LEPROSY REVIEW

The Quarterly Publication of
THE BRITISH EMPIRE LEPROSY RELIEF ASSOCIATION.

VOL. XVI. No. 1. AUGUST, 1945.

Principal Contents:

167 VICTORIA STREET, LONDON, S.W.1

Price: One Shilling and Sixpence
Annual Subscription: Five Shillings

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NOTES ON CONTRIBUTORS.

Dr. T. F. DAVEY as Medical Officer in charge of the Leper Settlement at Uzuakoli, S.E. Nigeria.

EDITORIAL

The British Empire Leprosy Relief Association is commemorating this year its 21st Anniversary. To celebrate the occasion, a meeting was held on the 26th of April at the Mansion House under the chairmanship of the Lord Mayor, and addressed by Sir Alfred Beit in the unavoidable absence of the Secretary of State for the Colonies.

The Association, which is dependent for its income on public subscriptions, aims at raising a sum of £210,000 so as to make possible the expansion of its work in the post-war period. We give, in this number, a rough sketch of the lines on which we hope to expand.

Compared with other diseases and judging by the usual standards, leprosy is not a major disease except in a few countries. But when in place of morbidity and mortality the mental and physical suffering it causes is taken as the standard, leprosy cannot be passed over as a minor ailment.

One of the chief achievements of B.E.L.R.A. during the last 21 years has been to put leprosy on the medical map. It is now recognised that early cases of the neural type yield to treatment and, although the more serious lepromatous type is still refractory except in a few cases, there are hopeful signs, as we have shown below, that more effective drugs may soon be available.

But although our remedies are still of only limited efficacy, the fact that leprosy can yield to treatment at all has had a most stimulating effect, and during this period more intensive study has been made than ever before. This study has had two outstanding results. We now know far more about the extent and distribution of the disease and its mode of transmission, and its nature and types are much more clearly understood.

If and when more effective treatment is procured, the effect may again be to stimulate much greater interest on the part of the medical profession, which is the main prerequisite for control.

It has often been the rôle of private individuals or societies to pioneer, and for Government to accept responsibility once the way has been shown. In our last number we referred to the active part that the Nigerian Government is now taking in the anti-leprosy campaign. In this number more particulars of this scheme are detailed. This is an age of period planning, and it is hoped that other colonial governments also will formulate plans for leprosy control which can gradually be put into effect when the end of the war sets free the necessary personnel.

NEW DRUGS FOR TRIAL IN LEPROSY

Apart from Chaulmoogra Oil and its derivatives, we have no remedy which has been acknowledged generally as of value in the treatment of leprosy, and in progressive cases of the lepromatous type, chaulmoogra has little or no effect. It is, therefore, with much interest that we turn our attention to new drugs which give hope of improvement. The many points of similarity between tuberculosis and leprosy make it natural that any drug found of value in the one disease should receive a careful trial in the other.

Promin and diasone have the effect of suppressing tuberculosis in experimental animals, but their toxicity has limited their use in the human subject in tuberculosis. However, favourable results have been obtained at least up to a point in leprosy. It has been suggested that the failure to influence tuberculosis in the human subject as compared with experimental animals is the greater chronicity of the disease in the latter and the consequent tendency of necrosed tissues to shut off the infection from the circulation. Leprosy is even more chronic than tuberculosis, but on account of its lesser toxicity, necrosis is less common. It may be on that account that the effects in leprosy are more favourable.

Penicillin has been reported as not of value in tuberculosis, but we include below two reports from Dr. Wharton, of the Mahaica Leprosy Hospital, British Guiana, showing the valuable results obtained in 15 cases. Recent reports show that streptothricin and streptomycin, derivatived, like penicillin, from moulds, have bacteriostatic effect on the tubercle bacillus, both *in vitro* and in experimental animals. The results of these preparations in leprosy should be of great interest.

Lastly, a report comes from Madagascar of a glucoside derived from a plant common in many parts of the tropics. Its reported action in leprosy appears to be somewhat similar to that obtained with promin and diasone.

It will be noticed that in the four out of these five drugs which have already been used in leprosy the effects are most striking in advanced cases. No results are as yet available in early lepromatous cases such as would be expected if the action were directly on the lepra bacillus itself. However, such results might be slow to appear, as it is known that even dead acid-fast bacilli will linger for a considerable period in the tissues without losing their acid-fastness. Whatever favourable results have been obtained at least indicate lines along which investigations

should be developed and raise the hope that further advances in the treatment of leprosy may be expected soon.

The following are short reports on each of these drugs :

Promin

Faget and his colleagues[1] in the National Leprosarium, Carville, U.S.A., after using this drug for some two years, came to the following conclusions : ' Promin is the sulfonamide drug which thus far seems to possess to the greatest extent some chemotherapeutic properties against leprosy. While no direct evidence of a specific bacteriostatic or bacteriocidal action against M. leprae has been demonstrated, it has been observed that promin appears capable of inhibiting the progress of leprosy in a considerable percentage of cases. As yet no case of leprosy has become arrested under its influence. It is found that promin can be safely administered intravenously for prolonged periods provided the blood and urine are examined frequently. When these precautions are taken, toxic manifestations are relatively rare and mild. The most important of them, hemolysis, if recognised early, is usually controllable and not a cause for discontinuance of treatment. Further experimental and clinical studies on the treatment of leprosy with promin must be conducted before more definite conclusions can be drawn as to its therapeutic value. It is not claimed that promin is a specific for leprosy, but in the writer's estimation it is an advance in the right direction in the therapy of this disease. Promin can be considered to have opened a new avenue in the chemotherapy of the mycobacterial diseases. It is hoped that further synthesis of sulfa compounds may produce a substance which will succeed in saving countless lives in this still dark field of medicine.''

Diasone

Favourable results have been obtained in the treatment of certain forms of leprosy by the administration of a synthetic preparation called Diasone[2]. It is a white powder which may be given by the mouth or (as first used by the writer) may be dissolved in normal saline and, after filtration, injected intravenously. Two chief dangers have to be guarded against : a tendency to produce haemolysis and secondary anaemia, especially at the beginning of the treatment, and an inflammatory reaction in the lesions. To guard against these dangers, it is necessary to make frequent blood tests, preferably red cell counts, but if that is not possible, the haemoglobin index may be relied on. Also, before each administration, the patient should be carefully examined. During the first few weeks, especially in

weak cases, it is an advantage to keep the patient in hospital and have the temperature taken and the urine examined for albumen.

If no intolerance is shown, diasone should be given on alternate days three times a week. The initial dose was generally 0.6 g., rising to 2.6 g. when given intravenously ; 1 g. was dissolved in 3 cc. of sterile normal saline and the solution was filtered through three layers of sterile paupe. In patients with Hb. index of less than 7.1, the maximum dose was 1.3 g. and ferrous sulphate 4 grains twice a day. Injections of liver extract were given to patients who showed progressive anaemia, and diasone was either stopped temporarily or the dose reduced

The most marked results are in advanced lepromatous cases, with ulcerating lesions of the skin and nose and advancing inflammatory condition of the eyes. In many cases these lesions heal up rapidly, the temperature becomes normal and the general condition of the patient improves. In less advanced cases nodules become flattened or liquify, burst, and dry up rapidly. There is a general feeling of well-being, and patients who have been bed-ridden are, in many cases, able to become active and engage in work. No cases have so far become bacteriologically negative. This drug is still in the experimental stage and is not yet available for general use.

Streptomycin

The *British Medical Journal* reports the use of this new antibiotic in tuberculosis[3]. " Recently, two promising compounds, streptothricin and streptomycin, have been isolated by Waksman and others from certain species of soil actinomycetes. They resemble each other in many respects, but streptomycin is likely to prove the more valuable of the two. It is derived from Actinomyces griseus, grown under certain conditions. The chief promise of these compounds lies in their action on the Gram-negative bacilli, many of which are resistant to both sulphonamides and penicillin. The most interesting of all applications of streptomycin, however, is its possible use against tuberculosis ; . . . it inhibits the growth of tubercli bacilli *in vitro*. Recently, Feldman and Hinshaw have described a trial on tuberculosis in guinea-pigs similar to their previous trials with promin. Guinea-pigs were inoculated with virulent bacilli and treated with doses of up to 6,000 units daily for sixty days. At the end of this time there was widespread tuberculosis in untreated control animals, while in the treated animals it was hardly detectable microscopically ; viable bacilli, however, were usually still present. These results are interpreted as showing that the anti-

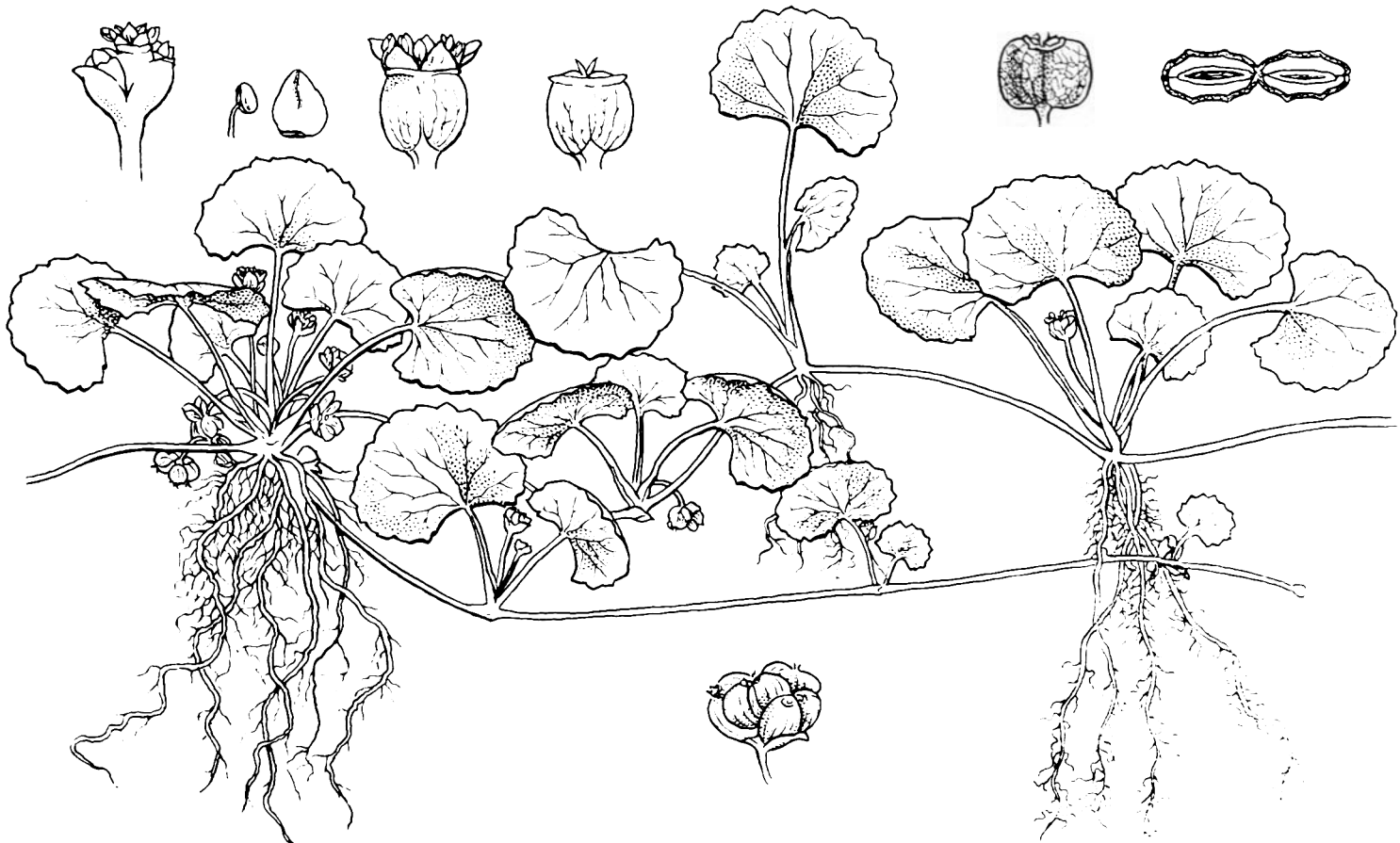
tuberculous activity of streptomycin is comparable with that of promin and similar compounds. . . . When streptomycin and streptothricin become more widely available in large enough quantities their clinical applications will deserve careful study."

Asiaticoside

The Lancet[4] reports the use of this drug in the treatment of leprosy. "A new method of treating leprosy is reported from Madagascar, according to the French Mission of Information. Dr. Grimes and Dr. Pierre Boiteau, who are responsible for the study, have been using a glucoside extracted from Hydrocotyle asiatica, an umbelliferous plant growing on the island. As far back as 1937 they had been experimenting with this plant, but at that time the chemical composition of extracts was not fully known, and therapeutic dosage was too close to toxic dosage for safety, though results were encouraging. In 1938, Boutemps, working at the leprosy laboratory at Antananarivo, isolated from the plant a new glucoside, which he named "asiaticoside"; this proved to be active and much less toxic than previous preparations. It is insoluble in water, and barely soluble in alcohol, but dissolves well in pyridine. Its chemical nature is being further studied by Devanne and Razafimahery. Boiteau has succeeded in making a solution which can be given by injection, and results so far are said to be remarkable. Ocular lesions are cured at once if treated before the posterior chamber is affected. Diffuse infiltrations disappear, lepromas break down and fill with fluid, burst, and afterwards scar up. Acute digital lesions and perforating ulcers heal completely. Anaesthesia and nervous lesions take a long time to improve, and recovery is equally slow in the muscles, but nevertheless, many patients treated in Madagascar have already reached the stage of active reablement Boiteau and Grimes consider that the glucoside probably acts by dissolving the waxy capsule of the lepra bacillus, thus exposing it to attack by the defensive agents of the body and by other drugs." The Director of the Royal Botanic Gardens, Kew, has kindly supplied further information about the plant referred to, and the illustration, a copy of which is attached. He writes: "*Hydrocotyle asiatica L.* now known as Centella asiatica (L) Urban, is very widely and generally distributed throughout the Tropics and sub-tropics of both hemispheres. It is a variable species, and is believed to consist of a number of varieties, and these may possibly vary in their glucoside-content."

Penicillin

Copies of two Reports on trials of Penicillin in leprosy addressed to the Secretary, The Board of Penicillin Control,



Centella asiatica (L) Urban (Hydrocotyle asiatica L).

Medical Department, have been received from Dr. L. H. Wharton, Medical Superintendent, Mahaica Leprosy Hospital, British Guiana, dated respectively April 30th and June 4th, 1945.

First Report.—Six cases of leprosy who have received a short course of Penicillin treatment. The sodium salt of Penicillin was used; each patient received 100,000 units, divided into 5,000 unit doses, by intramuscular injection every three hours. The cases selected were advanced Lepromatous (L-3) cases, who were gradually getting worse, and who had developed many complications of leprosy, viz., chronic ulcers, ophthalmic complications and repeated attacks of lepra fever.

Only one patient complained of any ill effects from Penicillin. This patient, after receiving 50,000 units, complained of vertigo, headache, nausea, and his pulse became irregular. Stimulants were given and he recovered, and asked to be allowed to finish the course of treatment. He received a further 50,000 units without any ill effects. None of the patients complained of pain at the site of injection. The patients were all co-operative, and a marked improvement in their morale was seen after 24 hours' treatment. I give below a detailed report on each case :

Case 1. A.B. Female 28. Mixed race. Advanced L-3 leprosy, with extensive chronic ulcers of both legs. Angry red Lepromatous infiltration of the face and forearms, skin section showing streptococci and staphylococci. Blood sedimentation index, 42.5. Leprosy smears before treatment ; skin and nose M/1 (M denoting more than 10 lepra bacilli in each field examined).

After Penicillin: The red lepromatous patches on the face and forearms had subsided completely, and there was marked reduction in the raised infiltrations. The chronic ulcers had lost their slough and showed healthy granulations. The leprosy smears showed no change from skin and nose, but the blood sedimentation was reduced to 11.5.

Case 2. L.H. Female 28. Negro. Advanced L-3 case. Numerous nodules on face and forearms and legs, and chronic ulcers of both legs. Lepromatous infiltration of both eyes, badly impaired vision. Blood sedimentation test 69.5. Skin and nose M/1.

After Penicillin: The nodules on face, forearms, and legs were greatly reduced. The oedema of the face disappearing completely. The ulcers of the legs were much improved, had lost the slough, and showed healthy granulations. The vision had greatly improved, and the patient stated she could now distinguish persons at a far distance, which she could not do before. Blood sedimentation test was reduced to 40, but leprosy smear tests remained the same.

Case 3. W.H. Male 39. Negro. Advanced L-3 case. Ulcerating nodules of face, both hands, chronic ulcers both legs. Repeated attacks of lepra fever. Blood sedimentation 37.5. Skin and nose M/1.

After Penicillin: Marked improvement in all ulcers, all redness and oedema of face subsiding. Blood sedimentation 20. Leprosy smears remained the same.

Case 4. J.C. Male 19. Chinese. L-3 case. Numerous nodules on face, forearms, and legs ; in an attack of lepra fever temperature 101. Chronic ulcers both legs. Blood sedimentation 35. Skin and nose M/1.

After Penicillin: The temperature became normal after 24 hours'

treatment. There was marked improvement in the nodules, redness subsided. The chronic ulcers of legs had taken on a healthy appearance. Blood sedimentation reduced to 26. Leprosy smears remained the same

Case 5. B.B. Male 15. Mixed race. Advanced L-3. Extensive nodules of face, forearms, legs. Much oedema of face. Frequent attacks of lepra fever. Lepromatous infiltration of both eyes, with marked conjunctivitis in one eye. Vision greatly impaired. Blood sedimentation 57. Skin and nose M/1.

After Penicillin: The oedema of the face subsided and there was marked reduction of nodules. The conjunctivitis had cleared up completely and the patient stated that the vision has greatly improved. The ulcers of the legs had taken on a healthy appearance. Blood sedimentation reduced to 35.5. Leprosy smears remained the same.

Case 6. J.S. Male 30. Negro. Advanced L-3. Ulcerating nodules of nose, face, forearms, hands, and legs. Loss of vision in one eye from lepromatous infiltration, and the other eye showing signs of infiltration, impaired vision, and conjunctivitis. Frequent attacks of lepra reaction. Blood sedimentation 43.5. Skin and nose M/1.

After Penicillin: There was marked improvement in all nodules and ulcers, and great improvement in the eye. Conjunctivitis had subsided completely and the patient stated the vision was much better. Ulcers had taken on a healthy appearance. Blood sedimentation reduced to 26.5. Leprosy smears remained the same.

Conclusion

(1) 100,000 units of Penicillin given to six patients over a period of 60 hours has shown marked improvement in the complications of leprosy.

(2) The above dose is not bacteriostatic or bacteriocidal to the leprosy bacillus.

(3) The blood sedimentation test showed marked improvement in all patients.

(4) I consider that this experiment shows promising results, but I think that Penicillin should be given in larger doses over a period of five days.

Second Report.—Nine patients suffering from advanced lepromatus leprosy—L-3 cases—were treated with sodium salt of Penicillin. Three patients received 400,000 units each, given in 10,000 unit intramuscular injections every three hrs. Six patients received 200,000 units each, given in 5,000 units intramuscularly every three hours.

It was noticed that all the patients experienced a marked increase in appetite and complained of a feeling of drowsiness while under treatment.

None of the patients showed a rise in temperature, nor did anyone complain of undue pain at the site of injection.

The patients were most co-operative and took a keen interest in the treatment.

I now give details of each case.

Patients who had received 400,000 *units*

Case 1. C.H. Male, 28 years. Mixed race. L-3 leprosy. *Before*

Penicillin: This patient was covered with large nodules and extensive deep ulcers of both legs. He had repeated attacks of lepra reaction and was gradually getting worse. The nodules on the nose, face, and hands were ulcerating. Blood sedimentation was 48. Leprosy smears: Nose and skin were positive, bacilli being recorded as M/1 (M denoting more than 10 bacilli in each field).

After Penicillin: The ulcerating nodules of the nose, face, and hands had healed completely. The oedema of the legs had decreased, and the large, deep sloughing ulcers of both legs were clean, healthy, and granulating up from the craters. The patient felt very much better physically and there was marked improvement in his mental outlook. Blood sedimentation was 22.5. Leprosy smears: Nose and skin remained M/1. were M/1.

Case 2. J.J. Female; 25 years. East Indian. Suffering from advanced lepromatous leprosy—L-3. Recent repeated attacks of lepra reaction. Extensive nodules of face and nose, arms, forearms, and legs. Nodules on face, nose, and legs breaking down and ulcerating. Oedema of face and legs. Gradually getting worse. Depressed mentally. Blood sedimentation was 60. Leprosy smears: Nose and skin were M/1.

After Penicillin: Marked reduction in oedema of face and leg. Ulcerating nodules of nose, face, and legs completely healed. Marked improvement in physical and mental condition. Blood sedimentation was 31.5. Leprosy smears: Nose and skin remained M/1.

Case 3. L.P. Female, 18 years. Negro. *Before Penicillin*: Advanced L-3 leprosy, extensive nodules of face, arms, forearms, and legs. Small chronic ulcers of both legs. Oedema of face and legs. Early lepromatous infiltration of both eyes. Gradually getting worse. Blood sedimentation was 52.5. Leprosy smears: Nose and skin were M/1.

After Penicillin: Marked reduction of oedema of face and legs, with complete healing of chronic ulcers of legs. Marked improvement in general physical condition. Blood sedimentation was 21. Leprosy smears: Nose and skin remained M/1.

Patients receiving 200,000 *units*

Case 4. H.C. Male, 32 years. Mixed race. *Before Penicillin*: Advanced L-3 leprosy. Extensive small nodules of face, nose, arms, forearms, hands, and legs. Chronic ulcers both legs. Oedema of face and legs. Lepromatous infiltration of both eyes, impaired vision, frequent attacks of pain in both eyes. Patient very depressed mentally, getting worse physically. Blood sedimentation was 56.5. Leprosy smears: Nose and skin were M/1.

After Penicillin: Marked improvement in oedema of face and legs and healing of ulcers of legs. Pain in eyes considerably diminished and improvement of vision in one eye. Marked improvement in mental and physical condition. Blood sedimentation was 20. Leprosy smears: ose and skin remained M/1.

Case 5. S. Male, 24 years. East Indian. *Before Penicillin*: Advanced L-3 leprosy. Large nodules of face, arms, forearms, hands, and legs. Ulceration of nodules on face and hands, and chronic ulcers of both legs. Oedema of face and legs. Repeated attacks of lepra reaction. Gradually getting worse. Blood sedimentation was 44. Leprosy smears: Nose and skin were M/1.

After Penicillin: Marked improvement in oedema of face and legs. Marked healing of ulcerating nodules and ulcers of legs. General physical condition much improved. Reduction of size of nodules of the face. Blood sedimentation was 23. Lepra smears: Nose and skin remained the same.

Case 6. R.C. Male, 24 years. Negro. *Before Penicillin*: Advanced L-3 leprosy. Extensive nodules of face nose. arms, forearms, hands, and leprosy. Extensive nodules of face, nose, arms, forearms, hands, and legs. Nodules ulcerating on face and nose. Chronic ulcers of legs.

Lepromatous infiltration of eyes with impaired vision. Gradually getting worse. Blood sedimentation was 25.5. Lepra smears : Nose and skin were M/1.

After Penicillin: Healing of ulcerating nodules on face, nose, and hands. Ulcers of legs healthy and greatly improved. Vision improved. Marked improvement in general physical condition. Blood sedimentation was 10. Lepra smears : Nose and skin M/1.

Case 7. B. Female, 27 years. Portuguese. *Before Penicillin*: Advanced L-3 leprosy. Repeated attacks of lepra reaction. Extensive nodules on face, forearms, hands, and legs. Red angry patches of infiltration of skin of face and forearms. Chronic ulcers of legs with oedema. Gradually getting worse. Blood sedimentation was 51.5. Lepra smears : Nose and skin were M/1.

After Penicillin: Marked improvement in acute reaction of face and forearms, reduction of oedema of face and legs. Chronic ulcers of legs showed marked improvement. General physical condition greatly improved. Blood sedimentation was 24.5. Lepra smears remained M/1.

Case 8. M.A. Female, 33 years. Negro. *Before Penicillin*: Advanced L-3 leprosy. Extensive large nodules of face, forearms, and legs. Nodules undergoing reaction. Oedema of face and legs. Ulcerating nodules of legs. Blood sedimentation was 21.5. Lepra smears : Nose and skin were M/1.

After Penicillin: Marked reduction of oedema of face and legs, with healing of ulcers of legs. Acute reaction subsided completely. Marked improvement in general physical condition. Blood sedimentation was 9.5. Lepra smears : Nose and skin remained M/1.

Case 9. W. Male, 21 years. Negro. *Before Penicillin*: Advanced L-3 leprosy. Extensive large nodules of face, forearms, hands, and legs. Had lost left eye from nodule. Right eye had small nodule on cornea ; greatly impaired vision. Chronic ulcers of leg. Gradually getting worse, very depressed mentally. Blood sedimentation was 51.5. Lepra smears : Nose and skin were M/1.

After Penicillin: Marked improvement in the general physical and mental condition. Healing of ulcers of legs. Slight improvement of vision in right eye. Blood sedimentation was 29.5. Lepra smears : Nose and skin remained the same.

Conclusion

(1) Penicillin given in total doses of 400,000 units is not bacteriocidal or bacteriostatic to bacillus lepra.

(2) It is of definite value in the complications of leprosy, especially in ulcerating nodules, lepra reaction, chronic ulcers, and inflammatory eye conditions.

(3) The marked improvement in physical and mental condition of the patient in L-3 leprosy would justify its use.

[1] *Int. Jl. of Lep.*, Vol. 11, p. 52.
[2] *Int. Jl. of Lep.*, Vol 12.
[3] *Brit. Med. Jl.*, May 19, 1945, p. 706.
[4] *Lancet*, March 17, 1945.

OBITUARY

Sir Frank Carter, one of the three founders of the British Empire Leprosy Relief Association and the Treasurer of the Association for 20 years, died on January 31st, 1945, at the age of 81. He began his career in South Africa. As a business man in Calcutta he took part in many forms of public service. He always sympathised with those in trouble, and those afflicted with leprosy in Calcutta spoke with gratitude of his generous help. When he retired from India he made the relief of leprosy his chief concern, and it was largely due to his generosity and support that B.E.L.R.A. was begun and developed during the first twenty years.

Sir William Peel, the late Chairman of B.E.L.R.A., died on the 24th of February, 1945. As Colonial Secretary in Malaya, he took a personal interest in the leprosy problem, and it was largely due to his efforts that the large and well-equipped leper settlement at Sungei Buloh, near Kuala Lumpur, was founded. As Governor of Hong Kong, he maintained his sympathetic interest in those afflicted with this disease. On his retirement from the Colonial Service he became Chairman of the Association and, in spite of indifferent health, gave to its interests much time and labour. His knowledge of colonial conditions and administration and of the leprosy problem in the colonies was of the highest value. He had the satisfaction before he retired of knowing that the magnitude of the leprosy problem had been realised and the responsibility of Government for it admitted in the highest quarters, and that through the Nigerian Leprosy Control Scheme a start had been made in dealing with it in one of the colonies where leprosy most prevails.

Sir Humphry Rolleston, who died last November, was for many years the distinguished Chairman of the Medical Committee of B.E.L.R.A. and a member of the Executive Committee. His wise guidance and sympathetic interest were of inestimable value in shaping and carrying out the administration of the Association.

FUTURE PROGRAMME OF B.E.L.R.A.
A Progressive Plan for the Control of Leprosy in the British Colonies

By E. MUIR

There are definite reasons why the British Empire Leprosy Relief Association should think out carefully and formulate, at the present time, a plan extending over a period for the control of leprosy in the colonies. During the world war all ordinary peace-time medical and social progress has been in abeyance. With peace in prospect there will soon be an opportunity for a fresh start.

The Colonial Development and Welfare Scheme is offering assistance with the relief of leprosy in proportion to its importance as a medical and social problem. Private bodies, such as B.E.L.R.A., the Leonard Wood Memorial in America, and the Mission to Lepers, are at present raising funds which should make it possible to expand anti-leprosy activities when the time comes. Not at present, but in the immediate future, doctors, nurses and social workers are likely to become available for this kind of work.

Even during the war years advance has been made in our knowledge, especially in the finding of new drugs which, in the opinion of those who have tested them, make possible a definite step forward in treatment. Intensified investigations are all the more called for, especially along the lines of improving treatment, field investigation, and methods of prophylaxis.

With these possibilities in view, it is well to be prepared beforehand, so that time and energy may not be wasted for lack of forethought and co-ordination.

The Nigerian Government has promulgated a five-year plan beginning in April, 1945, based in general upon the recommendations of the Medical Secretary of B.E.L.R.A., made in 1936. The plan is as follows :

1. A Senior Leprosy Officer will be appointed who will supervise and inspect leprosy work, organise investigation and surveys and research, train staff, and prepare future plans.

2. Leprosy organisation will continue on a provincial basis in those provinces where this method has already been developed, and this method will gradually be extended to other provinces.

3. There will be a leprosy service consisting of (a) a permanent cadre of experienced Medical Officers, Nursing Sisters and Leprosy Control Officers appointed on the usual terms of the Colonial Service ; (b) a permanent cadre of nurses, dispensers, clerks, inspectors, and subordinate personnel on approved Native Administration rates ; (c) a temporary cadre of leper patient staff.

4. The provincial work will have the following institutions :

(a) one or more leper settlements; (b) clinics for treatment of non-infectious cases and for educating the villagers; (c) clan segregation villages on the lines at present in force in the Owerri Province; (d) homes for incurable cases, for new-born uninfected children of leprous patients, and for children of patients who have no healthy relatives. While Government will undertake the financial responsibility for the above, taking over the existing doctors and Toc H lay-workers, the policy is that the missions, or other authority formerly in charge, should continue to be responsible for social, educational welfare, and religious activities.

5. Government will take over responsibility for the service in Onitsha, Owerri, and Benin Provinces and consolidate it on a permanent basis.

6. The plan will include the Western Provinces after preliminary surveys and investigations have been made, and gradually the work in this area will be consolidated.

7. The five-year plan is as follows:

1944/45

(a) Appointment of Senior Leprosy Control Officer and creation of Central Leprosy Control Unit. Initial general organisation in selected provinces and investigation in Western Provinces.

(b) Taking over and expansion of existing institutions, settlements, and clinics, with existing trained staff, in the following provinces: Benin-Warri, Onitsha, Owerri.

(c) Commencement of construction of new settlements in South Owerri and in Warri.

(d) Engagement and training of technical staff for new settlements.

1945/46

(a) Consolidation of organisation.

(b) Commencement of construction of a new Control Settlement in Western Provinces.

(c) Engagement and training of staff for Western Provinces.

1946/47

(a) Active prosecution of prevention and treatment in selected provinces.

(b) Consolidation of new organisation in Western Provinces.

1947/48

(a) Active prosecution of measures in all selected provinces.

(b) Assessment of results in these areas; special re-surveys of sample areas.

(c) Survey of new areas to be brought within the scheme.

1948/49

(a) Preparation for plans for extension of work in new areas.

(b) Revision of plans and estimates for maintenance of work in the original selected provinces at the end of five year period, based on assessment of results obtained.

The five-year plan will provide a leprosy treatment and preventive service for a population of 6,000,000 in densely populated areas of the country, in some of which intensive survey has shown that the incidence of the disease averages 50 per mille of the population (Owerri Province). There are, at present, only some 17,500 of the total leper population receiving treatment, many without that consistency and regularity which is necessary to give hope of arresting the disease. The problem is one of very great magnitude, and steps must be taken to diminish the spread of the disease. The five-year plan, as submitted, was estimated to cost, on an average, £47,000 per annum over the five year period, or 1.88 pence per caput of the population, with a total capital expenditure of £49,000, or 1.96 pence per caput.

The Secretary of State for the Colonies has approved a grant of £258,000 from the Colonial Development and Welfare vote to cover the capital and recurrent costs of the scheme over a period

of five years. From April, 1945, onward, B.E.L.R.A. will hand over to the Nigerian Government the financial responsibility of two doctors, two nurses, and five lay-workers, thus saving a total amount of £3,500 a year. This, along with increased income from subscriptions and donations expected this year, should make it possible for B.E.L.R.A. to engage fresh personnel and undertake new work whenever demobilisation after the war makes that possible.

Before surveying the most urgent work waiting to be done in the control of leprosy in the Colonies, it may be well to define the functions of B.E.L.R.A. alongside of those of Government, and also of other voluntary societies.

1. Leprosy work does not appeal, or has not in the past appealed, to more than a small fraction of those recruited for the Colonial Medical Service. Because of the nature of leprosy and the peculiarly altruistic type of service required, the recruitment of personnel can be more satisfactorily undertaken by a voluntary body like B.E.L.R.A., with the help of Toc H and Missionary Societies.

2. The training of personnel is another very important item which, because of its specialisation and long experience of this disease, and its intercolonial and international contacts, B.E.L.R.A. can more satisfactorily undertake than Government.

3. For similar reasons, B.E.L.R.A. has, in the past, taken a leading share in carrying out and co-ordinating research, in advising and initiating new methods of dealing with leprosy, and in stimulating interest and development along improved lines. There will be ample room for such activities in the future.

The International Leprosy Congress in 1938 adopted unanimously the following resolution :

" The maintenance of leprosaria should not be continued indefinitely by voluntary agencies, but should increasingly become an obligation of governments, and in new projects, governments should themselves undertake financial responsibility, though their management can often best be undertaken by voluntary organisations. There is also considerable scope for such organisations to work out the most suitable types of institutions for the particular countries concerned, and the best methods for their administration. The development of preventoria for children of leprous parents who are open cases may be mentioned in this connection ; these should be generously supported by the Government. There will probably always be a need for social work among patients, both in and out of institutions, for which the Government will have difficulty in making provision."

The policy of B.E.L.R.A., both in India and in the Colonies, has been to initiate anti-leprosy work and demonstrate results in the hope that the government concerned, after approving these results, would make itself responsible for consolidating what had been done and carrying it on permanently. This has, to a large

extent, been found a successful method, first in India and now in Nigeria. It is suggested that a similar method be followed in future in other regions where an adequate anti-leprosy policy has not yet come into force.

To sum up, B.E.L.R.A. will, in conjunction with Toc H and with the help of missionary societies, recruit personnel—doctors, nurses and lay-workers, whenever they are required and suitable candidates are available. It will arrange for their thorough training, both in England (when deemed advisable) and in suitable centres abroad, providing, where necessary, scholarships, accommodation and equipment for this purpose. During the period of training they will be expected to give any help of which they are capable in the places where they are located. After training, they will either be sent to suitable centres to work under B.E.L.R.A. or in Mission institutions, or be seconded, or handed over to Colonial Governments to be drafted into a Colonial Leprosy Service. With the help of such personnel, B.E.L.R.A. will, as far as possible in co-operation with Missions, develop fresh work in regions which require such development, devising methods suited to the local needs, in the hope that the local governments will later, where necessary and advisable, take their share in consolidating and carrying on approved units on a permanent basis.

The following is a rough survey of the more important requirements as regards leprosy in British Colonies and Territories. The countries considered are, as far as is known, in order of importance and likelihood of a programme being carried out : Nigeria, Southern Sudan, East Africa, Gold Coast, Sierra Leone, Gambia, British Somaliland, Nyasaland and Northern Rhodesia, South African Protectorates, Southern Rhodesia, West Indies, Cyprus, Malta. Other colonies such as those of Malaya and the South West Pacific should also be kept in mind.

1. **Nigeria** has far more leprosy than all the other British African territories put together and, even deducting the regions already planned for, will require more personnel and more effort than any other. Along with India it will also form the most important training ground for new personnel. In the Northern Provinces, apart from Zaria, anti-leprosy work is chiefly in the hands of American Missions. A doctor, a nurse, and one or two lay-workers, subject to the programme of the C.M.S., could be usefully employed in the Zaria centre. For the rest of the Northern Provinces, I suggest that, in the meantime, the responsibility should remain with the three or four missions at present in charge of settlements, and that it might be appropriate

that the American Mission to Lepers should give whatever extra financial help is needed. Their personnel might be trained at the leprosaria in Eastern Nigeria, and B.E.L.R.A. might give considerable help to Northern Nigeria by arranging for such training.

In the Western Provinces, the Nigerian Government's five-year plan undertakes surveys and the establishment of provincial anti-leprosy units. In the course of the next five years it may be expected that at least three doctors, three nurses, and six lay-workers will be required.

In the Eastern Provinces during the same period, having respect to the development of present work and the initiation of a unit in the Ogoja Province, four doctors, four nurses, and perhaps six to eight lay workers may be needed during the same period. With the present workers, this would mean seven doctors, five nurses, and up to sixteen lay-workers.

If B.E.L.R.A. is to undertake the responsibility of training them, money must be set aside for increased accommodation for those being trained, and also for scholarships for those under training.

2. **Southern Sudan.** The equatorial Province of the Anglo-Egyptian Sudan shows a high incidence of leprosy. The large Government Leper Settlement at Li Rangu requires at least one lay worker and a whole-time doctor. To the east of the Nile, the Church Missionary Society has done a certain amount of work, assisted by one of our lay-workers. There should, however, be at least a whole-time doctor, a nurse, and two lay-workers in that region. This would make a survey and the establishment of clinics possible. Further developments would depend upon the results of the survey. Work should be done in collaboration with the C.M.S.

3. **East Africa.** Included under this heading are Uganda Kenya, Tanganyika Territory and Zanzibar. Much work is being done by various Missions in these territories, chiefly in the form of Leper Settlements or Homes. In not one of them, with one recent exception, is there a whole-time doctor and, due to the pressure of other work, the medical supervision is very inadequate. Except for the work at Kumi and Ongino, and the U.M.C.A. in S. Tanganyika, little has been attempted in the line of surveys or control. In many of the larger institutions non-lepers are allowed to live alongside of the patients, and it is questionable if, under these circumstances, the effect of the institution is more infective or preventive.

As recommended by the Medical Secretary of B.E.L.R.A. in

1938, a leprosy expert should be appointed for East Africa, and until this is done there is not likely to be much real progress. There is not much prospect of such an appointment until after two years on account of the shortage of doctors due to the war. B.E.L.R.A. has so far supplied two lay workers to Tanganyika, one in the north and the other in the south. These should be continued if desired by the Government. The policy of the Tanganyika Government, according to a memorandum drawn up in 1938, is to continue to support the existing institutions, but to concentrate on one large industrial and agricultural settlement which would, as far as possible, be run on self-supporting lines. Once this has proved a success, others could be added later. In a poor land of low average fertility, huge extent and population, the problem is a particularly difficult one.

In Tanganyika, in addition to two more lay-workers, B.E.L.R.A. might supply to the Missions concerned the salaries of two or three nurses, to be appointed by the Missions and approved by B.E.L.R.A. In Uganda and Kenya, two nurses and two lay workers might be supplied.

In all three countries during the next two years, until an expert doctor is appointed, non-recurring grants might be made for approved purposes, and applications for the support of nurses might be considered.

4. **The Gold Coast.** Before any definite plan can be formulated an extensive survey must be undertaken. In 1936, I suggested that sample surveys would take at least two years if carried out by an expert doctor, assisted by two lay-workers. I consider that this is the minimum survey which would be of permanent value, and even this would be wasted unless arrangements could be made for permanent units. The form and location of these units should not be determined until the survey has been undertaken.

5. **Sierra Leone.** I suggest that a similar survey be made as for the Gold Coast. It would probably take about the same time, using similar personnel.

6. **Gambia** is a much smaller colony. I understand that the Bishop has in prospect personnel either ready or in course of training in England. B.E.L.R.A. might arrange for the training of a doctor and possibly lay-workers and, after working out an approved scheme with the Bishop and the local authorities, make suitable grants to promote the work.

7. **British Somaliland.** At the request of the Colonial Office I visited this country in 1938. In conjunction with the Senior Medical Officer and the District Officer, I approved a site

for an agricultural leper settlement in the high, healthy plateau bordering on Abyssinia. Before any action could be taken the war came and British Somaliland was overrun. A carefully-chosen and well-trained lay-worker could undertake the founding and running of such a settlement, and at the same time conduct surveys. The success of such a scheme would partly depend on collateral work by the Abyssinian authorities, as the neighbouring Harrar Province of Abyssinia shows a high incidence of leprosy and there is much coming and going between the two countries.

8. **Nyasaland.** Here there are nine small institutions which had, in 1939, a total population of between 400 and 500 patients. They are in charge of various missions, aided by an annual grant of £900. There should be two institutions, one for the north and one for the south, so that more concentrated work could be done. To begin with, one whole-time trained doctor should be appointed who could make surveys, improve the existing institutions, and concentrate upon one larger colony. He should have as his assistant a trained lay-worker.

9. **Northern Rhodesia.** In 1939, the number of lepers was calculated at 6,748 in the five provinces, of which more than two-thirds were in the Western Barotze Province. There are seven small institutions with between 400 and 500 patients. To begin with, one large institution should be formed, under the charge of a well-trained lay-worker, as suggested in my report. If a whole-time doctor were appointed for Nyasaland, he might later spend part of his time in Northern Rhodesia, advising the various missions on the running of their settlements.

10. **South African Crown Protectorates.** In Basutoland, the control of leprosy is well in hand. Recently, B.E.L.R.A. has supplied a well-trained lay-worker for Swaziland. We should be prepared to give further help when required in training or supplying trained personnel. Leprosy is considered a minor disease of no great importance in Bechuanaland.

11. **Southern Rhodesia.** I understand that the Government of this Crown Colony does not require outside help with leprosy at present.

12. **West Indies and British Guiana.** I understand from the Medical Adviser to the Comptroller of Development and Welfare that three suitable doctors for leprosy work could be absorbed under their fund. The British Guiana Government have asked for a lay-worker for welfare work in the Mahaica leprosarium.

13. **Cyprus.** At the time of my visit in 1939, the Cyprus Government would have welcomed an expert doctor who could carry out a survey of leprosy and, at the same time, of other

diseases. Possibly B.E.L.R.A. could pay part expenses of such a scheme. A lay-worker for the leper camp would also be useful.

The above scheme is very rough and sketchy and is put forward in the hope of receiving criticism and suggestions from the governments, missions, and others concerned. However little can be done in the near future, it should at least be possible to formulate a leprosy policy in each colony, with rough estimates, so that as personnel and funds become available, progress may be made.

LEPROSY CONTROL IN OWERRI PROVINCE OF NIGERIA*

By T. F. Davey, M.Sc., M.D., Ch.B.

Leprosy is a key disease. Its prevalence depends, not only on infection with Mycobacterium Leprae, but also on social conditions, housing, sanitation, education, and even on religious beliefs. In its elimination, specific treatment is a subsidiary measure, the main emphasis being laid on safeguarding the healthy from the disease. This is to be achieved by the isolation of infectious cases, combined with improved hygiene and sanitation, the treatment of endemic diseases, the raising of the standard of living, and the creation of an enlightened outlook where leprosy is concerned. Among these measures, the first and the last are our immediate concern, but the realisation of any of them depends ultimately on the people themselves. It is through their own efforts that leprosy will be overcome, not by any arbitrary measures. Where there is little desire for improvement, leprosy remains. The function of the leprosy worker is, firstly, to offer the best treatment to patients, and so care for them that their confidence is won and isolation rendered acceptable, and secondly, to enlist the active co-operation of healthy people in preventive work and apply this to the fullest extent.

In Owerri Province the leprosy problem is seen in an acute form. A susceptible population, living, for the most part, at poverty level in densely crowded villages, provides an admirable soil for the growth of the disease. The opening-up of the

* This is an abstract of a report by Dr. Davey on the sixth year of Leprosy Control work. Previous reports appeared in *Leprosy Review*, Vol. XI, 3, p. 123 ; Vol. XIII, 2, p. 31 ; Vol. XIV, p. 54. For maps illustrating this report, see the first two of these.

country and the decline of old institutions is exaggerating the problem at the present time. Out of a population of just over two millions, it is estimated that not far short of 75,000 people are suffering from leprosy to-day, and the Province is thus one of the most heavily infected areas in the world.

Leprosy control has been operating for six years. Begun experimentally in a few areas where the people appreciated its importance, it has gradually spread, and in spite of the fact that two of the six divisions in the Province are quite untouched, a total of 18,554 patients have so far come within its scope.

The ideal method of leprosy control is undoubtedly the isolation of patients in settlements where modern treatment can be combined with happy conditions of life. The immense numbers of patients involved in Owerri present such problems of finance, land, and staffing as to put this method of control totally outside the realm of practical politics, for in order to produce a progressive reduction in the incidence of leprosy, an expenditure of at least £1,000,000 per annum would be needed. It is enough to note that this figure exceeds the total income from taxation in the Province, and that leprosy is but one of several social and medical problems urgently needing attention.

With the abandonment of the settlement method of leprosy control, an alternative scheme has been applied. It calls for the following :

An efficient base of operations ; the localisation of the leprosy problem in each clan area, by planning leprosy control on a CLAN BASIS ; the isolation of infectious cases within the territory of the clan, wherever possible in model villages ; free treatment for leprosy being made available to all patients in the clan, at sites given by the clan ; preventive work and propaganda undertaken by Leprosy Inspectors operating in the area of the clan ; leprosy surveys, repeated every two or three years, to discover and deal with hidden and new cases, to examine contacts, and to maintain leprosy control when it is established ; cases not suitable for local treatment to be dealt with directly at the base ; the degree of control achieved to be judged by the proportion of infectious cases who are isolated. This programme demands the close co-operation of the people at every stage. At first, only one or two clans were prepared to accept it in its entirety. Work actually started where the people had themselves made some effort to isolate their lepers locally, and gradually increased as clans requested it until staff considerations prevented further expansion.

The Uzuakoli Settlement is both the base from which leprosy control work operates and also a centre for the isolation and treatment of patients. The following aspects of leprosy control are centralised at the Settlement :

Laboratory :

The individual case sheets of all patients, clinic and survey records are field and kept up to date. All patients admitted to the Settlement undergo a full laboratory overhaul, and Ide,

Kahn, and Lepromin tests are in use. The primary function of the laboratory is the bacteriological examination of patients, and 5,423 such tests have been carried out during 1944. Many persons have come for diagnosis, either privately or referred by Medical Officers.

Treatment:

At both Settlement and clinics, leprosy treatment follows a set routine both in system and technique, which though standardised to facilitate mass treatment, yet permits individual variation in dosage. Emphasis is laid on the intradermal injection of creosoted hydnocarpus oil, on psychotherapy, and on physiotherapy. Physical training is part and parcel of routine treatment. Massage, with the inunction of hydnocarpus oil, has been introduced on a large scale and is very popular. The disappearance of macules and all other signs of active leprosy is followed by observation for one year under bacteriological control, after which the patient receives a certificate dated and valid for three months, when re-examination determines its renewal. Large numbers of discharged cases return for re-examination. Since 1939, discharges from the Settlement itself total 337.

Training:

The maintenance of a large number of clinics calls for the continuous training of nurses, for these work at clinics while still patients, liable to be discharged. This is an extremely important function of the Central Settlement, for the success or failure of clinic rests ultimately on the ex-leper nurses who actually administer treatment. Tribute must be paid to the devotion of the nurses resident at clinics, who have accepted without complaint the isolation which such a life involves. They have befriended the patients, encouraged them to isolate themselves, and have won the gratitude and affection of thousands of patients, while all the time they simply receive a small maintenance allowance for their pains, being regarded as patients still under treatment. There are 130 such nurses at the present time, and the service they render their unfortunate brethren is above all praise. Nursing training follows a set course lasting 18 months.

Children's Departments:

The lot of children suffering from leprosy is often particularly hard, and provision is made for as many as possible at Uzuakoli. Of over 1,100 children in our care, 259 live at Uzuakoli, the majority of them maintained by B.E.L.R.A.'s adoption scheme. These children are fed at the communal feeding centre and attend school in the Settlement.

The uninfected children's creche, abandoned in 1940, when supplies of milk ceased, aimed to safeguard the children of patients by removing them from their mothers at birth and rearing them away from contact with leprosy. The department survived as a temporary measure in two forms : (a) as a *Mothers' Compound*, where relatively uninfectious mothers were themselves segregated with their uninfected children, breast feeding being permitted. The mothers are not allowed to take their children into the infected part of the Settlement. This arrangement has worked quite well in practice. So far no child has exhibited any sign suspicious of leprosy. At the present time, 17 mothers are so segregated. (b) Weaned children have been sent to non-leper relatives, with the exception of a few orphans. These have been boarded out in the homes of respectable people in the neighbourhood and all have progressed well. This department is of the utmost importance in relation to leprosy control, for the children of patients are one of the most important agents in maintaining the disease.

Other Activities :

Free accommodation is provided at the Settlement for 100 aged or crippled patients who are unable to fend for themselves. They live in cottages with nurses in attendance, and a variety of interests makes their lives happy.

The Settlement, in addition to the above, is a large centre for isolation and treatment, where 1,179 patients are now in residence. The industrial development of the Settlement has had to give place to the development of leprosy control work outside the Settlement, but many industries are carried on, and the social life of the patients is highly organised. The Methodist Mission is responsible for religious and social work, and the Church occupies a most prominent place in the life of the Settlement. The day school has infants and primary departments, and has been supervised by ladies who are certificated teachers. The communal feeding centre is serving nearly 600 meals per day. The Boy Scout Group has over 100 members and is enthusiastic.

The Clan the Basis :

In working for leprosy control in the Province, the first principle adopted is the localisation of the leprosy problem to each clan. The clan is the natural social unit. When adopting a programme which calls for a great deal of self-help, the clan may be ready to assist where its own families are concerned, but usually resents the intrusion of lepers from other clans. We, therefore, plan leprosy control on a clan basis, rigidly excluding outsiders, but demanding, within the clan, the full co-operation

of each family. This principle of localisation is of the greatest importance. The opening-up of the country is permitting lepers to travel as never before, and the influx of new patients into any area is bound to create new problems. Lepers tend to settle in the vicinity of clinics, and these may thus actually create the problem. With the incidence of leprosy already at a very high level the movements of lepers from place to place should be minimised, and this is best achieved by providing facilities for their care in each clan.

The Isolation of Infectious Cases:

The second principle adopted is the isolation of infectious cases. In the existing state of our knowledge this is the only satisfactory direct means of overcoming the disease, and takes precedence over treatment in this respect. Isolation cannot be forced, and leprosy control resolves itself to a large extent in the discovery of ways and means of persuading patients to isolate themselves voluntarily, and then applying these until all infectious cases are isolated. All other measures are secondary to this, and leprosy control is thus as much a social as a medical matter.

The importance of isolation in relation to treatment needs to be stressed. Leprosy treatment is obviously an essential part of the programme and will cure all symptoms in many cases. Unfortunately, the degree of infectivity is roughly proportional to the length of time treatment is required, so that the most dangerous cases are least affected by the treatment and may remain sources of infection for many years. The problem is, in fact, even more complicated than this. The mortality rate of persons suffering from the severe forms of leprosy when untreated is high, largely on account of the neglect and undernourishment which is their usual lot. The period during which these unfortunate people may be sources of infection to others is thus limited. The effect of treatment is to prolong life, and incidentally, the period of infectivity. Until more effective methods of treatment are discovered, isolation must be the primary means employed to stamp out the disease.

Solitary isolation is to be deplored. We have met instances in many districts where the family has tried to isolate a patient by prohibiting social intercourse with him. The large number of patients concerned render this method ineffective as long as the patients remain at home, but the chief criticism of this method of isolation is the attitude of mind it creates. The solitary leper is an outcast. The isolated patient needs a community life in the best possible conditions, and this is supplied by the model village

we are endeavouring to provide in each clan. Healthy people are expected to provide land and building materials for the village. An attempt is made to utilise a local style of house-building, and by adequate hygiene and sanitation, present an object lesson to healthy people in village planning. By confining the village to patients from the clan, no patient in far removed from his home and there is no excuse for relatives to neglect patients unable fully to fend for themselves. No stern rules are applied to confine patients to the village. It is generally agreed that over 90% of leprosy is caught from contact within the compound, and the removal of patients from compounds where they formerly lived should ultimately eliminate infection to this amount.

Nurses live with the patients in the village, ulcers are dressed daily, and life is more happy than at home. Social life is organised. At two villages there are flourishing Boy Scout Troops, and sports and handicrafts are encouraged everywhere.

Our experience has been that patients have been sincerely grateful for what has been done for them, and accept isolation without difficulty, unless there are personal problems involved, such as the dependence on them of healthy children. Such problems must be faced and aid given to patients as necessary.

The following is a list of centres for isolation now established, with numbers of patients living in each : In the Bende Division, in addition to the 1,179 cases in the Uzuakoli Settlement, there are eleven centres with 831 patients, and four more centres are under construction ; in the Okipavi Division, six centres with 680 patients ; in the Orlu District, two centres with 123 patients ; in the Ahoada Division, six centres with 263 patients, and another centre waiting development ; in the Aba Division, two centres with 33 patients and another waiting development. In all, there are, in addition to Uzuakoli, 27 centres with 1,807 patients, and 6 more waiting development.

Leprosy Treatment Centres :

The provision of a leprosy treatment clinic is usually the first active step taken in leprosy control work in each clan. We make it clear from the start that leprosy control can only be maintained by the people themselves, and their continuous co-operation is necessary. Their willingness to co-operate is to be shown by the setting aside of a suitable place for the use of their lepers free of charge, and the free provision of buildings. The clinic is thus provided entirely by the people, and during the six years leprosy control has been operating there has been no exception to this rule. One or more trained nurses live at the clinic and carry out

routine treatment, while the clinic becomes a branch of the Central Settlement, is visited by a touring staff from the Settlement, and treatment at the clinic approximates, as far as possible, to that at the Settlement. An atmosphere of friendliness combined with effective treatment attracts patients. Those in special need are sent to Uzuakoli, but many mild cases who do not need isolation discover effective treatment at the clinic while they continue to lead their normal lives. A minimum of two years' treatment is necessary, yet already we have been able to discharge 379 patients as completely symptom free, not one of whom has needed Settlement treatment. The fact of the matter is that there are many mild cases of leprosy at large who would never bother to go to a Settlement, but who are prepared to attend a clinic. They need nothing more. With advanced cases, the clinic is a means to an end. Even in the best possible conditions in a Settlement the treatment of lepromatous cases rarely takes less than five years, and must take longer at a clinic where it is not possible to apply such measures as physiotherapy to any large extent. Much can be done, however, to make the lot of these people happier, and the numbers attending clinics indicate the value the patients place on these.

Even with ample propaganda, some patients will neither go to a Settlement nor attend a clinic without some impetus being given them. We have proved this repeatedly, for surveys have revealed numbers of such cases. Although they were afraid they had leprosy, they yet lacked the initiative to do anything about it, possibly dreading any public knowledge of their complaint.

Leprosy Surveys:

Sooner or later in each clan a leprosy survey becomes necessary. When numbers attending the clinic become stable it may be assumed, not that all patients are attending, but that all those having enough initiative of their own are attending. This is the sign that a survey is necessary in order to bring to light those who remain. Many surveys have now been carried out in the Province, considerably more than 60,000 of the population have been included, and an appropriate technique has been evolved. In selected areas, surveys are undertaken by the staff of the Central Settlement, but elsewhere surveys remain in the hands of Leprosy Inspectors, which means that surveys are continuously in progress in many parts of the Province at once. Such surveys lack the high degree of accuracy possible to an expert staff, but are the only possible answer to the problem of surveying a population of over two millions, especially as surveys must be repeated at intervals if the maintenance of leprosy

control is to be guaranteed. Repeated surveys are the only means of discovering new infections and keeping in touch with newcomers into the clan.

Twenty Leprosy Inspectors are at work in different parts of the Province. They are attached to clinics and undertake preventive work, visiting schools and meetings for propaganda purposes, advising relatives, tracing absentee patients to their homes, and undertaking localised surveys. This work is of the utmost importance. One feature of it is the examination of contacts, especially children, for signs of early infection.

Leprosy Control:

When all infectious cases are isolated, all patients receiving treatment, and machinery is in operation for the repeated survey of the population and for continuous preventive work, the programme is complete, and a progressive diminution in the incidence of leprosy may be expected. A state of affairs approximating to this is actually in existence in Bende Clan, Ozuitem Clan, Abam Clan, Abiriba Clan, Nkporo Villages, Oboro Clan, Abua Clan. In several other clans an advanced degree of leprosy control exists.

Vigorous anti-leprosy work is in progress throughout Bende Division ; with its 829 square miles and estimated population of 183,360, 16 out of 17 clans are participating in it. The incidence of leprosy is high, and we have concentrated on this Division as there is a widespread eagerness for leprosy control work. Approximately one half of the total number of lepers in the Division are now in our care, and this number includes a considerable proportion of the advanced cases. The one clan unconcerned with leprosy work is the Igbo Clan, a large clan, in parts of which there are many people suffering from leprosy. There is little unity among the elders in the clan and this is holding up progress, not only where leprosy is concerned.

Throughout the Okigwi Division, with a population of 155,464, leprosy control is in its early stages The area is well covered by clinics, which are being attended, in the Okigwi District, by more than 2.3 per cent of the population, in spite of the fact that no survey has been undertaken. Propaganda has not been pressed. Leprosy Inspectors are finding their time fully occupied in supervising clinics, and so far very little preventive work has been done among the population. The patients already attend clinics in such numbers that an excessive incidence of leprosy must be presumed. It is hoped, during 1945, to carry out a specialised survey in order to obtain precise figures. The

fact that six villages for isolation purposes already exist is evidence of the willingness of patients to co-operate.

In the Orlu District, with a population of 300,000 and 6,031 patients, leprosy control work is of recent origin. The district presents peculiar problems on account of the remarkable density of the population. Progress is most marked in the Oru Clan, where a village has been opened at Uli. Elsewhere it is extremely difficult to find sites for isolation purposes. With the exception of Oru Clan, lepers are everywhere in a depressed condition, and examples of gross neglect are more numerous in the Orlu District than elsewhere.

In the Ahoada Division, with 170,490 population and 2,057 patients, great progress is being made, three clinics and two villages having been opened during 1944. Although there is no land shortage, and diet appears to be more satisfactory than in the most northerly Divisions, the leprosy incidence is very high indeed. There is a commendable keenness for leprosy work and, if staff permitted, much progress would be possible. Some of our best clinics are situated in this Division.

In Aba Division, with 183,999 population and 919 patients, leprosy control is in its infancy. Prejudice is deep-seated. Lepers are treated badly, yet there are many objections to anything being done to help them. Clinics have operated since 1941, and at last there are signs that a more intelligent attitude is developing. In the Asa clan there is much co-operation, and a village is being built in the immediate future, an excellent site having been approved. The Ngwa clan presents the most difficult problems, but a site for a village has been given at Akumimo. The incidence of leprosy in the Division varies considerably. Along the banks of the Imo River it is high, in some places excessive, but elsewhere appears to be low.

One striking feature of leprosy in Aba and Ahoada Divisions is its amenability to treatment. The outlook for patients in these Divisions is much better than in the hills at the north of the Province. From Abua clinic alone, 140 patients have been discharged symptom free.

New Developments:

The application of new Government proposals to Owerri Province will doubtless make it possible to increase the size of the work being done. A daughter settlement, designed as a hospital and organising centre for the southern Divisions, is visualised. Meanwhile, every effort is being made to render existing work more effective. The first claim on our energies is the welfare of isolated patients, and a village welfare department

has already been started. Another department of vital importance is the Child Welfare Department. Both of these new departments will increase efficiency at the two most vital points in leprosy control.

The main lines of leprosy control work in the Province are already established, and what remains is to cater for unusual conditions demanding special measures. Townships are an important consideration here, and call for special measures.

REPORT FOR 1944 OF THE INDIAN COUNCIL OF B.E.L.R.A.

The Leprosy Department at the School of Tropical Medicine, Calcutta, organised and staffed in part by the Indian Council, has done some very valuable work, especially in clinical, immunological, and epidemiological studies.

Clinical

There are two main types of leprosy, lepromatous and neural, which have certain definite characteristics distinguishing them from each other. From the points of view of prognosis, treatment, and prophylaxis, it is very important to distinguish the one from the other. While the great majority of cases can easily be divided into one category or other, there are a few intermediate ones which are difficult to distinguish. A very thorough study of these atypical cases has been made. While the matter is too technical to give in full, two quotations may be of interest :

" Our study has so far shown that, in some of the cases, the atypical and histological findings are temporary and are often associated with the phase of reaction. In some other cases, however, the atypical findings persist. The lepromin test appears to be of definite value in sorting out these cases of doubtful classification.

" It is often said that, in children, the prognosis of leprosy has to be a guarded one. A study is being made of the prognosis of the disease in children with the different kinds of lesions. The study has so far shown that, in cases of tuberculoid lesions at least, the prognosis amongst children is as good as amongst adults."

The histamine test is recommended for use in cases with suggestive but indefinite signs of leprosy, especially in children.

Immunology

The lepromin test has been studied, and it has been found that the three protein fractions obtained from the leprosy bacillus give a more immediate and reliable result in testing for a patient's resistance to leprosy, and in distinguishing the types of the disease. An attempt was made to obtain proteins with similar action from other acid-fast bacilli, which can be cultured in artificial media. This would very much simplify the production of the material used for the test. The acid-soluble proteins of four of these bacilli was effective in most cases, but unfortunately not in all.

Epidemiology

A very careful re-survey of a limited area in the Bankura district was made. This area was first surveyed in 1937, and up to and including 1944, four other surveys were made. The numbers found are tabulated as follows :

	Year	Cases		
		Neural	Lepromatous	Total
Original survey	1937	328	96	424
	June, 1941	333	89	422
	,, 1942	337	91	428
	,, 1943	338	91	429
	,, 1944	316	76	392
	January, 1945	417	73	490

The total population in 1937 and 1944 numbered approximately the same. " The number of new cases, 107, detected during the year 1944 has been unexpectedly high. During the previous six years, the number of new detections was, on the average, about 20 per year. During the present year, because of the re-survey, it was expected that this number would be considerably higher, but not more than five times as high as in the previous years. The more thorough examination during the year is, no doubt, greatly responsible for this increase. While, during the previous years, new cases were detected through examination of contacts, and of persons under suspicion, etc., during the present year the whole population has been re-surveyed, each individual person being examined. As a result of the thorough examination, many undetected cases present in the area for some years, several over five years, have been detected during the re-survey.

" The original survey in 1937 revealed a total number of 424 cases. Till June 1943 this number was more or less maintained. In the latter half of 1943, due to acute economic distress, there

was a large number of deaths amongst the patients, especially of the lepromatous type. This resulted in a fall in the total number of cases during the early part of 1944, this fall being relatively more marked in the lepromatous cases. By the end of 1944, however, the total number of cases was more than made up by the large number of new detections made in the survey ; the number of lepromatous cases, however, was still below its previous level. In a majority of the new cases, the onset of the disease has been reported, and appears to be quite recent. These observations suggest that the economic distress in the area has been responsible for the production of a large number of fresh cases, possibly by lowering the general resistance of the population through under-nutrition. If this be so, here is an example of the dual effect of the famine conditions on the leprosy situation in the area. During the famine a large number of cases died, and there was a material decrease in the number of patients in the area ; in the period following the famine a large number of fresh cases appeared, possibly as a result of the lowered resistance of the population, and the number of cases in the area has actually increased."

There are reports on the following branches : Madras, Bengal, Central Provinces and Berar, Bihar, Orissa, Bombay, Punjab, Central India, Bangalore, and Hyderabad. The following extracts from the reports of the Madras and Central Provinces Branches are of special interest :

" Perhaps the most outstanding development of the whole year is seen in the issue of an order by the Government at the close of the year giving their approval to the post-war reconstruction scheme for leprosy, placed before them last year. The occasion for this order was the resignation of Dr. R. G. Cochrane, Hon. Secretary of the British Empire Leprosy Relief Association (Madras Provincial Council), when he became the Principal of the Missionary Medical College, Vellore. This order creates two essential units, which mark the commencement of a real effort by Government to solve this problem. These two units are : (a) the office of the Honorary Director of the Leprosy Campaign, and (b) a Research Unit. It is believed that, by the creation of these u nits, machinery and staff is being set up which will result in a great advance in the campaign in this Presidency. Dr. R. G. Cochrane has been appointed the first Honorary Director of this campaign, and it is confidently hoped that, ere long, the results of this far-sighted step on the part of Government will be seen, and that other provincial governments will follow the lead of Madras."

The Central Provinces Branch reports that "a leprosy committee was appointed by the Government of the Central Provinces and Berar to review the existing anti-leprosy activities of the Province and to make suggestions for the future development of the work on sound lines."

REVIEWS

International Journal of Leprosy, Vol. XI, December, 1943.

A World Within a World is an article by Perry Burgess. He reviews the various disabilities connected with leprosy in which the patients and their dependents are involved : isolation from families, families left uncared for, life in an abnormal community, unwillingness to work, partial inability to work because of the disease, lack of work because of lack of markets.

He propounds a scheme by which all leprosy patients would be provided with work according to their capacity, which would maintain their self-respect by bringing in a wage which would maintain them and their dependents and provide for the time when they are no longer able to work. His suggestion that the uninfected wife or husband be permitted to accompany the ill spouse into the segregation institution is a questionable one in some countries, though it might be less dangerous in others.

Sensitization to Lepromin, by J. M. M. Fernandez. When lepromin, containing all the elements of leproma, is injected intradermally, there are two possible reactions : (a) an immediate one after 24 to 48 hours, with erythema and oedema, and (b) a delayed one, which starts after a week, and forms a papule or nodule at the site of injection. The author considers the first to correspond with the protein derivative reaction obtained by Lowe and Dharmendra by injecting protein extracts from lepra bacilli, and that, when this is positive, it is a sign of previous sensitization with leprosy bacilli.

He adopts Wade's view that the second reaction is a sign, not of allergic sensitiveness, but of capability of developing an allergic state after the introduction of the antigen into the body. Dharmendra and Lowe have shown that both the early and the late reaction are caused by the protein fractions of the bacilli, only that, in the latter, the antigen is set free more slowly. He

found that injections of whole lepra bacilli, suspended either in oil or saline, and also injection of a Koch's bacilli in oil, had the effect of changing, in a certain number of cases, a negative into a positive lepromin reaction and intensifying originally positive reactions. The lepromin used for this test was a solution of the protein of lepra bacilli producing an immediate reaction. He considers that an allergic reaction is a sign of the power of resisting leprosy, and is dependent on an unknown factor. When, however, this factor is absent, nothing can be gained by intradermal injection of antigen.

Sister Hilary Ross found raised tyrosin indices for euglobulin in 147 out of 150 cases, the greatest variation being in active advanced cases, and the albumin-globulin ratio below normal in 123 of the 147. She suggests that hepatic disfunction and liver damage may be an etiologic factor in the disturbed protein metabolism. The same author found the Mazzini flocculation slide test gave false positives in presumably non-syphilitic patients to a lesser degree than Kolmer's simplified complement fixation test and the Kahn standard test. The Mazzini test is rapid and easy for those with experience to interpret, and the antigen supplied is stable. For these reasons it is particularly valuable for isolated leprosaria.

Faget and Pogge, after using pooled blood plasma transfusions in 12 cases, consider that, at present, there is no evidence to indicate that non-specific blood plasma has any value in the treatment of leprosy.

Feldman and Moses treated guinea-pigs infected with tuberculosis with diptheria toxoid without effect.

Peixoto describes a case with lesions which he ascribes to mixed syphilis and leprosy.

Davison makes a plea for a standardised method of staining for acid-fast bacilli in nasal smears. He advises 20 minutes decolourization with 5 per cent. sulphuric acid.

A condensed Spanish translation is given of a report by Dr. Faget and his colleagues at the National Leprosarium, Carville, on treatment of leprosy with *promin*. (The conclusions are abstracted elsewhere in this number.)

Leprosy in India. Vol. XVI, No. 3, July, 1944.

This number is restricted in its size due to paper shortage It contains an abstract of the report on promin by Faget and his

colleagues, which we have already referred to, and which we have abstracted elsewhere.

***Leprosy Control.** Dr. Robert Cochrane has drawn up a comprehensive scheme for the control of leprosy, with special reference to the Madras Presidency of India. This should be read in the original by all interested in the subject. He deals in turn with institutions, teaching, survey, rural and urban leprosy, general hospital and out-patient clinics, children's sanatoria, deformed and derelict cases, the beggar problem, research, propaganda, the place of voluntary organisations, and legal measures. He rightly lays stress on the importance of having a doctor of the right calibre to organise and carry through the scheme, and that the methods he advises should first be tried out experimentally in a limited area. The voluntary principle should be used as far as it will go, but there should be powers to use compulsion in the case of infectious patients who are not willing to co-operate. Again, compulsion would only be applied in limited areas where there was already proper institutional accommodation. Admission to institutions would be confined to four classes of cases :

1. Early lepromatous cases (infective) who are liable to pass on to the more advanced stage unless given institutional treatment.

2. Infective cases, whether early or late, in whose house there are young children liable to be infected.

3. Acute conditions needing hospitalisation might be admitted temporarily where there is a bed available, or if the patient is unable to go to a general hospital.

4. All active cases among children, whether open or closed.

Under *teaching* he proposed four types of courses : elementary, lasting 14 days ; advanced, for whose wishing further acquaintance with the subject, and especially those in charge of out-patient leprosy clinics ; refresher courses of 10 days duration ; and specialist courses of 6 months' duration.

Surveys should be undertaken only as a basis for the organisation of a preventive unit, to ascertain whether leprosy is a serious disease in a given area, or to find out if leprosy is diminishing or not in an area as a result of preventive measures.

The question of child leprosy and children's sanatoria must be actively considered, and child contacts should be periodically examined for early signs.

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* *Indian Medical Gazette,* Vol. LXXIX, No. 9, September, 1944.

Makogai. This is the title of an attractive illustrated booklet written by Dr. Austin, the Medical Superintendent of the Central Leper Hospital in the Fiji Islands.

Makogai lodges patients not only from Fiji but from New Zealand, the Gilbert and Cook Islands, Samoa and Tonga. The island itself is oval in shape, volcanic in origin, with mountains up to 876 feet, while the various buildings are situated in the bays or " flats."

From the description it must be a most beautiful spot, and the patients are well looked after by the doctor and sixteen missionary Sisters of the Society of Mary, assisted by ten native Sisters.

The photographs show women patients working in the laundry, the men making boats and houses, the children boxing and staging a drama, and the Sisters at work.

The number of patients from the Fiji Islands was 352 in 1919, and is now 444, an increase of 92 over a period of 24 years This is chiefly due to the increase of the population in the colony. Also, in 1919, there were no cases admitted in the early and relatively non-infective N-1 stage, 24 per cent. of the admissions were hopelessly crippled or deformed N-3 cases, and 32 per cent. were in the far advanced and highly infective L-3 stage. In 1943, on the other hand, 27 per cent of the admissions were N-1, 3 per cent. N-3, and there were no L-3 cases admitted.

These figures indicate that the great majority of those admitted in 1919 not only stood no chance whatever of a return to normal civil life, and would have been nothing but a serious burden to their friends or Government had they been released, but also must have left behind them a great number of undisclosed cases among relatives and friends whom they had already infected. The Medical and Native Medical Practitioner Services of Fiji were far less efficient than is the case to-day, and there is no doubt that hundreds of earlier cases must have been missed.