LEPROSY REVIEW.

VOL. II. No. 4. OCTOBER, 1931.

EDITOR - R. G. COCHRANE, M.D.

Contents.

NOTES ON CONTRIBUTORS.

Prof. ETIENNE BURNET, M.D., is Secretary of the Leprosy Commission of the League of Nations and Director of the new Institute of Hygiene which has been established in Paris.

A. C. STANLEY SMITH, M.B., B.CH., is a missionary under the Church Missionary Society in Kigezi, Uganda, and gives part of his time to the medical care of the cases in the new Bunyoni Leprosy Settlement.

F. G. ROSE, M.D., is Medical Superintendent of the Mahaica Leprosy Hospital, British Guiana.

ISABEL KERR, M.B., CH.B., is doing valuable treatment work at the Leprosy Hospital, Dichpali, India.

A. R. DAVISON, M.R.C.S., L.R.C.P., is Medical Superintendent of the Emjanyana Leprosy Institution, South Africa.

E. MUIR, M.D., F.R.C.S. (Edin.), is Director of the Leprosy Research Department of the School of Tropical Medicine, Calcutta.

Rev. R. BANKS is the Missionary in charge of the Makutupora Leprosy Settlement, Tanganyika Territory.

THE

BRITISH EMPIRE LEPROSY RELIEF ASSOCIATION

Office: 29, DORSET SQUARE, LONDON, N.W.1.

Telephone : PADD. 7882.

Editorial.

IN our last issue we were glad to give the chief prominence to the report of the Leonard Wood Memorial Conference on Leprosy. In this number of the REVIEW, the attention of readers is drawn to Dr. Burnet's contribution on the work of the League of Nations, and on the Conference of the League of Nations Commission in Bangkok last December. Dr. Burnet's article will be studied with great interest, for the work of the Bangkok Conference was supplementary to that of Manila. We regret we cannot, for lack of space, print the complete findings of the Bangkok meeting, but copies can be supplied to those desirous of having them.

Dr. Rose's report on the leprosy settlement in British Guiana is instructive from the treatment point of view. An increase in the number of patients discharged without deformity from the institution rising from 14·3 per cent. in 1923, to 93·8 per cent. in 1930* is no mean achievement, and partially answers the point which has been raised, that the comparison between two groups of patients under similar conditions and stage of disease, one group being placed on chaulmoogra treatment and the other not, has never been made. One can assume that the conditions in the leprosy settlement have remained unchanged, but the cases have come in slightly earlier, but still not nearly so early as in settlements in India. Therefore, one can legitimately conclude, we think, that part, at any rate, of the great improvement is due to the so-called specific treatment.

Dr. Davison, of Emjanyana, contributes an article on his institution, and in the course of this, he mentions a treatment which he has been using of massive doses of alepol, as much as 50 and 100 c.cs. of a 10 % solution being given. In a private communication, he states that he has had to discontinue such large doses on account of general and eye reaction. In this connection, we should like to quote the following extract from a letter from Dr. Bernard Moiser :—

> "With regard to the use of 9 per cent. alepol (plus 5 per cent. novocaine), I tried this on 98 male and 74 female patients intramuscularly and subcutaneously for a period of three months, and was obliged to give it up and return to the 6 per cent. solution, on account of painful local indurations, aseptic abscesses and hæmatomata. In a few cases that were seen by me there was also a rise of temperature. Most of the patients also complained that the stronger solution caused more pain, both at time of injection and later, so that it would appear that 6 per cent. is as strong as should be used. I am, however, definitely of opinion that 6 per cent. solution is better than 3 per cent., is well borne by the patients, and is safe."

**See* Chart facing p. 149.

The League of Nations and the Fight against Leprosy.

ETIENNE BURNET.

IN 1925 the Health Committee of the League of Nations decided to institute an enquiry into certain statistical and epidemiological aspects of leprosy; as a result of this enquiry, the Health Committee appointed a Leprosy Commission, on which the following nations are represented: Germany, Brazil, United States of America, Great Britain, British India, Japan, Union of South Africa.

In order to understand its work it should be explained that the Leprosy Commission of the League of Nations is different from other institutions devoted to leprosy. It is not an international study society, such as has recently been proposed should be founded. It is not a society for scientific medical research and social action, like the British Empire Leprosy Relief Association or the Leonard Wood Memorial for the Eradication of Leprosy. It is not a mission inspired by the religious spirit, like the Mission to Lepers. It is neither a scientific society nor a health authority. These various institutions are primarily societies devoted to leprosy. The essential character of the Commission, as of the Health Committee from which it springs, is that it is international and universal. It has for its aim the bringing together of the forces existing in the world for a useful work and to arrive at an agreement, with a view to action, on disputed questions. Those who criticise it because it is not an assembly of technical specialists do not understand it. If it contains both specialists and at least an equal number of responsible heads of great public health authorities, it is because these men are best qualified to put into practice the conclusions of the Commission. The Leprosy Commission, like all the Commissions of the League of Nations, always invites the collaboration of specialists, either in sub-commissions or individually, in as great a number and for as long a time as is necessary. Its method of work consists in bringing together the men of different nations, in facilitating the exchange of ideas, in bringing the questions to a head in conferences of experts, and in taking the responsibility for conclusions that are recommended to governments.

The first concern of the Leprosy Commission was to obtain knowledge of the situation of leprosy in the world, not merely from the bibliography, but by direct observation; it instructed its secretary to visit not only institutions,

leprosaria, hospitals and dispensaries, but doctors, laboratory workers, hygienists and administrators in countries where leprosy was prevalent. This was done in order to be able to work out a programme that would be generally acceptable.

Nobody nowadays doubts that the campaign against leprosy, like so many other sanitary and economic activities, must be organised on an international scale. The trade in raw materials between the temperate zone and the tropics has multiplied the opportunities of contagion between the inhabitants of countries exempt from leprosy and those of infected regions. Owing to the dispersion of leprosy in the five parts of the world and especially in countries where the conditions of life are still primitive, leprologists are widely separated, and many of them are isolated and "lost" as are prospectors in new countries. There is no uniformity either in the scientific language or in the technique of treatment, where methodical comparisons would be so useful. Leprologists are not agreed either on a classification of the forms of leprosy or on the definitions of the symptoms and lesions, and agreement is indispensable if it is desired to measure the still disputed results of treatment. On the other hand, governments, before committing themselves to the considerable expense that the fight against leprosy requires, expect that the most efficacious system should be recommended by a technical authority of a universal nature such as can be possessed only by a conference of specialists where all opinions are represented. It is no exaggeration to say that for ten years doctors, health authorities, scientific and medical associations, missions and governments have all been looking to the League of Nations to give a general impulse and direction to the new crusade against leprosy.

This appeal to the League of Nations was expressed as early as 1923 by the Strassburg Conference, then by a considerable number of interested persons, and finally quite recently by the Wood Memorial Conference on Leprosy at Manila.

In the course of his enquiry,* the Secretary of the Leprosy Commission found leprologists very divided upon the two chief questions, segregation and treatment. Some were convinced that treatment by chaulmoogra oil and its derivatives would cure all cases of leprosy if they were taken early enough. According to others, there are no proofs that

* The report was published in May, 1930. Report on the Study Tour of the Secretary of the Leprosy Commission in Europe, South America and the Far East, January, 1929, to June, 1930. Geneva, 1930. (League of Nations Health Organisation, Official No. C.H.887.)

general and dietetic treatment *plus* chaulmoogra derivatives give any better results than general and dietetic treatment alone ; the comparisons of two equivalent groups of patients, the one receiving and the other not receiving chaulmoogra treatment, is a fundamental experiment that has never been made. On the question of segregation, some believe that the internment of cases in leprosaria remains the corner stone of prophylaxis ; others go so far as to say that segregation does more harm than good, because it frightens the sufferers, who hide themselves, escape early treatment and allow their contagious leprosy to develop to the stage when it becomes incurable.

In British India, under the direction of the British Empire Leprosy Relief Association the Propaganda Treatment Survey (P.T.S.) system was put into practice. This is an admirable development of what French Colonial doctors used to call as early as 1917 " the free treatment " of leprosy. In Japan faith is still pinned to segregation.

In theory it would seem very difficult to rally the two parties to a common doctrine, but already the evidence of well proved facts and practical needs were imposing complex solutions. It was reported that the prevention of leprosy is not a problem capable of a simple solution and that the means to be employed vary of necessity with the geographical, economic, administrative, financial and other conditions of the leprous countries. The relative efficacy of treatment at least, could not be denied. The old compulsory segregation, in its mediæval form, was rejected in most countries for both scientific and humanitarian reasons ; the isolation of contagious cases, however, was not relinquished and asylums for indigent cases and for incurables will always be necessary. India retained leprosaria under the P.T.S. system and Japan reported that only the contagious ones were confined in the leprosaria. The practical system in the Philippines evolved under the influence of the P.T.S. system influences in its turn many other countries. The necessity for as early treatment as possible was recognised. The two parties (adherents and adversaries of segregation ; believers and sceptics as regards treatment) have been obliged in practice to make concessions which give grounds for the belief that they will come to some agreement on a programme of prophylaxis. The report of the Secretary of the Commission infers the possibility of international agreement and action.

At the same time as this enquiry was paving the way for the work of the Leprosy Commission, a society founded in 1928 in the United States, the Leonard Wood Memorial

for the Eradication of Leprosy, was organising a conference of leprosy specialists. It appeared at first sight useful to join the two conferences, but then it was deemed preferable to let each retain its independent character. The League of Nations Commission held its conference in December, 1930, at Bangkok, at the same time as the Eighth Congress of the Far Eastern Association of Tropical Medicine. The Leonard Wood Memorial Conference was held in January, 1931, at Manila. The members of the Leprosy Commission of the League of Nations having been invited, in a personal capacity, to sit as members of the Leonard Wood Memorial Conference at Manila, there was collaboration and continuity between the two conferences.

Members of the Bangkok Conference: *President*, Dr. Bernhard Nocht, Director of the Institut für Schiffs-und-Tropenkrankheiten, Hamburg; *Members*, Professor Carlos Chagas, Director of the Instituto Oswaldo Cruz, Rio de Janeiro (absent); Surgeon-General H. S. Cumming, Director-General of the United States Public Health Service (absent), represented by Surgeon N. E. Wayson, U.S.P.H.S., Director, United States Leprosy Investigation Station, Honolulu, Hawaii; Major-General J. D. Graham, I.M.S., Public Health Commissioner with the Government of India, New Delhi; Dr. G. Alexander Mitchell, Director of Public Health, Union of South Africa, Pretoria; Professor Ernest Muir, M.D., F.R.C.S., Leprosy Research Laboratory, Calcutta School of Tropical Medicine; Professor Mataro Nagayo, Director of the Government Institute of Infectious Diseases, Imperial University of Tokyo (absent), represented by Dr. Masao Ota, Tohoku Imperial University, Sendai, Japan; Major-General Sir Leonard Rogers, C.I.E., F.R.S., I.M.S., Hon. Medical Adviser of the British Empire Leprosy Relief Association, London (absent); Dr. H. Windsor Wade, Chief Pathologist, Philippine Public Health Service; Medical Director of the Leonard Wood Memorial for the Eradication of Leprosy, New York; *Secretary*, Dr. Etienne Burnet, Secretary, Leprosy Commission of the Health Organisation of the League of Nations. The following were also present at the Conference, Dr. C. L. Park, Member of the Health Section of the Secretariat of the League of Nations; Dr. R. Gautier, Director of Eastern Bureau of the Health Organisation of the League of Nations.

The readers of this REVIEW already know the work of the Manila Conference which has so successfully continued the task begun at Bangkok, and prepared for the foundation of an international society of leprosy and of an international review. The Manila Conference insisted upon the international character of the campaign against leprosy. It appealed to the League of Nations for the publication of an international leprosy year-book. We refer readers for further particulars to the Report of the Manila Conference, as the subject of this article is the work of the League of Nations Leprosy Commission.

I. Principles of the Prophylaxis of Leprosy.

The chief task of the Commission has been the preparation of a report which proposed, for the first time it seems,

a doctrine of leprosy prevention, understanding by doctrine a body of rules upon which the leprosy experts and the heads of public health authorities, representing various countries and opinions, have agreed, without claiming to eliminate the peculiarities imposed on each country by its own conditions.

This report* is brief, clear and frank. It is divided into two parts :—

1. The principles of the prophylaxis of leprosy.
2. Technical suggestions.

In the second part, the Commission, knowing that the work would be resumed with its participation at Manila, has defined its position only on technical questions that it had placed on its agends. In the two highly controversial questions of treatment and segregation it has endeavoured to lay down guiding principles which are consonant with the state of our scientific knowledge and the experience of experts in leprosy. It is by reasoned conviction that it upholds segregation (until such time as it can be dispensed with,) while proposing that the old term *segregation* should be abandoned and the more liberal and medical term *isolation* should be used instead ; it further recommends not only general treatment, but also special treatment by hydnocarpus oil (chaulmoogra) and its derivatives, because the efficacy of these products was recognised.

The Manila Conference has approved in principle the report on prophylaxis of the Leprosy Commission.

II. Technical Suggestions.

1. *Practical Activity.*—The Commission intends to facilitate the relations between leprologists and to realise as far as possible uniformity in study and practice. The year-book suggested by the Manila Conference will be published. For this purpose, it has sent to public health authorities, institutions and missions a questionnaire to which they are asked to give short and precise answers.

According to another resolution of the Bangkok and Manila Conferences, the documents used for clinical and statistical purposes should be standardised ; observations, cards, reports, pictures and diagrams. We have asked authorities and institutions to send us their models. We will

*League of Nations. Health Organisation. The Principles of the Prophylaxis of Leprosy. First General Report of the Leprosy Commission. Geneva, April, 1931. (Official No. C.H. 970. Series of the League of Nations Publications III Health. 1931. III. 2.)

compare them and prepare models which we will have examined by experts and which will be recommended for general use.

While admitting that every case of leprosy must be treated individually, it seems possible to arrive at a certain degree of standardisation in treatment, as regards medicaments on the one hand and methods of application on the other. There must be precision in the definition of remedies, in the technique of extraction, purification and preservation of the hydnocarpus oils, in the determination of their activity indices, and a codification of the preparation of the esters and soaps.

2. *Research.*—The Manila Conference drew up an extensive programme of clinical and experimental research. The Leprosy Commission, which is neither a scientific society nor a research institute, confines its attention to a small number of questions, the most important and urgent ones for the practice of treatment and prevention ; in recommending this limited programme to the study centres of different leprous countries, it intends to collect and compare the results with the co-operation of international experts.

In the front rank it places the demonstration of the efficacy of treatment by chaulmoogra and its derivatives.

The crucial experiment, consisting of the comparison of two equivalent groups of patients placed under the same conditions, one of which would receive the special chaulmoogra treatment and the other not, raises serious difficulties. It is difficult in one institution to deprive a certain number of lepers of treatment in order that they may serve as controls to the treated patients. Nevertheless, as there may be conditions where this crucial test would be possible, the Commission decided to recommend it.

It then recommends experiments to compare the different forms of special treatment (oils, esters, soaps) and the methods of inoculation (subcutaneous, intramuscular, intradermal).

It hopes that it will be possible at a later date to analyse a sufficiently large number of uniform observations on patients who have received consecutive treatment, and be able to draw from them some indications of the reasons for the success or failure in the different cases.

It recommends research on an early diagnostic reaction, serological or biochemical ; thorough post-mortem examination of persons who have been rendered negative or been cured and who have subsequently died from causes other than leprosy ; full researches on chemotherapy ; researches

into the causes of the decrease of leprosy in certain countries, including the foci still existing in Europe.

3. *Establishment of International Study Centres for Leprosy.*—There are experts fully prepared for research on leprosy who have only a very small number of patients at their disposal, and there are large groups of patients who are not used for research for want of a sufficient number of doctors or laboratories. The first work of co-ordination consists of bringing the research workers and the cases together. The results obtained at Calcutta, at Culion, at Honolulu and in Japan show the efficacy of a good organisation of study centres.

It is necessary, says the Bangkok Report, that each country where leprosy is endemic should have at least one centre devoted to the theoretical and practical study of the disease. The commission recognises, moreover, the usefulness of international centres which act as clearing stations between the leprous countries, and between the workers of the scientific centres of Europe and North America and the leprous countries. It has decided to establish two international centres, the one at Rio de Janeiro, the other in Japan.

In Brazil, there is abundant material for study already made available by the institutions (administrative centres, leprosaria and dispensaries) of the states of Rio and São Paulo. The Brazilian government and a well-known philanthropist, M. Guinle, have given the necessary credits for the organisation of an international centre at Rio under the auspices of the League of Nations.

In Japan the material for study abounds and research on leprosy has at all times been very active ; the laboratories of the leprosaria have produced some remarkable works in the whole field, particularly on serological diagnosis and on the culture of the *Mycobacterium leprae*. The Japanese Government has decided to establish an international centre at Tokyo.

The men invited to work in these new centres will spend a certain time in the institutions at Calcutta, Culion and Honolulu. In 1932, a Japanese leprologist will be appointed to study leprosy in Europe and at Rio, after having passed through Calcutta, Culion and Honolulu, and a leprologist from Europe will study leprosy in the Far East, particularly in Japan.

4. *Leprosy and Tuberculosis.*—The Bangkok and Manila Conferences did not ignore the analogy that exists between leprosy and tuberculosis, but the leprosy specialists hesitated

to emphasise this analogy because of certain differences between the two diseases. If it is right to notice the clinical and bacteriological differences, there is nothing but advantage in utilising the resemblances from the point of view of social hygiene and prophylaxis.

The complete system of prophylaxis recommended by the Conferences coincides with the system employed against tuberculosis ; epidemiological control at the base, legislation on compulsory notification, examination of contacts, special hospitals or special services in the hospitals, treatment centres, dispensaries, sanatorium-colonies and refuge-colonies, inspection of schools, social service, re-education for vocational work of improved or cured persons. The classification into open and closed cases is made in both diseases. The regulations which, in England, give to public health authorities the power, by order of a judge, to enforce compulsory hospitalisation of a contagious case of tuberculosis, and which remove such persons from certain occupations (particularly dairy-farming) closely resemble certain regulations with regard to leprosy. Occupational therapy is necessary in leprosy and in tuberculosis. The reality and the duration of cures, and the study of relapses, are two sides of the same critical studies. Against both diseases the organisation of the treatment and the prophylaxis must be regional, administered by the local authorities under the direction of and with grants from the central authority. If hygienists who are not yet familiar with leprosy wish to gain an idea of the system of prophylaxis that they have to apply against this disease, they should remember that methods which are applicable to leprosy are also applicable to tuberculosis.

Such is the international work begun by the Leprosy Commission of the League of Nations to help in the eradication of leprosy from the world. It is a work of encouragement, and rapprochement, exerted upon national and international institutions, utilising the moral authority and means of action that are peculiar to the League of Nations. It is not difficult to see in the activity of the Commission a part of the collaboration that the British peoples bring to bear upon the League of Nations, and the influence of the ideas that inspire the British Empire Leprosy Relief Association and of the examples which it shows in British India and West Africa.

Leprosy in Kigezi, Uganda Protectorate.

A. C. STANLEY SMITH.

THE Kigezi District of the Uganda Protectorate is only just beginning to emerge out of the mists of obscurity, in which 50 years ago nearly all Central Africa was shrouded; and Africa has hidden her fairest jewel nearest her heart. For many who have widely travelled in the dark Continent, say that the country surrounding the Mufumbiro range is for grandeur and beauty unsurpassed.

The district lies, tucked away in the south-west corner of the Protectorate, where it borders on the Belgian Congo to the west, and ever since the arrival of the Medical Mission there in 1921, leprosy has been recognised as being a considerable item in the health picture of the country. The geographical distribution of leprosy in Uganda is peculiar, and in the absence of a detailed survey it seems that, while there is a heavy incidence around Mount Elgon, Buganda and Ankole are almost clear, until another area of incidence is found away west on the Congo border.

In the Kigezi district, by far the larger number of lepers are found in the Bufumbira county, around the foot of the massif of extinct volcanoes, which form the Mufumbiro range.

The native knowledge of the disease is surprisingly exact. "Ebibembe," as it is called, is classified into two distinct phases. The first of these is the initial appearance of the depigmented patches, and the second is when the edges of these patches begin to swell; and they show in their diagnosis a clinical acumen which is quite remarkable. I have had cases brought to me as leprosy in the earliest stages, which I would have hesitated to accept as such, until a positive scraping from the nose revealed the bacillus lepræ, and proved these primitive diagnosticians correct.

It is difficult to give a true statement of their views on segregation. They both practice it and yet freely ignore it. There are a few leper colonies of their own making, and occasionally a village has a leper hut, where one poor unfortunate is separated from his people. And yet throughout the district, it is common to find lepers marrying untainted wives, and being allowed the freest intercourse with the rest of the community. This is the rule, and segregation the exception. The explanation of their contradictory attitude towards their lepers, I think, lies in the fact that

they do not believe in the infective nature of the disease. It is a fact that as we question our patients, we seldom can elicit a history of leprosy in the same family. In other words they do not look upon leprosy as a contagion, but as " an Act of God." Those who are isolated are probably put away because their condition is so repulsive as to become an offence to society.

The type of leprosy in Kigezi is of all varieties—anæsthetic, nodular and mixed. But Dr. Cochrane gave it as his opinion on his visit to the district, that the infectivity rate was abnormally high. This is borne out by a fact reported to me by one of the White Fathers, that in one village where six years ago there was one leper, there are now fifteen. Certainly some of the cases coming up for treatment are exceedingly severe.

Treatment was undertaken from the start following closely the guidance of Sir Leonard Rogers and Dr. Muir; and it has been of undoubted benefit. In one's absence from the field, no figures are available, but nodular cases in quite an advanced stage have been greatly improved—and the patients have shown by their perseverance in coming for treatment, that they were conscious of real benefit received. But when that has been said, there does remain a sense of disappointment in not getting the spectacular results obtained in India and elsewhere. We began to feel that the possible explanation was that, though the lepers were treated in an isolation ward, the surroundings of a general hospital did not give the chance of providing the general hygienic conditions (as necessary in treatment as the specific drugs) which would lead to more permanent benefit.

It was, further, impossible to extend our accommodation, and the whole problem of meeting the menace of leprosy in Kigezi demanded a wider and more ambitious plan. The following scheme was, therefore, worked out by Dr. Sharp, and it is on the eve of being put into operation.

On a large island, lying close in to the shore of Lake Bunyonyi, 6 miles from Kabale, there is to be established a leper colony. It will be staffed by two ladies, trained in administrative and leper work, and it will be visited regularly by a doctor on the staff of the C.M.S. Mission Hospital at Kabale. The lepers will be invited to come and make their homes there during the period of their treatment, and everything will be done to make their lives healthful and happy. In addition to extending a general invitation to all lepers, two classes will be specially sought for, namely,

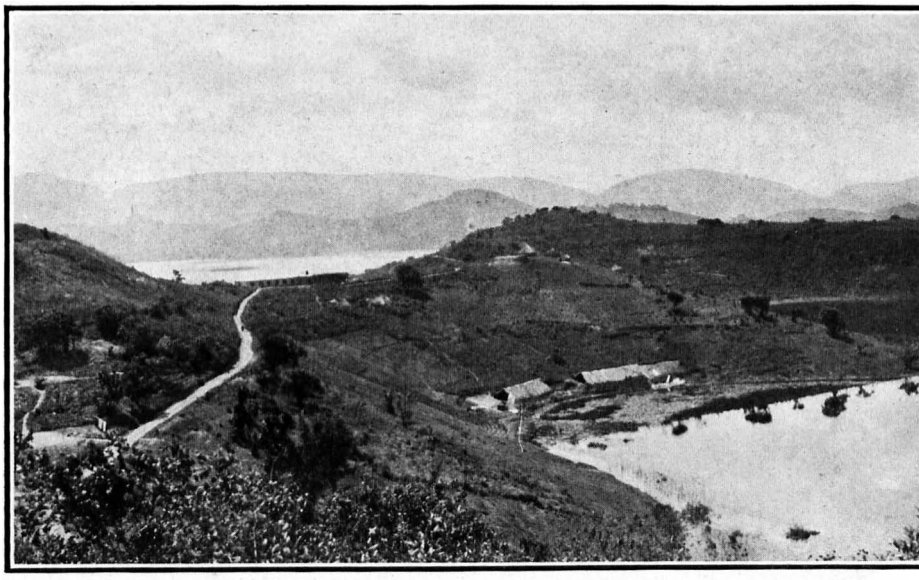
the actively infectious cases, and the young children. A hospital is being erected to contain about 40 beds to deal with bed-ridden cases, and incidental diseases.

This scheme has been entrusted to the Mission as essentially a missionary enterprise, and the missionary side of the work should be its glory and crown. There must be few diseases where so long-drawn misery is more constantly present than in this. Its persistent gnawing pains, the devastating bouts of lepra fever, the wearisome length of its course, and its appalling ugliness all combine to make it the disease more shunned than any other by civilised humanity. To these sufferers the story of the Love of God in Christ comes as the dawning of a new day. I have never met any class of patient, who have been as receptive of the Gospel as the lepers; and it seems as though, just as it was when Jesus was here among men, He loves to stretch forth His Hand and touch them.

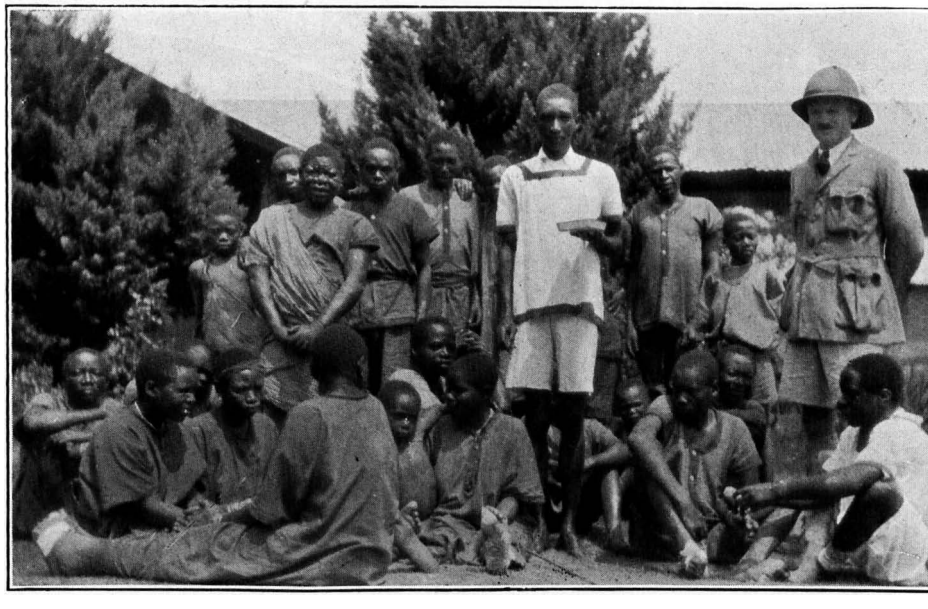
The acceptance of the Gospel, with its assurance of pardon, and the redeeming experience of the Life in Christ, means for the leper a mental state of such peace and joy, that all specific treatment is enhanced in value. And so the colony works for the healing of the whole man, as well for the body as the soul.

The scheme for dealing with leprosy as a whole will use this hospital and colony as the training school for the native medical assistants who, in growing numbers, are being sent out by Government and Mission to staff out-patient dispensaries. These will be able to come in for intensive courses of instruction in the best methods of treating leprosy, and on their return to the dispensaries they will be able to deal more adequately with those many cases who for one reason or another, are unable to come to the colony.

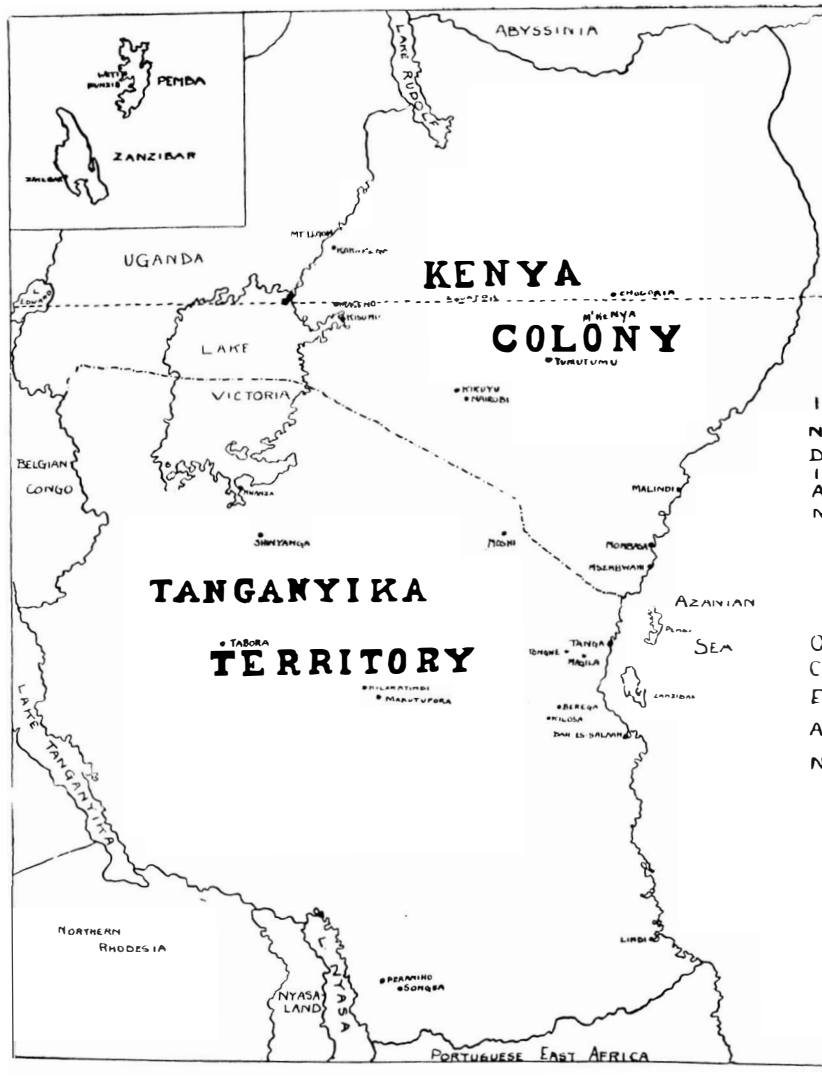
The Government of Uganda, the B.E.L.R.A. and supporters of the Mission at home have subscribed to erect the necessary buildings, and they are rapidly nearing completion. Further, the Government have undertaken to use their influence to persuade the lepers to come to the colony; and now the medical mission is on the point of starting this scheme to tackle the problem of arresting the progress of leprosy in this remote but populous corner of the British Empire.



General View of Island and Leprosy Settlement on Lake Bunyoni, Uganda.



Group of Typical Cases at Kigezi, Uganda.



Sketch Map of Kenya and Tanganyika showing Main Treatment Centres.

Leprosy in Kenya, Zanzibar and Tanganyika.

R. G. COCHRANE.

OWING to the publication of the special Leonard Wood Memorial Conference number this series of articles on leprosy in British Africa had to be postponed. I propose to deal in this contribution with leprosy in Kenya, Zanzibar and Tanganyika, and I shall conclude this series in the next number of the REVIEW by a summary of the situation in S. Rhodesia and South Africa.

KENYA.

Kenya, with a population of 2,736,517 (1926) and an area of 225,100 square miles, can be divided into three main areas as far as leprosy is concerned, *viz.*, North and Central Kavirondo; (2) Coastal Region; (3) Frontier Province. The former two foci are known to exist and the latter is suggested for it is reported by those who have been stationed in that most inaccessible part of Kenya that leprosy is fairly prevalent, and in Abyssinia it is known to be widespread. It is not suggested that leprosy is not prevalent in other areas of Kenya, for instance, there appears to be quite a definite focus in the Kikuyu territory, and Dr. Irvine of the Scottish Mission has an extensive work at Chogoria. It seems, however, that the areas already mentioned are those of the heaviest incidence. I shall deal mainly then with the situation in North and Central Kavirondo and the Coastal Area.

(1) *North and Central Kavirondo.*

In North Kavirondo there is a leprosy settlement at Kakamega, some 50 miles from the Uganda border. There seems to be little doubt of the heavy incidence of leprosy in this area, and perhaps this is not surprising for it borders the area in Uganda which has a very high incidence of the disease. From the number of admittances to the leprosy settlement at Kakamega it has been estimated that there cannot be less than 800 cases in this one district alone, and this may be an under-estimate, for the bordering Mbala district of Uganda has an incidence approaching 2 per cent. As in most places where leprosy is prevalent one finds little fear of the disease among the natives, and that the social and hygienic conditions of the population are bad. There is one leprosy settlement at Kakamega, with accommodation for over a hundred inmates. The great majority of these are unfortunately, very advanced cases. There appears,

however, to be a general tendency for the earlier type of case to present itself for treatment, and as these begin to be discharged from the home, other, and still earlier cases will probably be attracted. The leprosy settlement itself consists of seventeen mud and wattle huts and a central corrugated iron roof hut, which is used as a store house. All treatment is carried out at the general hospital dispensary nearby, as there are no facilities at present for treatment in the settlement. Under present conditions, it is difficult to persuade patients to stay for a sufficiently long period. The Secretary in his report recommended that Kakamega should be developed further and form the central leprosy settlement for this area. If this were done, there would be a reasonable prospect of meeting the problem in North Kavirondo.

In Central Kavirondo leprosy work was started by Dr. Strangways Dixon at Maseno. After his departure cases were treated at the Government hospital. Out of 65,000 cases which presented themselves for treatment, 70, or just over one per thousand, were cases of leprosy. It appears, therefore, that while the number of cases is not so great as in North Kavirondo, yet the amount of leprosy present is not negligible. The people of Central Kavirondo, however, have little if anything, to do with those of the North, and, therefore, they are averse to entering the leprosy camp at Kakamega. If this is so, and it is demonstrated that there are a large number of sufferers in the district, it might be well to consider the establishment of a small colony for the advanced and " open " cases of the district. Meanwhile, there are facilities for treatment at the government and mission hospitals.

In and around Nairobi there appears to be little leprosy. There are, however, about a dozen cases isolated in the infectious diseases hospital outside the city. Some thirty miles from Nairobi in the Kikuyu reserve the Scottish Mission are treating a few cases, and two wards have been erected with funds from the Association for isolating sufferers who may come for treatment. At Tumutumu and Chogoria in this reserve there seems to be a higher incidence, but, generally speaking, leprosy does not appear to be so prevalent as elsewhere.

(2) *The Coastal belt* of Kenya seems to have a fair incidence, and it is at Msembwani, some 30 miles from the Tanganyika border on the coast and in the Diga district, that the Government have built a very good leprosy colony. At the time of the Secretary's visit the colony was close on completion ;

it is not known how many cases have been admitted since. In addition to the settlement at Msembwani there is one at Malindi which has been in existence for some years. It is proposed to continue this camp, for it is not always easy to persuade sufferers from leprosy to go outside their own tribal area for isolation. While leprosy is not so prevalent in Kenya as in certain other parts of Central Africa, yet it is by no means negligible and will demand the closest attention of the authorities before its ravages are in any way controlled.

ZANZIBAR.

The protectorate of Zanzibar consists of two islands, *viz.*, Zanzibar and Pemba. These islands are among the most beautiful and picturesque in all the African continent. It is estimated that there are some 500 cases of leprosy in Zanzibar, and this gives an incidence of about one in six hundred. There is a settlement on Funzi Island, some four or five miles from Weti on the main island of Pemba. At the time of the Secretary's visit there were about 120 cases isolated, 50 of which were women. Unfortunately, the majority of cases which were seen were advanced, and without exception had the disease on an average of over three years before discovery, and, further, when the disease was discovered, were found to be in the later cutaneous stages. The work at Funzi is supervised by the Medical Officer from Weti, and two resident sisters carry on the routine work. In addition to the leprosy settlement, there is a colony for the old deformed arrested cases a few miles outside the town of Zanzibar. This is in charge of a Roman Catholic sisterhood, who look after the simple wants of the people. A few cases are also treated at the various dispensaries scattered throughout the Islands.

It is evident from recent investigations that leprosy occurs in localised foci. If this is the case, the disease should be more readily controlled. If contacts were examined regularly, as has been suggested should be done, it should be possible to trace 80 per cent. of new infections. As Sir Leonard Rogers, the Hon. Medical Adviser to the Association, has pointed out, in communities where such an examination could be enforced, it should be feasible to reduce the incidence of leprosy in ten years by 50 per cent. Zanzibar is a well ordered State, its people are above the average in intellect and civilisation ; therefore a scheme for the examination of contacts should be possible of enforcement. Recent information has come from the Government that such a

plan is in contemplation. The outlook then, for the ultimate control of leprosy in Zanzibar should be good.

TANGANYIKA.

The Mandated Territory of Tanganyika, situated within the equatorial belt, is the home of most tropical diseases, and leprosy is no exception. The hot humid climate and the prevalence of malaria, dysentery, syphilis and sleeping sickness, all tend to lower the resistance of the people to such an extent that they fall ready victims to a chronic scourge such as leprosy. It has been stated that the incidence of leprosy averages about two per thousand, giving a total number of sufferers in Tanganyika of about 8,500, but as two per thousand is a very low estimate for the incidence of leprosy in Central Africa the actual number of sufferers may well be twice as high, or even higher. In the course of a hurried walk through a few villages in Northern Tanganyika, the writer noticed at least three cases in each village. The incidence of leprosy in India has been found to be vastly higher than it was ever thought to be, and there is no reason to think that the rough estimate given for the territories of Africa is any more accurate.

Within the last six years, a considerable amount of leprosy work has been organised in Tanganyika. The districts where definite work is being carried on are Moshi, Tanga, Shinyanga, Kilosa, Kilamatinde, Lindi and Songea. In Moshi there is a small Government camp which might well be developed further, for, while leprosy in this area is not as prevalent as elsewhere, yet from all accounts, it does not seem to be uncommon. In the Tanga district at Magila, Tongwe and Korogwe the U.M.C.A. are doing quite an extensive dispensary work, and as many as 100 cases are treated in some of their hospital out-patient departments. Perhaps the most extensive work is being done by Dr. Maynard at Shinyanga, a station on the railway line from Tabora to Mwanza. It seems that this, and the vast area along which runs the Central Tanganyika Railway, represents the heaviest foci of disease, for it is in these districts that quite a large amount of leprosy work has been developed. C.M.S. at Kilamatinde and at Berega (Kilosa district) are also developing leprosy settlements for the treatment of the numerous cases around their mission stations. Further south, there seem to be two fairly large foci, one some 30 miles inland from Lindi, and another in the Songea district. The U.M.C.A. are carrying on work in the Masasi Diocese of the former district and a

Roman Catholic mission have work near Lindi and the same mission have also developed a leprosy settlement in the Songea area at Peramiho.

The Secretary on his East African visit was unable to see much of the work, but there seems little doubt that leprosy is one of the major problems of Tanganyika, and the Government have been urged to appoint a special officer for leprosy investigation purposes. Unfortunately, owing to shortage of funds, little can be done in this direction. Here is an opportunity for some philanthropist to help in a practical manner to relieve this open sore of Central Africa, for little permanent work can be done without a specialist investigating, surveying, and constantly working out plans to deal with the problem. This scourge is not insoluble and given right methods leprosy is a preventible disease.

Report on Anti-Leprosy Work in British Guiana during the Year ended December 31st, 1930.

F. G. ROSE.

(*Published by kind permission of Surgeon-General Kelly.*)

TREATMENT OF IN-PATIENTS AT THE MAHAICA LEPROSY HOSPITAL.

THE number of patients at the end of the year 1929 was 271, and on the 30th June, 1930, 278. Of this number, 141 had received treatment for a period of more than 3 months; those who had been under treatment for less than 3 months have been omitted from consideration.

New cases numbered 32; the rest have been under treatment for periods varying from 6 months to 4 years; 12 persons were discharged conditionally during the period under review.

During the second half of the year (June to December) 169 persons received treatment, but 7 have been omitted from consideration, having been treated for less than 3 months. New cases admitted numbered 16; the rest have been under treatment for periods varying from 3 months to 4½ years. 21 persons were discharged conditionally.

Table I gives the results of treatment from 1928 to 1930.

	Cases.	*Improved.*	*Including Negs.*	*Including Stationary.*	*Worse.*
		Per cent.	Per cent.	Per cent.	Per cent.
Jan.—June, 1928 ..	222	64·0	14·.9	27·0	9·0
July—Dec., 1928 ..	135	76·3	5·5	15·6	8·1
Jan.—June, 1929 ..	142	56·6	15·2	24·7	19·7
July—Dec., 1929 ..	152	50·7	23·1	33·5	15·8
Jan.—June, 1930 ..	141	56·7	15·0	36·9	6·4
July—Dec., 1930 ..	162	76·6	24·2	22·2	1·2

Treatment of Out-Patients.

In addition to lepers isolated in the Leper Hospital, there are now a number of negative cases who attend for out-patient treatment. These belong to two categories, *viz.*, positive cases who after treatment as in-patients have become negative and have been conditionally discharged, and cases which have never been positive and so have never been isolated in the Leper Hospital. It is now the practice after a patient has been consistently negative for at least six months, to discharge him conditionally and require his attendance monthly for further treatment and re-examination for a further period of at least four years.

Out-patients are negative cases both those conditionally discharged and those who, having never been bacteriologically positive, have never been admitted to the Leper Hospital. The numbers are as follows :—

	Discharged but still under Treatment.	*Other Out-Patients.*
No. ..	37	9

Drugs used.

(1) Chaulmoogra oil with 0·5 per cent. creosote (T. Curzii).

(2) Ethyl esters of chaulmoogra oil.

(3) Anti-leprol (a mixture of chaulmoogra esters).

(4) Esters of " Crab-oil " (prepared from Carapa Guianensis).

(5) " Alepol " (sodium hydnocarpate) in 3 per cent. solution.

The first four are given as a rule intramuscularly, the esters also by subcutaneous infiltration and intradermally.

Alepol by the intravenous route.

The esters are prepared by Dr. Muir's method.

The pure oil is always given warm, and it has been found useful to keep it in a cheap thermos flask, pouring out through a glass tube only a small quantity at a time.

The following tables show the comparative results of the administration of these drugs.

ESTERS OF CHAULMOOGRA OIL.

	Patients.	*Improved.*	*Including Negs.*	*Including Stationary.*	*Worse.*
		Per cent.	Per cent.	Per cent.	Per cent
1927	95	51·6	41·8	46·3	2·1
1928 (1st Semester) ..	52	57·7	10·4	34·6	7·7
1928 (2nd ,,) ..	21	80·9	16·7	4·8	14·3
1929 (1st ,,) ..	15	66·7	11·1	13·3	20·0
1929 (2nd ,,) ..	53	79·2	32·4	17·0	3·8
1930 (1st ,,) ..	105	57·1	11·7	38·1	4·8
1930 (2nd ,,) ..	118	76·3	25·0	22·9	0·8

PURE CHAULMOOGRA OIL.

	Patients.	*Improved.*	*Including Negs.*	*Including Stationary.*	*Worse.*
		Per cent.	Per cent.	Per cent.	Per cent.
1928 (1st Semester) ..	10	40·0	12·5	40·0	20·0
1928 (2nd ,,) ..	12	75·0	33·3	16·7	8·0
1929 (1st ,,) ..	14	92·9	63·6	0	7·1
1929 (2nd ,,) ..	19	73·7	61·5	21·0	5·3
1930 (1st ,,) ..	23	65·2	35·3	34·8	—
1930 (2nd ,,) ..	34	76·5	30·0	20·6	2·9

"ALEPOL."

	Patients.	*Improved.*	*Inclnding Negs.*	*Including Stationary.*	*Worse.*
		Per cent.	Per cent.	Per cent.	Per cent.
1928 (1st Semester) ..	142	70·5	19·0	21·1	8·4
1928 (2nd ,,) ..	102	68·8	3·1	25·6	10·5
1929 (1st ,,) ..	113	63·9	13·5	20·2	15·8
1929 (2nd ,,) ..	26	34·6		57·7	7·7
1930 (1st ,,) ..	10	30·0		30·0	40·0
1930 (2nd ,,) ..	3	33·3		66·7	

Five patients were treated with anti-leprol, all of whom have improved; though none has yet become negative.

Two patients were treated for six months with esters of crab-oil both of whom improved, but neither has yet become negative.

Alepol is used only until a dosage of 10 c.c. has been reached, after which the patients are given 10 c.c. of esters or oil increasing to 15 c.c. intramuscularly. Therefore, it must be borne in mind in interpreting the results that " Alepol " is never used for more than six months, generally three to four months, as a preliminary stage of treatment, and that anti-leprol has been under trial less than six months.

Sometimes reactions may be so severe with alepol as to necessitate a change even sooner.

In our hands, the pure chaulmoogra oil continues to give the best results.

Painful Swellings and Abscesses.

For two years all the drugs before injection have been exposed to ultra-violet radiations from a mercury-vapour lamp at a distance of 12 inches for 1 hour on the day of injection. The solution or oil is spread in Petri dishes in a very thin layer.

Originally, this was done owing to the differences in appearance of the samples of oil obtained, on the assumption that changes induced in the oil in the process of manufacture might account for the varying results of its administration.

After exposure the oil becomes lighter in colour and more translucent, rarely produces abscesses, and appears to produce quicker results. Similar changes result in the solution of alepol after exposure and no sclerosis of veins leading to venous obstruction is now noted even after six months' administration of a 3 per cent. solution.

Solganal and Keysolgan.

Corneal ulceration, choroiditis, irido-cyclitis and other eye conditions are a very distressing feature of the disease, and during the year, experiments were begun with these gold preparations as recommended among others by Hoffman.

The results of this treatment are very promising and it bids fair to revolutionise the whole outlook in leprosy with regard to eye-disease.

Local Treatment.

The method of local treatment remains the same.

After trial of different caustics, it appears that the only one which at all approached trichloracetic acid in value was the oil expressed from the seed of the local Cashew tree. Mr. E. D. Martyn, of the Government Department of Agriculture, whom I consulted on the subject, gives me the following information as to the Cashew :—

" *Anacardium occidentale* L. is a native of South America and belongs to the family Anacardiaceæ. The stem yields a gum like arabic, the shell of the nut yields a caustic oil which is, however, destroyed by heat." Following on the demonstration of the usefulness of this oil seeds were procured and several plants are now growing in the compound in addition to the original old one.

Electrical Treatment.

Over twenty-six people received treatment here with great benefit. The use of the ultra-violet radiation has been described elsewhere.

Operative Treatment.

The usual operative procedures have been undertaken, such as excision of nodules, trimming of ears, plastic operations on the face, etc.

Discharges.

77·2 per cent. of the patients discharged in 1930 (35 in number) were able-bodied men and women who are earning their own living outside. With few exceptions, they attend monthly for treatment and examination.

The following table show the percentages of able-bodied persons discharged in each of the five years, 1926 to 1930.

Year.	*Percentage of able-bodied among those Discharged.*
	Per cent.
1926.. ..	Nil.
1927.. ..	23·5
1928.. ..	21·2
1929.. ..	34·0
1930.. ..	77·2

This is a striking illustration of the fact that very many more persons are now being admitted in an early and, therefore, curable stage of the disease.

Relapses.

Two cases relapsed during this period, both nodular.

During the last five years, the patients discharged as recovered after treatment number 150, and of these 13 have died of diseases other than leprosy, while 11 have relapsed and have returned to the Asylum. All the rest, 126 in number, are being periodically examined and have kept in good health and free from any evidence of recurrence of the disease.

Metabolism in Relation to Leprosy.

I. KERR.

THE study of basal metabolism in connection with disease is not only of interest but of essential importance. Especially does this hold good with an insiduous disease such as leprosy. Given a normally healthy body, leprosy infection will be held in check, waste products being eliminated from the tissues by the detoxicating effect of a healthy metabolism. This is, in all probability, one reason why many " contacts," though having the infection, do not develop leprosy, and also why many, who have acquired the disease, do not fall victims to its worst forms.

It is this normal metabolism which should be induced in our patients. We may call it raising their resistance or increasing their tolerance of our treatment, but the aim is essentially the same.

The basal metabolic rate is lowered by poor diet and unhygienic surroundings whether it be among the rice-eaters of South India or the dried fish-eaters of Norway.

According to Colonel McCarrison, the oils of the unsaturated fatty acid series stimulate the metabolic rate. The hydnocarpus group of oils, being more highly unsaturated than the others, presumably accelerate metabolism in more marked degree. By careful administration of hydnocarpus preparations and by grading the amount given, we are able to obtain just the degree of stimulation a patient may be able to bear. At the sites of injection, especially if the preparation is given intracutaneously, there is increased vascularity from the local inflammatory reaction. The phagocytes are stimulated by the irritation and in consequence there is an increase of metabolism locally while in due course the disease processes are modified.

The irritation by the oil is not confined to the part injected. That it spreads beyond the infiltrated area is manifest by the itching caused in the surrounding skin soon after injection. That part of the oil reaches the general system is evident from the fact that in distant untreated lesions there is also modification of the disease.

It is possible, however, to bring about improvement in leprosy lesions by administering hydnocarpus preparations by intramuscular injections only. By this method, the minimum of irritation is caused. But for the maximum amount of improvement, it would seem that both types of injection are necessary. Not only is there improvement in the injected lesions but the patient maintains that he feels

better, that is, the tonic effect of the oil is asserting itself or in other words, the basal metabolic rate is being accelerated.

Improvement of leprosy lesions by local irritation followed by improvement in the general health is not the result of hydnocarpus treatment only. Electrical treatment and light therapy are reputed to have this effect. Much local improvement is also brought about by the use of trichloracetic acid, but as the writer has never treated any leprosy cases with this physical agent alone, its general effect cannot be gauged. By its irritant action, however, it increases the vascularity of leprous lesions and permits drugs which accelerate metabolism to reach these lesions.

It is also possible to obtain improvement in cases of leprosy by drugs whose therapeutic effect is to increase the metabolic rate without local irritation. Potassium iodide is of this sort. It should not be used, however, until the physician has had considerable experience of leprosy treatment by the ordinary methods. It is useful in those cases who have undergone courses of hydnocarpus preparations and who have ceased to progress. Complications contra indicate its use. The general resistance of the patient must be good. To ascertain these needful conditions a knowledge of the Sedimentation Index is indispensable. Given these requirements, however, namely, an experienced knowledge of treatment on the part of the physician and a good resistance on the part of the patient as evidenced by the S.I., potassium iodide will be found to be a useful drug in the treatment of leprosy. It creates a state of greater re-activity to the hydnocarpus preparations. It is valuable in causing these to renew their therapeutic action when to all appearances the patient has become callous. This is the reason why after a course of potassium iodide, one has to be careful with the dosage of hydnocarpus preparations.

Another drug which is useful as an adjunct in leprosy treatment and which comes within the same category as potassium iodide, is thyroid extract. Its use also presupposes experience of the treatment and a careful scrutiny of the Sedimentation Index. For potassium iodide, however, it is necessary to have the S.I. comparatively low while thyroid extract may be most useful when this index is high. When the S.I. is high, the serum is loaded with waste products—partly because the metabolism is too slow to deal with their assimilation and excretion. This condition may be due to a minor hypothyroidism—an endocrine deficiency which in its latest form, is much more frequent than is generally believed and which is, in many cases,

a predisposing cause of leprosy as well as a complication caused by the disease itself. A vicious circle is produced; the diseased tissues depress the thyroid, the basal rate is slowed and the waste products cannot be dealt with. With a slow metabolic rate and a thyroid whose function is in abeyance, we get various degrees of hypothyroidism, while those in whom this deficiency exists are likely to develop a cutaneous form of the disease. It would seem that a slow metabolism causes the mycobacteria lepræ to collect in the tissues. They settle down here and since the normal metabolism is not operative to deal with waste product, pathological conditions are created and cutaneous lesions are the result. Nerve leprosy cases do not take thyroid well. It would seem that in them there is no endocrine deficiency of this nature.

Thyroid extract stimulates all the body cells. By its catalytic action it increases combustion "as a bellows blows a fire." The thyroid may act directly on the cells or indirectly through the nerves (sympathetic) or both. When that action in leprosy is withdrawn, we have a variety of symptoms which will show improvement if thyroid extract is given. Some of these are:—

Fatigue.
Constipation.
Acidosis.
Ichthyosis.
Thickened tongue.
Scaly lesions.
Keratosis.
Alopecia of outer eye-brows.
Sensitiveness to heat and cold.
Slight œdœmatous infiltration.
Bilaterial "anæsthesia."

The dose of thyroid extract is from gr. 1/8 of the fresh gland, using Parke, Davis, and Company's tablets. Two and half grains is a large dose when we take into account the fact that thyroid extract does not reach its maximum effect in the system till the ninth day, and is not entirely excreted from the tissues till three weeks.

The signs of thyroidism vary but the principal are persistent quickened pulse rate; giddiness; no increase in appetite or loss of appetite; rheumatic pains and the ordinary signs of lepra reaction.

Courses of small doses are most beneficial. Too large a dosage will cause loss of weight and the body tissue will be called upon to make up the waste. The small doses will cause actual retention of nutriment (nitrogen) and increase of weight. The latter aim is the ideal at which we should direct our efforts when minor hypothyroidism complicates leprosy.

In using a drug of the nature of thyroid, it is necessary that the patient should have the best possible diet in order that the processes of combustion may go on. If the drug is doing its work in the tissues, the appetite will increase. Hunger can be an excellent test of a healthy metabolism.

Thyroid extract, even if used with S.I. and record of body weight as guides, will occasionally cause lepra reaction. But this, even though severe, will be beneficial to the patient. After such a reaction, it is advisable to cease giving thyroid for some weeks. It is just possible that the patient's own thyroid gland has been stimulated. We must, therefore, take this into consideration.

Another method by which we can improve metabolism in our leprosy cases is by physical exercise, that is, manual work rationed according to the amount a patient can do. By this immunity is slowly acquired and the preparations which have been injected are better assimilated. Garden and field work provide all grades of labour. It is pleasing to watch how dependent on their work patients gradually become and how much they like it. As is evidenced among men who undertake heavy work, acidosis decreases and there is development of the muscles and other tissues.

In leprosy treatment, therefore, no single method can be adhered to. Even when we have utilised all our resources, we still find in many cases a residium of the disease—" the last four anna's worth "—which may resist our efforts. But whatever treatment is chosen, the aim is the same, namely, by any means at our hand, to secure, maintain and increase the general good health of the patient so that he himself is able by natural physiological processes to throw off the disease.

Survey of 105 Villages in the Livingstone District, Northern Rhodesia.

WHEN in Livingstone, Northern Rhodesia, I visited a few villages in company with Mr. Farquhar B. Macrae and demonstrated a rough method of leprosy survey. Mr. Macrae, when on tour of the villages in his district, continued the survey on the lines I had indicated, and this note is published in the hope that those who are on " safari " will be stimulated to take an interest in leprosy. Leprosy lends itself to rapid surveys of this kind, and in the average village of Africa it is not difficult to collect the villagers together and examine them for leprosy. The people are generally not opposed to such examinations, and

as they can generally recognise leprosy it is a fairly easy matter to divide up cases into the types here indicated.

It is seen in this survey that out of a population of 7,741, 101 suffered from leprosy, giving an incidence of 1·3 per cent. As it has been generally held that there is very little leprosy in and around Livingstone, such a percentage is rather startling. If, however, the figures are examined it will be seen that out of 101 cases only four are in the highly contagious stage and 13 (raised patches) are presumably in the mildly infective stage That is 17 per cent. are open cases and 83 per cent. are closed. This is suggestive that while the incidence of leprosy is fairly high yet the type is not so severe. It would be interesting to discover whether in a known leprous area these percentages would be reversed. The point is that while an incidence of 1 per cent. is high, yet an area where 83 per cent. are closed cases is not so dangerous from the public health point of view, as one where open cases were over 50 per cent. Further, if these 83 cases were largely adults the assumption is that the community in this area is highly resistant. If the percentage of open cases was high, and the majority of early cases were children or adolescents then the disease should be actively combated, for it would be suggested that the population had a low resistance to the disease.

These few remarks I trust will stimulate Medical Officers, Missionaries and others to study and investigate leprosy along such lines. Such figures for an area of supposedly low incidence are rather surprising and one is constrained to ask, if these are the rough figures for the district around Livingstone, what would they be if known heavily infected areas such as Basutoland were thus surveyed. The following table is a summary of the statistics furnished by Mr. Macrae :—

No. of Villages.	Isolated Patches.	General Patches.	Raised Patches.	Nodular Patches.	Mutilations.	Total.	Total Population.
105	25	11	13	4	48	101	7,741

EDITOR.

Grants for Leprosy Work.

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

TANGANYIKA TERRITORY.	£
Africa Inland Mission, Shinyanga	500
Benedictine Mission, Peramiho	300

These grants have been made for the provision of dispensaries and simple housing accommodation for cases undergoing regular treatment. 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 them to the Secretary of the Association.

Anti-Leprotic Treatment at the Emjanyana Leprosy Institution, South Africa.

A. R. DAVISON.

SCOFFERS at the efficacy of our modern anti-leprotic treatment are as plentiful in South Africa as they are in other parts of the world, and so I am grateful to Dr. Cochrane for giving me this opportunity to tell of our results. Before giving the figures of the discharge rates at this institution for the last ten years, I must mention that the leprosy policy of this country was altered in 1923, and in that year 228 cases were discharged. These were old burnt-out non-infective cases that had accumulated in the institution. The figure for the next year also included many of this type. I assumed duty in 1926, and previous to this little or no anti-leprotic treatment had been given—the maximum dose then was 12 minums of ethyl-esters of hydnocarpus. The effects of active treatment therefore are to be seen in the figures for the last four years. The policy of the Leprosy Board has not altered since 1923.

Year.	*Average Number of Patients in Institution.*	*Number Discharged.*
1920	569	12
1921	638	21
1922	587	41
1923	572	228
1924	518	61
1925	502	32
1926	572	46
1927	598	99
1928	567	87
1929	545	111
1930	530	95

Our discharge rate for 1925 and 1926 combined, therefore, averaged 7·2 per cent., whereas the combined rate for the last four years gives us an average discharge of 17·5 per cent. We may, therefore, claim that treatment is enabling us to discharge two and a half times as many cases as before. What these figures do not show, but what is obvious to leprologists, is that we are discharging cases that have been arrested before mutilations have occurred—very different from the 1923 group.

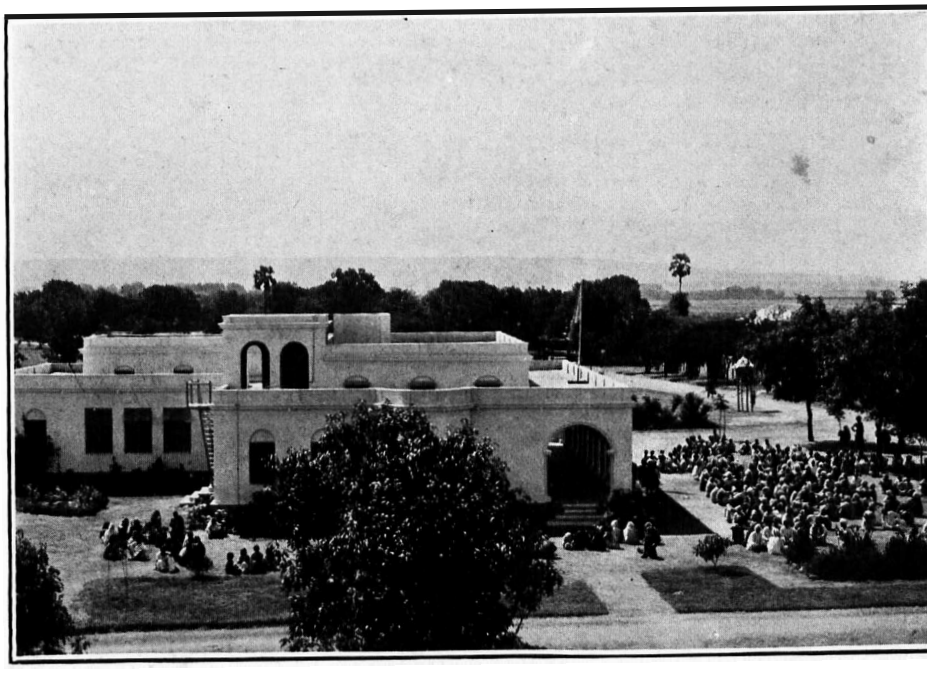
It is perhaps advisable to describe briefly the cases which we have to treat and our criteria of " arrest." The average

duration of the disease before the admission of the patient to this institution is 4½ years. Even this figure may be an underestimate as the South African native does not recognise the hypopigmented patch as a manifestation of leprosy, and usually attempts to date the onset of the disease from the first appearance of erythematous maculæ. Our cases, therefore, may be divided roughly into three groups (1) advanced neural showing deformities and hypopigmented maculæ; (2) maculo-anæsthetic with raised erythematous margins to the maculæ and slight or no deformity; and (3) the nodular type. These seem to be later stages of leprosy than the duration of the disease would lead one to expect, but Dr. Cochrane confirms our opinion that leprosy in this country is apparently a more fulminating disease than it is in India.

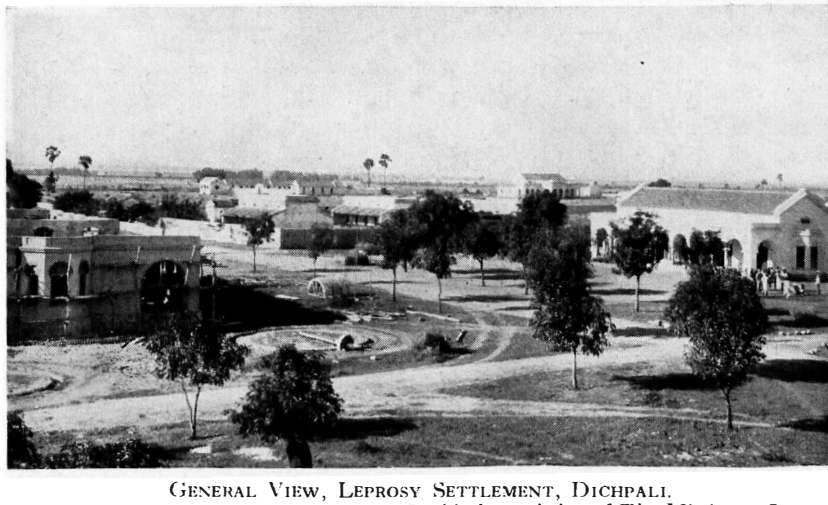
Our criteria of arrest are, firstly: absence of bacilli from the nose and skin for a period of twelve months after clinical manifestations of activity have disappeared, and secondly, no recrudescence of activity in the skin as shown by erythema or by spread of the maculæ. Cases are discharged as arrested by a Leprosy Board which meets annually. The Board has powers of discretion and may discharge a case without these formalities. This has happened in instances where burnt-out cases have been admitted.

Types of Treatment and Technique.

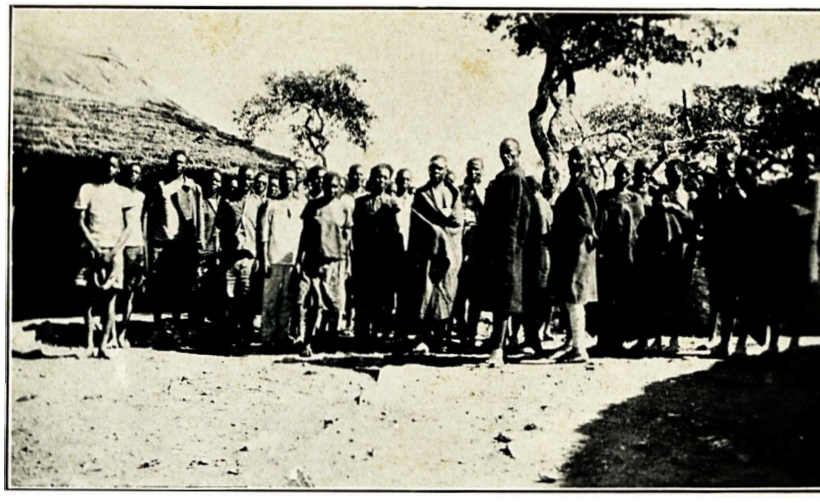
Under this heading I have little to say that has not previously been said in the LEPROSY REVIEW. We differ, perhaps, from other workers in that we prefer to use intramuscular injections as opposed to subcutaneous. We have also come to believe that treatment should be very energetic even at the commencement. Our initial injection in routine treatment is 5 c.cs of either ethyl-esters of hydnocarpus, hydnocarpus cum 1 per cent. iodine, or alepol (5 per cent. solution). We raise the dose as rapidly as possible to a maximum of 10 c.cs. Alepol is our mainstay for routine treatment. It is easily prepared, easily injected and the results are very definite, while the injection is practically painless. It is not toxic even when an initial dose of 100 c.cs of 10 per cent. strength was given. I hope to report further on these big doses of high concentrations. In one case under this treatment the maculæ which had raised erythematous margins became pale and flattened after two injections. This injection is too painful to be used as a routine, but once we have succeeded in making it painless,



LEPROSY TREATMENT HOSPITAL, DICHPALI, INDIA.
[*By kind permission of The Mission to Lepers.*]

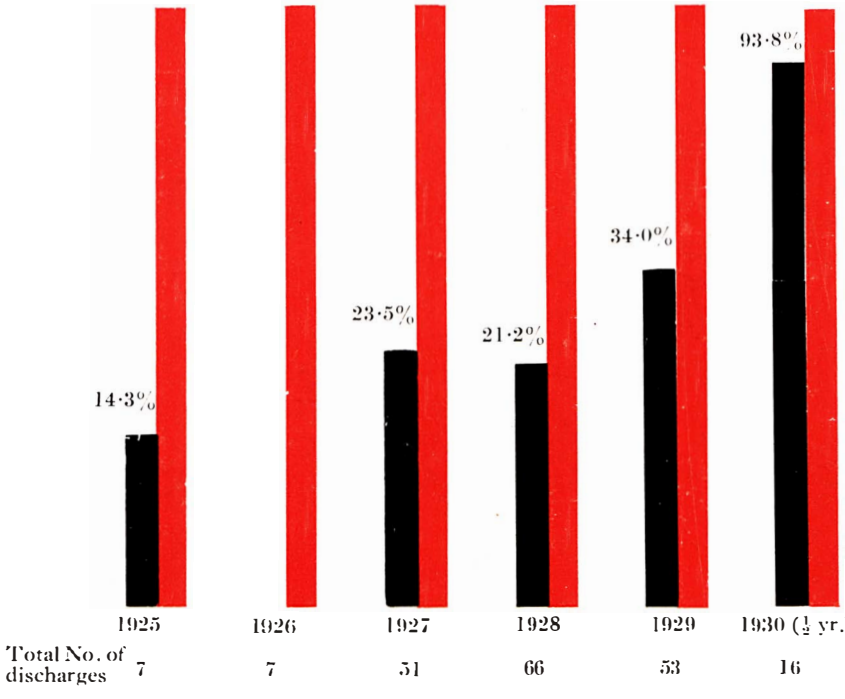


GENERAL VIEW, LEPROSY SETTLEMENT, DICHPALI.
[*By kind permission of The Mission to Lepers.*]



Searching for Lepers in a Village in Northern Rhodesia.

Chart showing the proportion of discharged persons from the Leprosy Hospital, Mahaica, British Guiana, from 1925 to 1930, who bear none of the stigmata of leprosy, and are able to earn their own living.



we will have discovered the certain, and what is more, the rapid cure for which we are all searching.

Counter irritation in the form of acid trichlor 1 in 1 of water is also part of our routine. This is painted on to the maculæ and then allowed to remain until the part becomes white. It is then swabbed off with liquor potassæ—unless this is done there is a possibility of a keloid developing. I demonstrated one case to the Board where the beneficial effects of this paint could be clearly seen. The patient had been admitted with one large raised erythematous macule on his chest. One half was painted and at the demonstration appeared healed, whereas, the other half was still in its original condition.

In addition to injections and counter-irritants, every patient in the institution receives one dose per day of our " Mist. anti-lep." This consists of ten minims of chaulmoogra oil and two drachms each of Cod Liver Oil and Parrish's Food. At the same time that this is issued, we give each patient 1½ oz. of orange juice. The diet is on a liberal scale, particularly with regard to proteins. It includes 10 oz. of meat per day as well as potatoes, beans, green vegetables and meal. Once a week the patients are allowed to brew their own " Kaffir Beer " (made from sprouted maize).

Our patients, I think, are happy and contented, though their one desire is to become healed so that they may return home to their people. They firmly believe in the efficacy of treatment. At one time the suggestion was put to them that certain patients would be returned to their homes where special huts would be built for them, and they would live under a modified form of home segregation. They were enthusiastic about the idea until one man asked where they would get their treatment. When it was explained to them that the District Surgeons would not be able to give them their injections, they turned the whole idea down. They want to be healed and then sent home.

Literature.

The following publications can be obtained from the Association :—

Leprosy Review, Vol. II, No. 3, July, 1931. Issued quarterly by the Association. Price 2s.

Report, 1930. Annual Report of the Indian Council of the Association.

Leprosy in India, Vol. III, No. 3, July, 1931. Issued quarterly by the Indian Council of the Association.

Leprosy.

E. MUIR.

PART II.

(*Continued from "Leprosy Review," Vol. II, No. 11, April, 1931*)

Extracts from a Chapter on Leprosy in "A System of Bacteriology in Relation to Medicine," Vol. V. (Privy Council, Medical Research Council).

HISTOLOGY OF THE SKIN LESIONS.

Leprosy is generally classified among the infective granulomata.

(1) The examination of the earliest and mildest skin lesions shows an increase of the cellular elements in the most superficial, *i.e.* the papillary, layer of the corium, which underlies the basal layer of the epithelium. The epithelial ingrowths, *viz.*, the hair follicles with their appendages the sebaceous glands, and the sudoriferous glands and ducts, are also coated by this increased cellular element, the disease thus being carried down deep into the corium. This cellular increase consists of the following elements: connective tissue cells; star-shaped mast cells containing in their cytoplasm granules which are to a great extent acid-fast when stained by the Ziehl-Neelsen method; large epithelioid cells apparently of endothelial origin, which, when they have ingested B. lepræ, are known as "lepra cells"; and small cells similar in appearance to lymphocytes.

It is often impossible in such early lesions to discover any acid-fast bacilli. Whether this is due to their scarcity or to the infecting organisms not being acid-fast, though present, it is difficult to say. It is not likely that these cellular changes are due to the toxins of distant organisms and they must, therefore, be due to B. lepræ present locally. Nor are the changes caused by germs which were formerly present and have now died out, as the changes described occur in the active, extending margin of the lesions also. The presence of B. lepræ is also proved by the fact that, when the resistance of the patient is suddenly lowered by any intercurrent cause, such lesions often change into lesions of the type next to be described; and in the latter type organisms of various degrees of acid-fastness may be found, some retaining the stain dark red, others staining only slightly, and others appearing as "ghost forms," only their outline appearing in the counterstain.

In this earliest lesion there is a slight amount of flattening of the papillæ and in consequence of the interpapillary spaces of the epithelium. The infection does not appear to invade

the epithelial elements, but it is accompanied by trophic changes in the epithelium, such as parakeratosis and hyperkeratosis. The hairs become affected and break off at the mouth of the follicle, the part inside the follicle becoming softened and swollen with a bulbous end. There is a loss of the sweat function. Granulation appears to be perivascular and to follow and surround the vascular plexus which immediately underlies the epithelium, but there is often at first no vascular engorgement. Such lesions may remain stationary or may advance slowly, the infection probably being spread by mobile cells which ingest the organisms and carry them forward in the intercellular lymph spaces surrounding the superficial vascular plexus.

The nerve-branches supplying such a cutaneous lesion seem invariably to be affected, infection with cellular changes similar to those described in the skin gradually spreading upwards and affecting the larger branches and then the nerve-trunks. In the nerves, the various connective tissue layers surrounding the axis-cylinders (endo-, peri-, and epineurium) become the site of a granulation process similar to that described in the corium. The fibres themselves are, to start with, affected by the pressure of the cells. Apparently the non-medullated, sympathetic nerve-fibres are the first to suffer, and this, together with the cells proliferation causes the changes in the epithelium—keratosis, loss of sweat function and changes in the hair follicles ; while at the same time there is a loss of epicritic sensation and of pigmentation. If the pressure is prolonged, the fibres are destroyed ; but, if resolution takes place in time, the fibres are preserved and function is restored. In other lesions the nerves appear to be affected first, and it is possible (though proof is wanting) that there may be a descending infection of the skin from the nerves.

(2) The lesion described above is of the most mild and chronic nature. When the resistance of the patient, either local or general, is less, the lesion is subacute, its margin spreads more rapidly and shows engorgement of blood-vessels. In this type a few acid-fast organisms can be found in sections ; they lie chiefly inside the large epithelioid (lepra) cells, and there are also a few lying apparently in the intercellular spaces. In this lesion there are often multinuclear giant cells as described by Kedrowsky (1914), Bayon (1915), and Henderson (1928), very similar in appearance to the typical giant cells of Langhans found in tuberculosis. Here the granuloma tends to become more thickened and to spread to the deeper vascular plexus. The centre

of the lesion does not show engorgement of the vessels, but only the periphery.

(3) A third type of lesion rather more acute than the last may arise from either of the types described above or may belong to this type from the beginning. There is engorgement of the superficial capillary plexus throughout, but the invasion of the nerve-branches is less certain, being sometimes present and sometimes absent. Giant cells are not found as a rule, and epicritic anæsthesia, keratosis, anhydrosis and depilation may or may not occur. Acid-fast organisms are present in larger numbers and granulation of the corium, though it does not yet invade the lowest layers, is more widespread. The epithelium is raised above the level of the surrounding skin surface by the pressure of the granulomatous corium and is flattened out and thinned, the interpapillary spaces disappearing.

(4) In the fourth type there is a further progression from the last. The lower layers of the corium are invaded ; lepra cells are large, some containing large numbers of acid-fast bacilli and others few, while some organisms are to be seen in the intercellular spaces, possibly set free from broken-down cells. Pressure on the hair follicles and sweat organs causes their gradual destruction. The epithelium is forced outwards between the rows of hair follicles and the natural folds of the skin are exaggerated, giving the surface a tesselated or mosaic appearance. The most superficial layer of the corium is œdematous and comparatively free from acid-fast organisms, lepra cells and cellular infiltration. This is in marked contrast to the first type in which the superficial layer alone is affected. Such a lesion may originate either by a more superficial infection spreading to the deeper layers of the corium or by the extension of a focus deep in the corium which has been produced by a mycobacterial embolus in a vessel of the deep vascular plexus.

(5) The fifth type is the cutaneous nodule, starting round a deep emblous, but unlike the last it does not spread through the skin but forms a round circumscribed mass. In the centre there are aggregations of lepra cells, intermixed with small, round cells, while at the margin the proportion of the latter is greater. As a nodule becomes old the granular formation is often replaced to a large extent by fibrous tissue making it firm and hard. During severe reactions a nodule frequently shows degenerative changes and this may go on to pus formation, the pus being absorbed and discharged through a small perforation in the epithelium, or resulting in destruction of epithelium and the production

of an ulcer of which the remains of the nodule forms the hard base. At other times nodules are resolved, leaving only a small quantity of fibrous tissue under the thin epithelium.

These various types of skin and subcutaneous lesions have been described, but one type often merges into another, and lowering of resistance generally tends to change a less into a more severe type.

Lesions of the Nerves.

Equally important with lesions of the skin are those of the nerves. As has been mentioned, the central nervous system is seldom or never affected, but any of the peripheral nerves and their branches may become involved. Disease is found most frequently in subcutaneous nerves, especially in those most liable to injury, torsion, bending or pressure; thus the commonest nerve-trunks to be affected are the ulnar, peroneal and great auricular.

The histo-pathology of nerve-lesions corresponds more or less closely with that of the first three types of skin lesions described above. The nerve-fibres are destroyed by pressure of the granuloma, which infiltrates the connective tissue elements of the nerve, and later by the contraction of the new fibrous tissue which replaces the granular formation.

Nerve-trunks are invaded either by ascending lesions from the skin or by metastatic embolism. Proof of ascending invasion is exemplified when from a cutaneous lesion of the forearm thickening of branches of the radial and ulnar nerves gradually proceeds upwards to the respective trunks; proof of metastatic infection is shown when nerve-trunks are found affected but their branches and the skin supplied by them remain free.

One of the most important phenomena in leprosy has been referred to above, namely that the milder the type of lesion and the greater the resistance of the patient the more are the nerves involved; and inversely, the grosser the lesion and the lower the resistance the less is the disease found in the nerves. This cannot be explained by any essential difference either in the patient or in the strain of organism, for in the majority of patients the disease begins with the nerve type, passing on later into the skin type, and patients in whom the former has been maintained for years will pass on rapidly into the latter if their resistance is markedly lowered by an intercurrent disease or by any other cause; and patients who are suffering from the grosser skin types will show a marked increase of nerve involvement as the skin lesions diminish either naturally or under treatment. Many theories have been put forward

to explain this phenomenon. Perhaps the most likely hypothesis is that B. lepræ, when the resistance is low, quickly multiplies inside the ingesting cells and immobilisation takes place; whereas when the resistance is high the bacilli are able to travel up the nerve-branches from the skin, by direct spread, possibly of a non-acid-fast or less acid-fast form.

While in early leprosy the small cutaneous branches are most affected, in the last stage of the disease the trunks show most signs. In that stage therefore, whether the disease has been chronic throughout and never developed the grosser skin type, or whether in the intermediate stage there may have been gross skin lesions, we have the well-known acroteric (glove and stocking) trophic lesions due to pressure exerted on the axis-cylinders, first by the cell proliferation and later by the contraction of fibrous tissue. Seeing that the longer the nerve-trunk is the greater is the length of nerve-fibre over which pressure is applied, the distal parts of the limbs, *i.e.* the hands and feet, show the first and most marked signs of trophic involvement. Thus there is anæsthesia, both epicritic and protopathic gradually spreading up the limbs from the fingers and toes; thermal and pain sensations are lost; loss of sensation is often preceded by hyperæsthesia and paræsthesia. Side by side with these there are anhydrosis, depilation and changes in the nails; wasting and fibrosis first of the small muscles of the hands and feet and later of the forearms and legs. As the peroneal and ulnar nerves are most apt to be involved, the muscles supplied by these nerves are most markedly affected. Fibrosis of the small muscles of the hands and feet is followed by the typical claw hand (main en griffe) and the club-shaped foot; while drop-foot is a common result of wasting of the peroneal muscles. The bones are decalcified and slowly absorbed. Secondary infection often leads to abscesses and ulcers, while, apart from secondary infection, blisters, blebs and perforating ulcers occur generally as the result of a reaction in the affected nerve-trunk.

The Reaction in Leprosy.

B. lepræ differs from most ordinary bacillary and coccal infections in its low toxicity, the lipoid material in its composition, its intracellular growth and the presence of a mucoid substance which accumulates round about it even after the cell has been destroyed. In the typical leproma, such as we find in B^2 and B^3 cases, we have, therefore, a threefold protective mechanism consisting of the composition of the bacilli, the lipoid material tending to prevent its destruction; its intracellular position, the lepra cell

acting more as a host than as a phagocyte ; and the mucoid material, called by the earlier writers the " glœa." This protective mechanism enables the organism to multiply enormously, forming masses within separate cells, which, as the cells become further expanded and destroyed, coalesce, the bacilli embedded in the gloea being moulded in the intercellular spaces by the pressure of the surrounding cells.

The process of multiplication of bacilli may go on for months, or years, quietly without producing any marked local or constitutional disturbance. This period we may call the quiescent phase. When, however, due to any cause, there is a sudden breaking up of the lepra cells or liquefaction of the gloea, the bacilli are brought into contact with the surrounding tissues and a reaction takes place, there is engorgement of the blood-vessels, dilatation of the perivascular lymph spaces and marked local diapedesis of leucocytes, especially polymorphs, which phagocytose the organisms. Clinically there is sudden swelling and erythema of the affected lesions, and the appearance of rose-coloured cutaneous nodules in different parts of the body. As systemic changes we find a rise of temperature, bacillæmia and alterations in the blood-serum indicated by acceleration of erythrocyte sedimentation (Muir, 1928[2]). Only the lepra cells which are ripe and the glœa masses take part in the reaction, and thus lesions which do not contain ripe cells do not react. For this reason, reactions are comparatively uncommon in cases of the A types, though even in them reactions do occur in the nerve-trunks. Sections of a reacting lesion may show in the deeper layers of the corium vascular engorgement, perivascular œdema, marked polymorph leucocytosis with disappearance of acid-fast organisms ; while the more superficial layers are still quiescent, with the bacilli chiefly intracellular but contained in the cells only in small numbers ; in other words the deep parts having ripe cells have reacted in contrast to the superficial parts which remained quiescent, the lepra cells being immature.

Causes of Reaction.

The causes which bring about the reactionary phase spontaneously appear to be many ; among them may be mentioned febrile intercurrent diseases, gastro-intestinal disturbances and unaccustomed physical exertion. It may also be caused therapeutically by the injection of certain drugs such as hydnocarpus oil and its preparations, and it has been noted after vaccination for smallpox. Potassium iodide has a specific effect in this direction ; in certain cases in which ripe lepra cells or glœa masses are abundant as little as 1 or 2 grains given orally will produce a very marked reaction.

Effects of Reaction.

There are four well-marked effects resulting from reaction :—

(*a*) Resolution is brought about in the area which has reacted.

(*b*) Bacilli are set free in the blood-stream with resulting metastasis.

(*c*) There is a temporary depressant action on the general resistance of the body.

(*d*) When wisely induced with therapeutic intent by drugs in suitable doses, and at proper intervals, immunity results ; contrariwise, when reactions occur, accidentally or are induced without safe precautions, an allergic condition is liable to result which is detrimental to the patient. This allergic condition is what is commonly known as lepra fever ; the febrile condition may last for several weeks or even months, repeated reactions being induced and maintained by the high temperature and by the weak condition of the patient. One of the signs of immunity is the disappearance after two or three days of the rose-coloured, cutaneous nodules of embolic origin ; in progressive cases, in which immunity has not yet become sufficient, these nodules form the nuclei of new, spreading lesions.

The term phase has been used because of the repeated recurrence of reactions. We have thus three phases ; the quiescent, the reactionary and the resolutionary. The signs of resolution are indicated histologically by the appearance of resistant forms, spore-like swellings in the mycobacteria, granulation or loss of acid-fast staining, disappearance of acid-fasts and lepra cells, the cellular granuloma being replaced by fibrous tissue.

TREATMENT.

As may be gathered from the previous sections of this chapter, the chief emphasis in the treatment of leprosy must be laid on the improvement of the general health of the patient, and no line of treatment which neglects this factor is likely to give permanently good results. Syphilis, which is present in India and other places in a proportion varying from 25 to 50 per cent. of cases must be examined for and treated when present. Other predisposing diseases must be sought out and remedied when found. The diet must be carefully enquired into and regulated according to the ordinary rules of dietetics, remembering that leprosy is

a disease of over-eating as well as one of starvation. As in tuberculosis, exercise is very important ; leprosy is a disease of the lymphatic system and flourishes best in patients with a stagnant lymph-stream and soft, flabby muscles. The hardening up of the muscles is often sufficient of itself to cause a gradual clearing up of the disease. Suitable climatic conditions, general hygienic surroundings and a healthy, cheerful, hopeful and purposeful mental attitude are essentials for successful treatment.

The special treatment of leprosy consists in the application of drugs which break down the defensive mechanism of the leprosy organism and at the same time increase the immunity of the patient. The former of these objects is secured by the injection of such drugs as chaulmoogra (or hydnocarpus) oil and its preparations, and by the administration of potassium iodide orally. It is also promoted by any drugs which cause either local or general polymorphonuclear leucocytosis. The external application of local counter-irritants, for example, by painting lesions with trichloracetic acid, which produces leucocytosis in the granuloma, has a beneficial effect. The injection of such irritants as turpentine or the induction of protein shock by the injection intramuscularly or intravenously of milk, bacillary suspensions, and other forms of protein have the same effect. This accounts largely for the innumerable forms of treatment that have been recommended in recent years.

Attempts at the production of immunity have been made by the injection of suspensions of ground-up leprous nodules and of supposed cultures of the leprosy organism, such as Deycke's nastin (Deycke and Reschad, 1907) and Rost's leprolin. Similar endeavours have been made to produce group-specific immunity by the injection of other acid-fast cultures, such as tuberculin, used by many workers and autolysed tubercle bacilli as proposed by Row (1926). Immunity can, however, be induced (in the opinion of the author, much more effectively and conveniently) by the internal autovaccination caused by the breaking up of the leproma which is produced by the injection of hydnocarpus oil and the oral administration of iodide.

An important point which must be remembered is that in the earlier stages, and especially in B^2 cases, attempts to press this treatment excessively are apt to result in depressing the general resistance of the patient, and thus to lead not to amelioration of the disease but to its aggravation. In B^3 cases this danger, though it exists, is not so great, as patients, because of the higher degree of immunity

induced, may continue to improve rapidly under vigorous treatment even when the general resistance is lowered. In all cases, however, there is the danger of the patient reaching an allergic condition with continuous fever, which is one of grave danger and not infrequently ends fatally. In the earliest cases of the A_1 and B^1 types, treatment may be pressed, provided the patient's general condition is favourable seeing that reactions do not occur to an extent likely to depress his vitality.

PREVENTION.

General Measures.

As has been mentioned above, leprosy is spread by contact with infectious (chiefly B^2 and B^3 types) lepers, the longer and the closer contact the greater being the danger of transmission. This being so an infectious patient should have a separate room into which no one but himself enters, except those in attendance on him. His linen, eating utensils, furniture and other things used or touched by him should not be touched by others without due precaution. It is specially important that children should not come into contact with infectious lepers. New-born infants should be separated from their mothers at birth. Those whose occupation entails touching lepers should do so with care; they should discriminate between different cases regarding the degree of infectiousness, should realise the danger of drop infection while standing near B^3 cases, and should take precautions in dressing ulcerating nodules or in touching or using furniture, utensils, etc., that have been in contact with such patients. Rubber gloves should be worn or the hands should be washed carefully after all possible contacts. At the same time, the most important preventive measures are perhaps those which ensure a high measure of physical health.

Children and others who show early signs of leprosy should not be allowed to live in contact with highly infectious cases, as there is good reason to believe that, as in tuberculosis, repeated massive reinfections of those who have only a slight degree of leprosy are apt to lead to a graver type of disease.

Marriage should be forbidden, especially in women, even in the earlier types, as child-bearing frequently leads to a rapid development of the disease. In patients recovering from leprosy, marriage or sexual connection should be interdicted for at least three or four years after all signs of leprosy have disappeared.

[We are indebted to the Comptroller of H.M. Stationery Office for permission to reprint this article.—Editor.]

Dawn of a New Hope at Makutupora Leprosy Settlement.

R. BANKS.

IN 1929, the Church Missionary Society accepted responsibility for the little settlement for sufferers from leprosy, known officially as Makutupora, which is in the Manyoni district of the Dodoma Province in Tanganyika Territory. For some time things had been in an unsatisfactory condition, and it was with much joy that the patients received the news that there was hope of a better day. There were just over a hundred cases in the camp, the women outnumbering the men by two or three; there is also a fair sprinkling of children. With the prospects of a doctor being located to the mission station at Kilimatinde, only nine miles away, it was not only hoped to make life brighter for the incurables, but to give treatment to all early cases and children. A good start was made, however, before the doctor's arrival, and much patient sorting-out and preliminary work was done by Sister Hobbs who regularly visited the settlement attending to general ailments and giving injections. By her cheerful methods of approach she wore down distrust and suspicion and gained the confidence of all patients.

The settlement nestles in the foothills on the south-eastern slopes of the Saranda-Kilimatinde escarpment which overlooks the western portion of the thickly-populated Unyangwila plain. The situation as a segregation camp is excellent, although a rocky projection running out on the lower side of the valley shuts off some of the prevailing winds. Water is good and abundant in quantity. We found it quite open and unprotected from the wild animals which prowl around, and scores of baboons with other beasts as well as native cattle drank promiscuously at the same pools from which those afflicted with leprosy drew their daily supplies; occasionally the women would be obliged to wait their turn until whole families of baboons had taken their fill. The soil is fertile though stony, and in a normal season splendid crops of millet and maize can be raised, though much of the harvest is destroyed through the ravages of baboons. The settlement is well off the beaten track and separated by a thick belt of bush from the nearest villages two miles distant, yet it is easily accessible from Kilimatinde along an all-weather motor road which we have made.

With the aid of a generous building grant from the

British Empire Leprosy Relief Association, a three-roomed erection was put up to serve as treatment room and drug store, food store, and rest house, whilst at Kilimatinde a base store was built to house the reserves of corn and rice which are bought on the market, and from here supplies are taken down to the settlement as required, usually once a week on a Ford box body car; formerly all food had to be transported on the heads of caravan porters, and much work was involved making up and distributing loads sufficiently small for them.

The system of the distribution of the food which had always been a source of much dissatisfaction was overhauled and new methods were adopted which were calculated to give to every patient a sufficiency of wholesome food at regular intervals, and when the inmates realised this, a great improvement began to appear in the general tone of the place. All grievances, real or fancied, were thoroughly investigated, but to save time in listening to numbers of trifling complaints, a Committee of three was appointed, chosen by the patients, who would first listen to all " shauris " (matters) and what was beyond their power to remedy they referred to the superintending missionary on his visits. Besides the small though regular allowance of corn, which all were allowed to draw, patients continued to cultivate their own plantations, and were at liberty to sell it if they wished to do so. We bought a large quantity from them in this way at the prevailing market price and put it into the general store. This encouraged them to work hard on their plantations. Those known to possess big reserves in their houses were exhorted to refrain from drawing from the common store whilst their own corn lasted, although we never actually refused anybody his ration if he wanted it. We tried to inculcate a public spirit—not easy with Africans. Disabled patients as well as children were supplied with rice in addition to a modicum of corn to save the trouble of grinding—no light task for a woman minus a few fingers or without hands. During our building operations, many of the able-bodied men and youths worked on brick-making, stone collecting and other tasks and received the same pay as labourers who had been engaged from outside.

Whilst several tribes are represented our people are chiefly Wagogo and like to live in the usual Cigogo fashion, dwelling in low, flat-roofed mud houses built in rectangular shape and into the enclosed square they bring their herds and flocks at night. We intend to improve on these mud houses for, whilst being good enough for the average healthy

native, they are constantly in need of repair beyond the strength of a disabled patient, and it is hoped to erect houses of a more permanent character which, besides being on approved lines from the hygienic point of view, will prove to be more economical in the long run than the tumble-down tembes which are dreadfully leaky and utterly miserable hovels in wet weather. Two ladies of the Mission, one a nurse and the other a deaconess, have recently offered to take up their abode at the settlement and devote all their time to the work. If this offer can be accepted, I foresee the settlement becoming very popular, and the many sufferers who, I am convinced, are hiding away in obscure villages, will emerge and seek the help and treatment we so much want them to receive.

The following extract from the report of the Medical Officer, Dodoma, forwarded by the Director of Medical and Sanitary Services, will give some indication of the progress that was made in the first half-year of the new régime.

" Since taking over the Settlement, the C.M.S. has effected a very remarkable improvement. The inmates, without exception, appeared well-fed and well-cared for, while dressings had been regularly and carefully carried out in all cases in which they were called for.

" Mr. Banks and Miss Hobbs visit the Settlement every week. At these visits, a general inspection is carried out, and Miss Hobbs administers injections of moogrol to twenty of the inmates. Along with Dr. Buntine I had the opportunity of seeing all the inmates, and think that this is a very liberal treatment list and that no useful purpose would be served by extending it.

" An excellent and substantial three-roomed building is in course of erection on a central site overlooking the entire settlement, and is almost completed. It is intended to serve as dispensary, store-room and treatment-room. It has been suitably rat-proofed, and should meet these requirements admirably. Some of the old dilapidated buildings have been removed, and the living quarters of the inmates have been repaired. Further improvements are projected, and the spring which affords the water supply is to be protected.

" It was also gratifying to observe the heightened morale of the inmates. Some of the able-bodied males were taking part in the making of bricks and other work, and tilling of the land had been resumed. . . . "

CORRIGENDA.

We would draw the attention of our readers to the following errors which appeared in the last number of the REVIEW.

LEPROSY REVIEW, Vol. II, No. 3, p. 84, should read thus:—"Cutaneous—3 (C-3). Advanced cutaneous: Numerous or very marked leprotic lesions in various stages of development or retrogression, usually with lesions in the mucosa.

"In all cutaneous types, there may be varying degrees of neural involvement and such cases should be recorded to indicate the degree of this involvement; as, for example, C-2, N-1."

We have received a letter from the Medical Superintendent of the Coast Hospital, Sydney, New South Wales, which reads as follows:—

"In an article which is reported (abridged) in the LEPROSY REVIEW, Vol. II, No. 3, of July, 1931, there is the following statement:—'In New South Wales, where over £2,000 per head is spent annually on each segregated case.'

This is incorrect. The Official Report for 1929 shows the average number of patients as 19·6, and the total expenditure for the year as £3,984—an average of £202 11s. 7d. per inmate per annum."

REVIEWS AND NOTICES OF BOOKS.

It has been decided to add this section on Reviews and Notices of Books, so that workers may be reminded of, and kept in touch with, the more interesting and practical books and articles connected with leprosy and its allied subjects.

Leprosy. By Sir Leonard Rogers and E. Muir. Wright, Bristol. Simpkin, Marshall, Hamilton, Kent, London. Price 12s. 6d. (1925.)

Although this book was published in 1925, it still remains the only text-book on leprosy, and much of the information is of great value to leprosy workers. No one contemplating leprosy work should be without a copy of this volume. R.G.C.

The Principles of the Prophylaxis of Leprosy. First General Report of the Leprosy Commission of the League of Nations. Price 6d.

This comprises the findings of the League of Nations Leprosy Commission Conference held in Bangkok in December, 1930. This report, together with that of the Leonard Wood Memorial Conference held in Manila, covers the whole field of leprosy and brings present views up-to-date. There will be a disagreement in certain quarters with the primary thesis of this report—that the prophylaxis of leprosy depends on successful treatment. One cannot agree with the statement that without effective treatment compulsory segregation is the only available weapon. Epidemiological investigations all tend to show that the closed case of leprosy in many countries represents a large percentage of the total sufferers, and treatment or no treatment, there is little justification for compulsory segregation if they are no danger to the community. It is because of the primary assumption that prophylaxis depends on efficient treatment that a large section of the report deals with this question. As in Manila, so in Bangkok, an attempt is made to bring leprosy into the same category as tuberculosis. If this was done generally, a better understanding of the disease would soon be manifest, and leprosy would assume its rightful position in general disease prevention schemes. R.G.C.

Dawn. Price $1·00.

It is with pleasure that we bring to the notice of the readers of LEPROSY REVIEW, the new quarterly issued and published by the patients of the Sungei Buloh Leprosy Settlement, F.M.S., and we quote the covering letter sent out with the magazine. "The magazine is composed, printed and issued by the patients for circulation among themselves. The Settlement is an isolated community of about one thousand people, and they try, rather gallantly, to keep their courage, their optimism and their grip on a healthy, normal outlook against great odds. The magazine is sterilised at the Institute of Medical Research, before issue outside, and is perfectly safe to handle and read." "Dawn" is the first issue of the quarterly magazine of the Sungei Buloh Leprosy Settlement. The inside cover has a drawing of the sun rising and underneath are these words:—

"The cry goes up, 'How long?'
And soon the night of weeping,
Shall be the morn of song."

We trust those interested will help this praiseworthy effort by getting into touch with the Medical Superintendent, Sungei Buloh Leprosy Settlement, Selangor, Federated Malay States. R.G.C.

LEPROSY REVIEW. VOLUME II.

INDEX OF TITLES.

INDEX OF AUTHORS.