a good education. They can be taught a great deal about leprosy, and they can, and do, pass on the knowledge gained to their own people. In several cases, the disease has been definitely arrested, sometimes cured, owing to the treatment having been started early, and to the help and persuasion of these " young doctors," who are gradually replacing the native and witch doctors in this country, so over-run with superstition and witchcraft. The attitude of the native to the disease has changed greatly in recent years. Formerly a leper was an outcast, shunned by all during his life and at death being given no decent burial. The African leper has seen such wonderful cures through the intravenous and intramuscular injections of arsenic and bismuth preparations in cases of yaws, that he quite believes that his disease may also be cured through injections. This faith in the treatment changes their whole outlook, there is a look of hope in their faces, and often of joy and gratitude when they realise what is being done for them.

Our routine treatment is by injections of alepol and local applications of trichloracetic acid in which the African has great faith. Great in his disappointment if this part of the treatment is not given.

The native in these parts of Africa is not a healthy subject, bilharzia, ankylostomiasis, dysentry, malaria, syphilis, yaws and other diseases are rampant. It is in the treatment of these cases that we may find the patient is also a leper.

The writer was once sent to visit a suspected case of small-pox. This turned out to be chicken-pox, but the most

important fact was that the patient was a very infectious leper. Here in Africa, we get to know the natives by frequent visits to their homes and villages. In no other way can we get to know and understand their methods of life and work. Much that is strange then becomes clear. The African in his turn learns to trust the European who soon becomes his friend, and to whom he will turn for advice. Instead of hiding and running away he will come forward and tell about his family life, his home, his illnesses and diseases.

So it is that we are gradually learning that if we want to rid East Africa of leprosy there must be no compulsory segregation. In the present state of affairs it would defeat its own aim. The African does want to stamp out leprosy, and will co-operate if we for our part try to adapt our methods so that they may not, more than necessary, run counter to all that the native holds dear.

Vegetable Gardening for Leper Patients.

B. MOISER.

REGULAR employment for the patients is a most important item in the routine of a leper settlement, and of all the varieties of employment I think that vegetable gardening is the best, for not only does it give healthy exercise, but it provides fresh vegetables in the dietary, a matter of great consequence.

The Secretary of the British Empire Leprosy Relief Association has asked me to write a few notes on the subject, as I have had experience of gardening in the tropics extending over twenty years.

The commonest mistake that is made in growing vegetables in the tropics is to shade the plants from the sun. All vegetables without exception will grow far better when exposed to the full blaze of the sun. It is only when in the seedling stage that they require any shade at all, and even then only during the hottest hours of the day.

Another common error is to give water in little sprinklings only. It is much better to give a real soaking once a week, and the next day to hoe the surface of the ground between the plants, thus breaking up the capillaries of the soil, and preventing surface evaporation. This does not apply to lettuces, which should have a good soaking every day if possible.

A third mistake is to use fresh manure. Whatever kind of manure is used, it should be old and well rotted, and it should be well mixed with the soil.

Choose a bit of ground well away from trees, down in a hollow close to water, but not subject to floods. Lay it out in beds four feet wide and about ten yards long. Leave two feet between the beds. Do not raise the beds above the general surface if the soil is of a porous nature. Rather let them be sunk a trifle.

Dig out the whole of the soil to a depth of two spades. Throw the top spit on one side, and the bottom spit on the other. Then put in six inches depth of manure, return the bottom soil and mix thoroughly. Then more manure, and mix this well with the top soil, and with as much wood ash as you can get hold of.

To prepare for sowing the seed, give the bed a real soaking with water, gallons and gallons, and let it soak in well. The next day hoe the surface when dry enough (but not if it is at all sticky), until it gets into a fine mealy condition—a " tilth," as it is called.

Then draw straight furrows with a hoe edge along a stretched line, two or three rows, according to the kind of vegetable to be sown.

The furrows should not be deep, the general rule being that seeds should be planted at a depth of two or three times their greatest diameter. Scatter the seeds thinly, gently push back the soil over the seeds, and press down with a rake held vertically or with the foot, lightly.

Do not water till the seedlings just appear above the surface. All seeds germinate better if the soil is covered with grass laid on sticks, or with old sacks, but be sure to remove the covering as soon as the seedlings appear, or they will become drawn and leggy, and will never grow into decent plants.

Do not let the seedlings become too crowded, especially cabbages, or any other of the Brassica tribe, but keep on thinning out to such an extent as to prevent adjacent leaves from touching one another. Of course, young seedlings must be watered every day, and it is better to give water in the evening, and hoe the ground in the morning.

In a dry garden, deep planting is of the greatest help, that is, when sowing beans or peas, or when transplanting tomatoes, cabbages, cauliflowers, brussels sprouts or kale, dig out furrows a foot deep with a spade, and sow or plant at the bottom of the furrow, and as the plants grow taller gradually fill in the furrow until the soil is even heaped up

around the stems. By this means the root system is a foot or more below the surface, well protected and supplied with moisture.

Practically all the English vegetables can be grown to perfection in the tropics, but I find that African natives do not relish all our varieties. They are particularly fond of cabbages, kale, lettuce, tomatoes, carrots, onions, spinach-beet, spinach, beetroot. Dwarf French beans are never a favourite with them, in fact, it is not worth while growing them at all. They much prefer their own beans.

I have not mentioned potatoes, for I have always found that in really hot countries they do not do at all well, but in sub-tropical climates they are a great success. Imported tubers should be used if possible, or at any rate secure your seed potatoes from another district. Do not make use of your own produce for planting more than once.

A few special cultural notes may be useful. Cabbages like firm soil, plenty of manure and lime. Transplant from seed bed when about two inches high to another bed, and leave in this till about six inches high, then transplant to permanent quarters, not less than two feet apart. Always take up with a trowel, with a good ball of soil around the roots. Beet and carrots do not like much manure, so it is better to let them follow a crop such as cabbage, which will have taken a good deal of nitrogen out of the soil.

Tomatoes.—There is great discussion as to whether these should be grown on a single stem, by nipping off all laterals, *i.e.*, the branches which grow out of the angle formed by the main stem with the leaf-stalk, or by allowing the laterals to grow. I think it may be said that the native much prefers the latter method, for he gets much more fruit, but they are smaller.

Tomato seeds are better sown in a tin of soil kept in the shade. Leave till the plants are about three or four inches high, and then transplant deeply, covering the stems right up to the lowest pair of leaves. Heap the soil up as they grow, thus creating a trench on either side of the row, which should be filled with water daily. Tomatoes are very apt to split if allowed to become dry and then watered liberally. They should be watered daily.

Leper patients should also have as much fruit as possible : citrus, bananas, pawpaws, pineapples, mangoes, etc. These can all be easily grown.

Leprosy in East and Central Africa.

R. G. COCHRANE.

(1) *Egypt and the Anglo-Egyptian Sudan.*

IT is proposed in this series of articles to review the situation in the territories recently visited by the Secretary of the Association. Most of the material is gathered from the reports which were furnished from time to time. In this first instalment the position in Egypt and the Anglo-Egyptian Sudan will be considered.

Egypt all down the ages has taken a prominent place in the destiny of north and central Africa. This land of romance and antiquity has many difficult problems to face, and the least of them is not leprosy. Leprosy has been known in Egypt for very many centuries. There is an old Egyptian record of about 1350 B.C., which refers to leprosy among negro slaves from the Sudan and Darfur. This is interesting in view of the present high rate and type of leprosy seen in the Bahr-el-Ghazal province bordering Darfur. Lucretius in his " de Natura Rerum " makes reference to the origin of the disease in the following lines :—

" High up the Nile midst Egypt's central plane,
Springs the dread leprosy and there alone."

It is evident then, that leprosy has been known in Egypt for many centuries, but until recently, apart from the segregation of a few advanced cases little was done for the unfortunate sufferers. For some years now the Church Missionary Society at Old Cairo has been doing what they could to treat the lepers which presented themselves for treatment at the hospital.

In 1928, the Egyptian Government took an active part in the organisation of anti-leprosy schemes. In this year a doctor was sent to India and the Philippine Islands for training and on his return was put in charge of the organisation of a complete system for the combating of leprosy in the country. Within a short time of his return, Dr. Dalgamoni organised an out-patient centre in Old Cairo. A philanthropically minded citizen gave a house in this part of the city for the purpose. This has been adapted in an admirable way, the old courtyard making an ideal place for the assembling of the patients. At the time of visiting this dispensary, some 300 patients were on the roll. Many of these were unfortunately advanced skin cases, but an encouraging feature is the increasing number of earlier cases coming forward, and one hopes that once this centre has been

established and prejudice broken down, a still greater number of early cases will present themselves for treatment.

The leprosy section of the Department of Public Health has under consideration a complete scheme for dealing with leprosy; it includes :—

1.—The establishment of three out-patient clinics, one in Egypt, and another to be established in Upper Egypt.

2.—The establishment of a leper colony about twenty miles from Cairo, ultimately to accommodate one thousand patients.

3.—The sending of another doctor to the Philippines and India for a period of training so that he can assist the leprosy expert in the organisation and running of the anti-leprosy work.

It has been suggested that the above proposals should incorporate a scheme for the training of medical students and practitioners in the diagnosis and treatment of the disease, that the leper colony should be a centre for clinical training and research and that the out-patient clinics also should be used for these purposes.

It is the intention of Government to pass a law for the compulsory segregation of all infective cases when the settlement has been completed. It has been brought to the notice of the authorities that while for those cases which were infective and could not, or would not, look after themselves, a law such as this, in a country like Egypt, was useful, yet it should be borne in mind that unless carefully supervised such a law might not produce the results intended, and cause the concealment of cases. There is no doubt that the Government are fully alive to the dangers of any parliamentary measures and it is not intended to bring in a general measure of compulsion.

In a civilised country such as Egypt, there should be little difficulty in instituting measures which will ultimately bring this scourge under control.

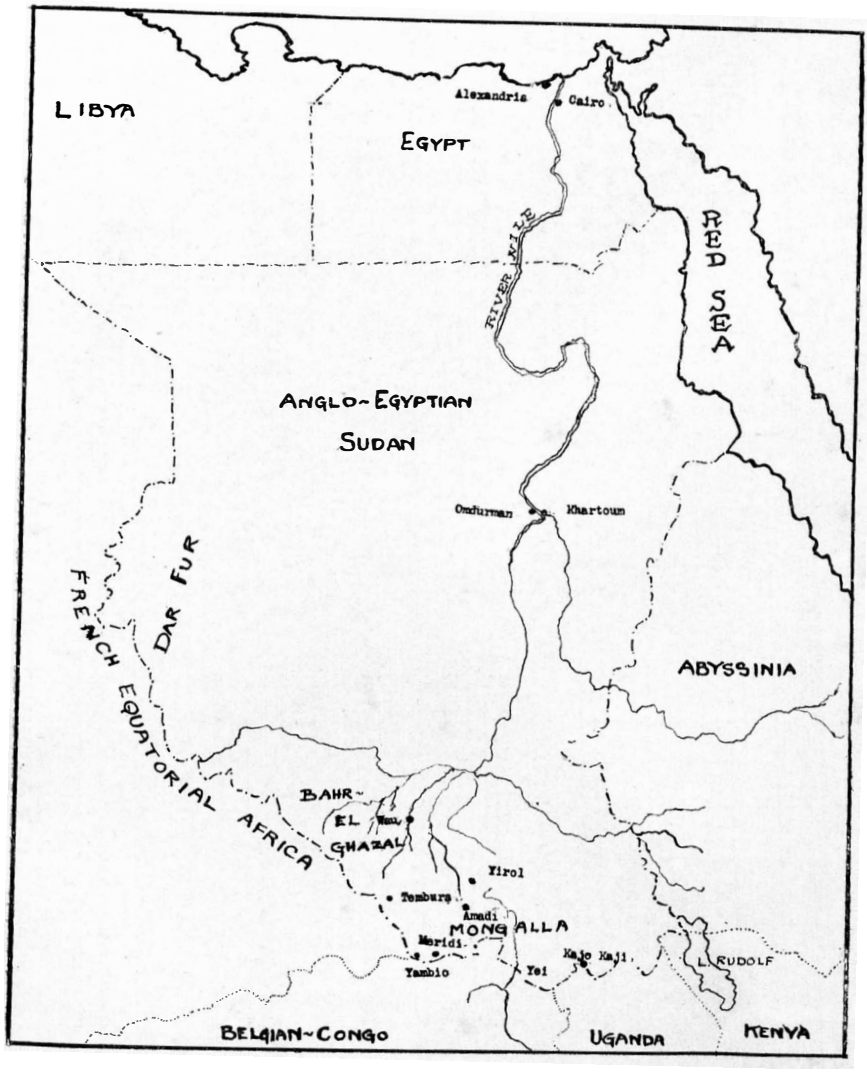
The Anglo-Egyptian Sudan.

The Anglo-Egyptian Sudan is not far short in area of the whole of British India, and has a population of 6,469,041 (1928). This comparison gives one some idea of the difficulty of administration and more particularly the difficulty of medical relief in the African territories. The medical problems of the Sudan are very similar to those of Egypt, and the endemic diseases of the two territories are of the same

nature. Leprosy, however, as far as is at present known, seems to be largely confined to the southern provinces. In Omdurman, the old Dervish capital, there is a leper home under the supervision of the Church Missionary Society. When the Secretary visited this hospital, there were some forty inmates, most of whom were very advanced cases. In addition to this institution for lepers the C.M.S. conduct a centre in connection with their hospital in Omdurman. Some eighteen cases were attending at the time of the visit, among these being quite a number of patients in the earlier stages of the disease. Apart from this centre, there is no work organised in northern and central Sudan, and according to present knowledge, there is little need of it. Owing to climatic conditions, northern Sudan probably has practically no leprosy, as this area is within the desert belt. In central Sudan, the incidence of leprosy has not been determined; there is a certain amount of evidence that the tribes in the Nuba Mountains are affected but to what extent is unknown. Most of the tribes in this area are warlike, and tend to be troublesome, and therefore until they have been brought under discipline to a greater extent, it would be very difficult to organise " anti-leprosy " work and still harder to attempt anything in the way of a survey. There is a certain amount of evidence that leprosy may be spreading from foci into Central Sudan, especially in Mongalla, but definite information is lacking. With the opening up of communications, and the pacification of the tribes, any tendency to spread, one fears, will be accelerated.

In the southern provinces of Mongalla and Bahr-el-Ghazal the incidence of leprosy is extremely high. The number of lepers in the Sudan has been estimated at 6,000, but there are over 5,000 segregated in these provinces alone, and therefore, there must be a considerable number over this figure in the whole territory. It is in Bahr-el-Ghazal and Mongalla, that the Sudan Government have undertaken anti-leprosy measures on a large scale. The situation in these two provinces is entirely different. In Bahr-el-Ghazal, whatever the reason—probably the disease is of an older origin, or the people are more healthy—leprosy is of a comparatively mild type, whereas in Mongalla the disease, especially in the Meridi and Amadi districts (see map), is of a much more severe type. In the course of these summaries I shall be referring again to the importance of estimating the type and infectivity of the disease when considering anti-leprosy measures. In the province of Bahr-el-Ghazal there are three leper camps, *viz.*, Wau, Yubo and Yambio. The policy of

Sketch Map of Egypt and Anglo-Egyptian Sudan, showing Main Leper Centres and Stations Visited by Secretary on Recent Tour.



SOME OF THE FIFTEEN HUNDRED LEPERS WAITING TO BE EXAMINED IN THE SUDAN.

the Government in this province is the provision of large settlements for lepers, where not only the actual cases but their families can live. They live in such a way that, as far as food is concerned, they become self-supporting in a short time. In a word, these settlements are in reality large out-patient centres where patients, instead of being scattered in inaccessible villages, are brought within one definite administrative area. This involves no hardship as the native huts are easily erected and therefore villages can readily be moved into more convenient areas for purposes of control. From their villages, which have been organised under supervision, the patients proceed to the central hospital and treatment station for injections and examination.

The area affected with leprosy is chiefly that occupied by the Zande tribe or the Niam Niam, the latter name being supposed to represent the noise that the tribe made when eating human flesh. These people, however, are now peace loving, cheerful, and amenable to discipline, so much so that the method described for controlling leprosy is eminently successful. Every leper is known and very shortly it is hoped that practically all the treatable and infective cases will have been segregated in the large areas provided for this purpose. It is therefore within the bounds of possibility that leprosy will be eradicated from this part of the Sudan within a few decades.

In the Mongalla Province there are four leper camps and settlements, and another one is being planned. The three existent centres are at Meridi, Lui (Amadi), Yei and Kajo-Kaji. At Lui, Dr. Fraser of the C.M.S., is in charge. Dr. Fraser is working among the Moro tribe and has plans for the extension of this camp. This is run on Mission lines, and the sexes are separated. I was struck by the large number of infective cases in this colony. The type of case seen indicates that either the disease is comparatively new in the district, or else for some reason the virulence has increased. The disease has probably spread from the Belgian Congo, and while there are indications that it is still spreading in the Bahr-el-Ghazal province, one would conclude that the danger of spread in Mongalla is greater.

The work at Lui has so far catered practically solely for the Moro tribe, but as the Bari tribe in the immediate neighbourhood are heavily infected with the disease it is hoped that the work will be extended so as to meet this situation. In addition it is the intention of the Government to organise another settlement near Juba to meet the needs of the district further south.

There are two other colonies in Mongalla, the first is at Yei about 30 miles from the Belgian Congo, and the second is at Kajo Kaji, near to the Uganda border. The settlement at Yei is run along lines similar to those in the Bahr-el-Ghazal and within a short time it is expected that all treatable and infective lepers in the district will have been brought under isolation.

There is a good deal of evidence that leprosy has been or is spreading from the large foci in Mongalla to the Upper Nile Province. Work has been started by the C.M.S. at Yirrol with a view to try and cope with the situation in that district.

It is of utmost importance that leprosy should be controlled in Mongalla for with the increasing facilities for rapid communications the disease is spreading to other areas. On account of the efficient organisation and the disciplined nature of the tribes in the southernmost provinces of the Sudan it is not too much to expect that such a menace will be largely averted, and that the present foci from which leprosy is tending to spread will be abolished.

Leprosy in Iceland.

SAM BJARNHJEDINSSON.

LEPROSY is said to have been prevalent in Iceland in the Middle Ages, but the exact date of its introduction or from whence it came is not known. One theory is that the Norwegians brought the disease into the country when colonising Iceland, another is that during the Viking invasion of Great Britain and Ireland, the Vikings captured a number of Irishmen and took them back to Iceland, and it is thought that these Irishmen caused the introduction of the disease. Leprosy is mentioned in the Icelandic writings dated about the 12-14th Century, but always in connection with the lives of saints. It is related that at the beginning of the 15th Century, one of the two Icelandic Bishops was ordered by the Pope to resign his position on account of his having developed the disease. The description of leprosy in the Pope's letter was probably the first to appear in Norway. This Bishop came from Bergen, so whether he brought it from there or developed it in Iceland cannot be said.

About the middle of the 16th Century, the disease had spread considerably and during the years 1652-54 four small hospitals were built. These hospitals were far from

perfect, and in all had room for only 30-40 patients. These hospitals were shut up in the year 1848 after having been used for 200 years, as the disease had diminished so much that they were often empty, or only half full. The theory that leprosy was a hereditary disease had now been superseded by the theory of infection. These hospitals were evidently closed at the wrong time, as leprosy commenced to increase rapidly in the last half of the 19th Century. This was further substantiated when Armour Hansen discovered the leper bacillus about 1870.

At the end of the year 1896, 250 patients were known but probably there were a few more. In 1898, laws relating to compulsory segregation of lepers were passed and a hospital was built near Reykjavik with 60 beds. A well known Danish doctor, Elhers of Copenhagen, induced the Danish Oddfellows to build this, and it was opened for patients on October 1st, 1898. The Icelandic State has run this hospital ever since. As the following statistics show, the disease has diminished considerably. The statistics from 1897-1900 are very imperfect.

Dec. 31st.	1896	..	250	lepers	Dec. 31st.	1915	..	78	lepers
,,	1901	..	169	,,	,,	1916	..	77	,,
,,	1902	..	163	,,	,,	1917	..	77	,,
,,	1903	..	158	,,	,,	1918	..	73	,,
,,	1904	..	145	,,	,,	1919	..	70	,,
,,	1905	..	130	,,	,,	1920	..	67	,,
,,	1906	..	123	,,	,,	1921	..	61	,,
,,	1907	..	110	,,	,,	1922	..	60	,,
,,	1908	..	104	,,	,,	1923	..	59	,,
,,	1909	..	104	,,	,,	1924	..	56	,,
,,	1910	..	96	,,	,,	1925	..	53	,,
,,	1911	..	90	,,	,,	1926	..	51	,,
,,	1912	..	93	,,	,,	1927	..	46	,,
,,	1913	..	90	,,	,,	1928	..	40	,,
,,	1914	..	85	,,	,,	1929	..	37	,,

As a result of the war being waged against the disease, the number of patients was reduced from 250 in 1896 to 37 in 1929, and during this time the population increased from 75,680 to 106,000.

During the first five years after the hospital was opened (1896-1901), the decline in the number of patients was only 81 (from 250 to 169), but it must be remembered that up to the date when the leper hospital was opened the lepers had received little or no treatment, and at first not nearly all the patients in need of nursing could be taken in. The worst cases were given precedence and especially those in the nodular stage of the disease. Many of the lepers were in a terrible state on entering the hospital. The segregation

of these patients was probably a great factor in hindering the spread of the disease.

During the years 1898-1904 the same experiments in treatment, as were being carried out elsewhere, were used at the hospital, namely the use of salicylates, mercury, arsenic, but the results were not good. The patient became worse and generally died as a result of some complication, *e.g.*, sepsis or amyloid degeneration, tuberculosis, pneumonia, etc.

Some of the chief leprologists about the year 1902 spoke favourably of the old eastern remedy for leprosy, chaulmoogra oil, and I decided to try it, and have used some derivative or other of the oil since 1907, *e.g.*, oil by mouth, ethyl esters, hydnocarpates, etc. The improvement in the condition of the patients was enormous, and their whole aspect towards treatment changed and this resulted in a checking of the virulence of the disease, fresh eruptions and reactions were less frequent, leprous nodules cleared up, and diffuse infiltration diminished, and often disappeared totally. The torpid ulcers of long duration became clean and healed, though the complete healing took a considerably longer time, and changes could be detected after a few months of treatment. These changes were especially noticeable in nodular lepers and mixed cases, but I never noticed any improvement in the pure anæsthetic form of the disease.

It should be noted, however, that most of the pure nerve cases had suffered from the disease for years, and that it had become naturally arrested. The patients were already deformed before treatment commenced.

In Iceland we have little experience of the efficacy of treatment on the early case of nerve leprosy. Chaulmoogra preparations appear to have little, if any, effect on trophic ulcers. The obstinate perforating ulcer can be healed with usual treatments, especially if the patient is confined to bed for weeks. This is a difficulty for patients object to staying in bed, and when they get up the ulcers recur. Ulcerations are nearly always found where pressure is greatest, *e.g.*, the metatarso-phalangeal articulations. The most efficient method of treatment is amputation of the toes in question with the head of the metatarsal bone. If ulceration recurs it is sometimes due to the fact that the head of the metatarsal bone has been left. A perforating ulcer of the heel is most persistent and difficult to heal because little radical surgery apart from an extensive operation can be attempted.

INDIAN SECTION.

Anti-Leprosy Work in India.

I. SANTRA.

IN India, there are three kinds of institutions engaged in anti-leprosy work. They are as follows :—

(1) A few Hindu institutions originally financed by temple funds, now aided by private bodies or the government, meant to house and feed the lepers so long as they desire to stay.

(2) The Mission to Lepers founded about 55 years ago, to give relief to the lepers, has kept pace with medical discoveries, and therefore has improved its method of service.

(3) The Indian branch of the B.E.L.R.A., a young organisation with the eradication of leprosy as its aim.

From Rameswaram (the southernmost temple) to Triloknath (northernmost temple) people believe that leprosy is the result of sins committed during a past birth, and therefore beyond human aid. Lepers leave their homes and take a journey to some temple situated over a hill or by the seaside. As a result of their travels, they come back looking better, and sometimes with all active signs removed. Thus the popular belief that a visit to a temple cures leprosy is strengthened. Temples renowned for benefiting leprosy are situated in the most out of the way places.

The simple diet, walking exercise, psycho-analysis, and auto-suggestion during the long journey certainly make the patients better. It is natural that in a chronic disease like leprosy, a patient seeks relief during a reaction. Hope, simple life and moderate exercise tend to bring down the phase quickly.

But recently communication has improved in India. With improved communication, the number of lepers in the premises of certain temples if formerly negligible, now has become dangerous. There are many villages near temples where there were no lepers 30 years ago, but now more than a dozen are to be found. When not cured of their disease, they settle down, as food and money are easily procurable from pilgrims. From what I have seen in the different parts of India during the last four years, I am of opinion that sheltering the lepers near the temples amounts to a public nuisance, and helps the dissemination of the disease.

Within the last five or six years it is wonderful how many

asylums have been transformed into hospitals, and how readily some superintendents have attached leprosy clinics to their institutions. In one asylum within a period of one year 1,080 out-patients have been seen and treated. Even in the remote corners of India, *viz.*, Chamba, Almora, Neyoor, the out-patient lepers get from the asylum what is not possible for them to obtain from state or government hospitals. Christian missionaries in India, because of their belief " that the ministry of healing is an essential part of the work of the Christian church," have an advantage over non-Christian workers, and therefore they naturally excel in their service to the condemned and ostracised lepers.

The Indian branch of the B.E.L.R.A. is a young organisation, full of energy and enthusiasm, and is guided by men who have vast experience in leprosy. It is engaged in research, training of doctors, propaganda and survey. Investigations into the methods of transmission, culture of the organism, effect of diet, and predisposing causes on the disease, improvement of treatment, specific tests to detect the results of treatment, pathology of the early stages, etc., are also pursued.

About a thousand doctors have been trained in Calcutta, and in other places. This number is much less than the number of doctors passing out from the various medical institutions in India. Therefore, there is a proposal that every medical school and college should arrange for a special course of lectures in leprosy.

About 20 different kinds of pamphlets have been issued in English and in Indian languages, and have been distributed in thousands.

A party of medical men has been engaged to find out the highly endemic areas, why there is more leprosy in certain areas, and among certain classes of the community, and whether the disease is on the increase. In addition to this, after the visit of the survey party, leprosy clinics are attached to the existing government or district board dispensaries, and lepers living in adjacent villages are invited to come to the clinics as out-patients, and the local doctors are trained in the matter of diagnosis, prevention and treatment of leprosy.

Owing in large measure to the work of the survey party whose investigations are gradually covering the whole of the country, there is undoubtedly a changed outlook on the part of the public, and there is less tendency to conceal the disease and less reluctance to come forward for treatment.

The work inaugurated on the spot by the survey party is being carried on after their departure by the provincial associations, and the medical department of the province or private bodies like the district boards.

The Central Province, Bihar and Orissa have appointed their own leprosy experts and survey parties. Bengal and Madras have appointed leprosy propaganda officers. Bombay presidency has appointed a leprosy expert. The United Provinces and Punjab are considering the appointment of leprosy experts shortly.

The provincial experts have been doing excellent work. The workers in Bengal have so familiarised the treatment that it has become available in every dispensary. In the year 1929 in Bihar and Orissa 5,923 lepers have been treated in 27 clinics, and 7,054 lepers were treated in six clinics in Madras. This is what is happening in all the provinces of India but the Punjab and North-Western Frontier Province, where leprosy is not very common except in the hill areas.

Thus we see that in India there are two main bodies, *i.e.*, the Mission to Lepers and the Indian branch of the B.E.L.R.A., which have been trying to cure lepers and to reduce the number of sufferers. Both these institutions help each other. Leprosy hospitals have been used as training places for doctors. Suitable cases are sent out from asylums to outlying doctors for treatment, and badly reacting cases are admitted into the asylums when they come with the recommendation of the dispensary doctor.

Our fight against leprosy will go on. The fight commenced at a stage when, as we know now, conditions were favourable for the spread of the disease. These conditions are still present, and are being accentuated. The village and caste system both of which limit epidemics will give place to small towns, and to democratic communities. Communication and intersocial mixing will increase with the increase of commerce and industry. If education does not keep pace with the above improvements we shall have to face a sterner fight. Therefore, let nobody imagine that leprosy is going to die out of India before we become hoary headed.

The Treatment of Residual Disease in Leprosy.

E. MUIR.

(Reprinted from LEPROSY IN INDIA, July, 1930).

IN India it is common to divide things into 16 annas after the manner of the rupee. Thus it is not unusual to tell a patient that so many annas of his disease have disappeared, and that so many annas remain to be cured.

In a typical case of skin leprosy it is comparatively easy to get rid of three-quarters, or twelve annas of the disease; it is the last four annas that are difficult to cure. This " four annas " I have called the *residual disease*; and it is the lines along which this should be treated that I propose to describe in this article.

Innumerable drugs have been put forward from time to time as specifics for leprosy. There are two main reasons for this. The first is that patients often recognise that there is something wrong with them and go for treatment to the doctor when the disease enters the reactionary phase. In this phase lesions of the skin, which have formerly been lying quiescent suddenly swell up and become red in colour and the local reaction is often accompanied by general symptoms such as fever and malaise. The doctor adopts some line of treatment and the patients' general health improves, with the result that the reaction passes off, the swelling of the local lesions disappears and the treatment adopted gets the credit of having affected a cure. The patient, however, is not cured; all that has happened is that his more marked signs have disappeared and the disease, unseen, may be gradually extending and invading fresh areas of skin. In fact it is possible to have large areas of the corium invaded with leprosy without outward signs or symptoms sufficient to attract the attention of the patient or even of the ordinary doctor.

The other reason for the multiplicity of " cures " is that in more advanced cases, in which there is thickening of the skin, nodular ears and liontiasis of the face, it is possible by means of many remedies to remove the disease to such an extent that the patient to the outward eye looks remarkably better and is not easily recognised as suffering from leprosy, though bacteriological examination still shows abundant acid-fast bacilli both in the skin and in the nasal mucosa.

A severe attack of typhoid, malaria, kala-azar or some other febrile disease may be sufficient to bring about such a change. Large doses of potassium iodide will often have the same effect and so to a less extent will many other drugs.

There are then many remedies and many circumstances,

such as those caused by various acute diseases, which will clear up the greater part of leprosy and to the unskilled eye make the patient appear better or almost better.

What has to be remembered is that these remedies, etc., may sometimes diminish the patients' ultimate chance of complete recovery. For, while making a very striking improvement in the appearance of the patient, they actually lower his general resistance, and for recovery from the residual disease in leprosy the one great essential is high general resistance.

The writer has therefore come to the conclusion that in the treatment of leprosy the raising and maintaining of the general resistance of the patient should be put in the first place. If it is low, all efforts should be exerted to raise it. Seeing that injections of hydnocarpus preparations may in the case of a weak patient cause still further weakening, it is advisable in many cases to postpone such injections till the patients' general health has been improved, or till other diseases, which had been weakening him, have been removed. In other cases injections may be given in small doses and increased according to the tolerance and general improvement of the patient.

Fortunately we have in the sedimentation test a very reliable criterion of the patients' resistance, and this test is specially valuable in patients who have a low resistance, as shown by a high sedimentation index.

In this short article I cannot go into the details of this test, but speaking generally, one may say that the best way to deal with the residual disease in leprosy is to keep down the sedimentation index to below 20, or better still to below 10, and consistent with this to press the hydnocarpus treatment, using preferably the intradermal multiple puncture method. This may be supplemented in some cases with potassium iodide, given once or twice a week. But it is well to rely on hydnocarpus ester injections in the first place, the dose being the maximum consistent with a low sedimentation index. Oral administration of iodide may be added when 6 c.c. of esters given twice a week fails to raise the index. The dose of iodide should likewise be limited to the amount that is consistent with maintaining this slow sedimentation rate.

When a patient has reached this stage in his treatment with slow sedimentation maintained in spite of fairly vigourous treatment then the prognosis is good and is only a matter of time for complete recovery to take place. It may take a long time for the skin and nasal mucosa to become absolutely negative, but the progress in such cases is steady and sure.

Reports.

AN ACCOUNT OF THE MEDICAL WORK FOR 1929 OF THE MISSION TO LEPERS' HOSPITAL, PURULIA, INDIA.

MANY improvements have taken place this year; the chief ones being :—

Enlargement of the Laboratory.

1. This has been doubled in size, and is being still further enlarged, making it possible to deal efficiently with the rapidly increasing number of patients. A binocular microscope has been added to the equipment of the laboratory.

2. A hospital ward has been built for the accommodation of cases of active phthisis. This enables us to keep these cases separate from the others.

3. Three new wards have been built, and two others are in course of construction, each to accommodate twelve patients. Of these one has been set aside for cases of suspected or latent tuberculosis.

4. A mortuary was opened early in the year. This will give us the facility to do post-mortem research as soon as time allows of it being taken up.

5. Two dressing stations (male and female) now allow ulcer cases to be attended to apart from the hospital.

6. A second English nursing sister has been added to the staff for the work of supervising the special treatment.

Medical work as a whole has gone on as usual.

A larger number of major operations have been performed (twelve) chiefly amputations, trachiotomies and operations for cataract. The minor operations, 346 in number, are mainly amputations of fingers and toes and incisions of abscesses (chiefly due to necrosing bone tissue.)

Of the diseases which commonly prevent the improvement of lepers, and which often help the leprosy to get a further hold, tuberculosis, malaria, and hookworm have been found to play an important part here. With increased facilities it is becoming possible to deal with these more thoroughly.

The death rate has proved slightly higher than that for last year, but is still markedly lower than that of any other year preceding. The chief causes of death were pulmonary tuberculosis, dysenteries, diarrhœas, and gangrenous ulceration of feet with consequent absorption of toxins. Of the 53 deaths occurring, only 13 were among treated cases.

Twenty-four deaths occurred in cases admitted in an almost moribund condition.

Special Leprosy Work.

There has been a marked increase in the number of out-patients, last year's figures being more than doubled. Many of the patients are females, and even children are now being brought.

Throughout this year injections have been given once weekly instead of twice as formerly, following the example of some notable leper asylums. This has proved advantageous in more than one way :—

(*a*) Patients tolerate larger doses.
(*b*) Longer time is given for complete absorption of oil.
(*c*) There is time for more individual attention to patients.

The total number of injections given this year was 27,476.

During the year the following laboratory examinations were done :—

Kahn test, 421.
Erythrocyte sedimentation test, 1,311.
Bacteriological examinations, 75.
Examination of fœces for hookworm, 336.
Examination of blood for malaria, 48.
Miscellaneous examinations, 7.

Experimental and Research Work.

Creosoted hydnocarpus oil is still the routine treatment. Experimental and research work has been restricted owing to lack of staff, but some new remedies have been tried.

(1) Alepol and sodium gynocardate (Aqueous solution) have been injected subcutaneously in selected cases.

30 were given alepol.
20 were given sodium gynocardate.

The results obtained were not superior to those obtained with hydnocarpus oil, and when given in a strength sufficient to be effective were more painful than the oil.

(2) Ethyl ester of hydnocarpus oil combined with 4 per cent. doubly distilled creosote is being tried in selected cases. It is intended to continue this until sufficient data have been collected to show its value as compared with our routine treatment.

(3) During the past $1\frac{3}{4}$ years an experiment has been carried out with the treatment of children up to 8 years old by daily inunction of (*a*) ethyl ester of hydnocarpus oil and $\frac{1}{4}$ per cent. iodine.

(*b*) Hydnocarpus oil and ¼ per cent. iodine. As a result, it has been found out that,

(i) Oil is of little or no value as sole form of treatment.

(ii) Ester inunction on children over 5 years is not sufficient as sole form of treatment.

(iii) Ester inunction on children *under* 5 years is an adequate means of rendering them symptom free. The dosage is one drachm.

It is proposed to adopt this latter as a routine treatment for children under 5. A brief summary of the experiment is appended.

Ester inunction experiment.
Children treated totalled 19.
Ages from 9 months to 8 years.

Symptom free.	5	19
Improved.	7	
Unchanged (all over 5 years).	6	
Relapsed after cessation of treatment, 8 years old.	1	

(4) An experiment is being carried out under the direction of DR. E. MUIR (of the School of Tropical Medicine, Calcutta). Thyroid extract is being administered orally in conjunction with injection of hydnocarpus oil. This experiment is still in progress. In order to regulate the dosage, observations are being made on the rate of sedimentation of the erythrocytes.

Thanks are due to all those who have so kindly helped to make possible the advances recorded this year. Particularly are they due to H. E. Sir Hugh Stephenson, Governor of this Province, whose gift enabled us to extend our laboratory ; and to Mr. Berthoud, the Commissioner of Chota Nagpur, for our new microscope.

The following table gives briefly the results of treatment for the year under review.

RESULTS OF TREATMENT FOR 1929.

	Total under treatment	Different types under treatment.					Results.					
		A1	A2	B1	B2	B3	× Symptom free.	* Much improved.	Improved.	Same.	Worse.	Died.
In-patients ..	588	82	181	34	186	105	8	76	348	131	12	13
Out-patients	476	138	92	109	111	29	6	68	247	139	16	—
Total ..	1,064	220	273	143	297	131	14	144	595	270	28	13

REMARKS.

× These patients have remained bactereologically negative for a year, and have been free from all active symptoms.

•Several patients in this column might have been included in the symptom free groups had they not taken their discharge or left before the prescribed observation period had expired.

+ These figures consist chiefly of patients who have been attending for a short time, and so have not begun to show improvement worth noting. Several of the patients in this column and in the " worse " column have been handicapped by being the victims of other chronic diseases also.

(We are indebted to the Mission to Lepers for permission to publish this report.—EDITOR).

How to Maintain Attendance.

A TREATMENT CENTRE PROBLEM.

F. W. ROSS.

AFTER managing a treatment centre for more than a year I am convinced that the problem of maintaining attendance is *not* one that looks after itself. In almost any infected area it is possible to get a good attendance when a centre is opened. Even without preliminary propaganda, crowds of people will present themselves in the hope of being cured. But how many of them persevere? Apparently only a minority.

At our place we have 1,080 names on our records of lepers who have been diagnosed as such and who have taken treatment. After a year's work our usual attendance is about 250. Of course it is not the same 250 every day. Roughly speaking, about 350 are attending. What of the remainder? Granted that of the missing 730 quite a number are incapable of benefiting by injections, the residue is still large enough to cause disquiet. It should be stated that in our special circumstances we cannot do follow-up work, visiting the homes of those who have ceased to attend and persuading them to continue. But such enquiries as I have made lead me to the conclusion that our figures compare favourably with other places where those facilities exist. The problem is not one that concerns us alone, it probably concerns all centres more or less.

The primary reason why patients get discouraged is, of course, the slowness of results. At the present stage of knowledge, treatment is a lengthy business, demanding a fair degree of pertinacity on the part of the affected person. If the centre is a long way off, entailing an absence from home of several hours each treatment day, then more than ordinary perseverance will be required, especially as patients generally have work of their own to see to.

The urgent need is obviously to find a remedy which is quicker than any in use at present. The problem would then become very much simpler, but even now a great deal may be done, and is done, if only people can be induced to keep on attending. The question is, what methods will produce that result ? There is no short cut to success in that direction, but there are some elementary things which should constantly be borne in mind.

First of all, great importance should be attached to establishing a cordial relationship. Let it be quite clear that those who come are welcome. Cheerfulness and friendship cost nothing, but they make all the difference to the atmosphere of a place. Other things being equal, the medical officer who has a pleasant manner and a sense of humour will get better attendance than the man who ignores the personal factor. Village people especially are very informal, and like to be treated informally. The official manner is nowhere popular. We have one patient who travels regularly from a place 70 miles distant, and there are others who came from a town more than 30 miles away. These people could get private treatment from local practitioners for the same expenditure of money, and with very much less trouble. That they come to us is due, I think, to the personal factor.

We sell crude oil, for external application, at less than cost price, and this is a great attraction. I should recommend it where possible. The medical value is slight, but the mental effect is more than slight. I do not grudge the amount this costs us annually, because I know that it has a real effect in inducing people to come.

A small dispensary with stock mixtures is not expensive to run, and medicines may be given free. Since stress is laid on general physical condition in connection with leprosy treatment, it is obvious that such an arrangement should be made wherever possible. Leaving aside the consideration that results will be better, it cannot but improve attendance.

A treatment centre should be a propaganda centre. If it is not feasible to utilise the bioscope, or if no magic lantern is available, still other resources are open. Even the illiterate eagerly accept a copy of any leaflet which may be issued, and bear it off to someone who will read it to them. There are the excellent productions of the B.E.L.R.A., and since printing in India is cheap, it is possible to issue something specially adapted to the locality from time to time. A keen man will find plenty of opportunities of using the special set of posters, to great advantage. Activity of this sort gives

a good impression, and has a stimulating effect on those who have commenced treatment.

A method of our own for encouraging people to attend is as follows. Every dose of 7 c.c. or more (we use hydnocreol), is written on a slip of blue paper. This entitles the recipient to immediate attention whether he arrives early or late. Where the crowd is considerable a man may have to wait some time, but the possession of a special ticket exempts him from that. This is a privilege which is much appreciated by our people, but there is no particular point in applying it at a centre where the number is small and the work quickly finished.

Naturally every effort should be made to study the convenience of patients, both as regards hours of work, and also for their comfort. If adequate provision is not made for shelter from sun and rain a good attendance can hardly be expected. During the hot weather our practice is to make arrangements for drinking water and we also give away a handful of *batasha* to everyone. That is a small point, but it is appreciated by the man who has a total journey of ten miles on foot.

Where possible, patients who have ceased to attend should be looked up and the reason enquired into. It may be that they have allowed other interests to oust this special matter, or they may have become alarmed because of reaction, or an inflamed arm. It must be urged with sympathy as well as firmness that in this respect a man has to consider the danger to which he is exposing other inmates of his house, so long as he remain infectious.

Lastly it is hardly necessary to stress the importance of exercising utmost care in the actual work. Nothing less than the highest standard of efficiency should be tolerated.

Treatment is free, and theoretically the question of attendance ought to be left to the people concerned. But let me take an illustration from another field of activity. I know of village primary schools where the attendance is good because the teacher is constantly visiting homes and reminding parents of their responsibility in sending their children to school. And I know of other schools where the attendance is meagre because the teacher assumes that his job is merely to be at the school between specified hours to give instruction to such as like to come. The aim in leprosy work is to rid the world of a terrible disease, and those who engage in that work should be willing to do more than the necessary minimum. Until a more rapid cure is available there will be big demands on the keenness and resourcefulness of local

workers. Regular and continued attendance is ultimately the responsibility of the leper patient alone, but it should never be forgotten that the worker can help a great deal in bringing about that desirable state of affairs.

Grants for Leprosy Work.

The Executive Committee of The British Empire Leprosy Relief Association have recently made the following grants :—

UGANDA.

For distribution by Local Committee £500

BRITISH GUIANA.

Surgeon-General, Georgetown £500

To assist the Government to develop leprosy centres for the treatment of early cases, and also to further their programme of leprosy surveys for the territory.

Applications for financial aid will be sympathetically considered by the Committee, and all applications should, in the first place, be sent to the Director of Medical Services of the Colony concerned, who will forward to the Secretary of the Association.

Literature.

Leprosy Review, Vol. I, No. 4, October, 1930. Issued quarterly by the Association. Price 2s.

Leprosy in India, Vol. II, No. 4, October, 1930. Issued quarterly by the Indian Council of the Association.