PROGRESS IN THE CONTROL OF LEPROSY IN THE BRITISH EMPIRE

By

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The problem of the reduction of leprosy in the British Empire is one of great magnitude and difficulty. Approximate estimates of the prevalence of the disease by Rogers and Muir (Leprosy, 2nd Ed. 1940, Table 4) show 506,300 in our Asiatic possessions, 302,600 in African, 6,234 in Oceanic, 6,000 in British Guiana and the West Indies and 848 in other smaller areas: a grand total of 821,982. Even this large figure is considered by some authorities to be an underestimate if all early cases are included. Fortunately the problem is much simplified by the fact that only about one-fourth of the whole are of the more infective, fairly advanced and easily recognized lepromatous type, and the remaining three-fourths are either uninfective chronic nerve forms or early cases that have not reached an infective stage.

The problem is then to effect, in one way or another, separation from the healthy of as many as possible of the highly infectious forms, and at the same time to discover and treat the early uninfective cases so as to clear up the lesions of a large proportion of them before they reach an infective stage. As most of the contagious, advanced lepromatous cases die within ten years, if they could be isolated and if the great majority of early cases were discovered and efficiently treated during a decade or two, very few infective cases would be left to carry on the disease, and a great reduction of leprosy could be brought about in a relatively short period of time.

For centuries past and up to about two decades ago, reliance had been placed in many countries solely on compulsory segregation of all types and stages of the disease, for want of anything better. Except under the favorable conditions existing in Norway no material reduction of the disease ever seems to have resulted from this drastic measure. In 1915 to 1917 the writer recorded much improved results in the treatment of a considerable number of leprosy cases by means of injecting suitable preparations of the long used chaulmoogra and hydnocarpus oils in place of the oral administration of these nauseating remedies; a method that was confirmed and extended in 1919 by Dean and Hollman in Honolulu and subsequently by other British and American workers, as recorded in the writer's Cameron Prize lecture (1) of 1929. The rigid compulsory segregation of the Old World, resulting as it did in the hiding of early cases for from three to eight years in different countries, now became even more positively injurious in that cases were not detected while amenable to treatment. It therefore be-

came necessary to reconsider and modify the age-long compulsory segregation methods in the light of the new knowledge.

In 1923 the writer, with the help of his friends Sir Frank Carter and Mr. Oldrieve, founded the British Empire Leprosy Relief Association (B.E.L.R.A.) for the purpose of ensuring the adoption of the improved treatment in British-administered countries, with necessary modifications of compulsory segregation wherever it was in force to prevent its causing the wholesale hiding of the early amenable cases of leprosy. In 1934 the writer recorded a brief history of the first decade of the work of B.E.L.R.A. (2) and the following account of the present position of the campaign and the lessons to be learned from the experience gained through it may be of interest. As was anticipated the application of the above mentioned general principles have had to be varied in their details to meet special conditions prevailing in different areas of the scattered British Empire.

INDIA: Census returns of the advanced easily recognized cases of leprosy show 147,911, of which some 10,000 are cared for in a number of missionary and Government institutions. As a large proportion of these are chronic uninfective nerve cases, their isolation does little towards controlling the disease and compulsory powers only apply to a small number of indigents with open lesions. The total number of leprosy cases in India is estimated at 500,000 or more and surveys of 2,435,610 persons in 4,560 villages in various parts of India revealed 16,499 cases, or four and a half times the census numbers in the same areas. Some three-fourths of the total number are uninfective nerve and early cases. The much higher leprosy rates in areas of high rainfall pointed out by the writer (3) is illustrated by the very humid Shan States of Burma having 61 per mille and humid Madras City 26.6 per mille, against only 0.06 per mille in the dry Punjab.

Before my retirement twenty years ago under the age rules from active work in India, I was fortunate in obtaining the services of Dr. E. Muir as a whole-time worker to continue my researches on leprosy in the School of Tropical Medicine I had founded in Calcutta. In addition to the valuable researches carried out there by Dr. Muir, and by his assistant and successor Dr. Lowe, the former introduced the Propaganda-Survey-Treatment system in extensive areas of India, carried out by numerous doctors specially trained in Calcutta and other centers. An educational campaign first brings home to the people the importance of the leprosy problem: a house to house survey then enables all the earlier cases not included in the census returns to be discovered and a dispensary is opened under an expert medical man to supply them with regular treatment. In some years as many as 100,000 cases of leprosy have been thus treated at a very minute fraction of the cost of isolating them, though difficulties in obtaining regular and prolonged attendance has somewhat lessened the utility of out-patient treatment. Steps have been taken also to open in each province at least one agri-

cultural colony in which as many as possible of the more infective lepromatous cases are isolated and regularly treated under experts, with land to cultivate to help in feeding the patients. E. Muir also introduced the plan of persuading villagers to isolate the more infective cases in separate huts as a means of lessening the frequency of house infections from them, for these had been found to be responsible for 64.5 per cent of the total new infections in Madras City.

The value of the modern injection treatment in suitable cases may be illustrated by the work of the Dichpali Leprosy Hospital in the Hyderabad Deccan. The annual report for the 12 months of 1939-40 shows among 657 admissions, 71 discharged "symptom-free," 242 more discharged with "disease stationary and non-infective," 200 "improved but left before completion of treatment," 132 "discharged otherwise," presumably not improved, and 12 died. Thus, if we omit those whose treatment was not completed before they left, 70 per cent of the admissions were cleared of all symptoms or infection. The above records show that a good start has been made in introducing modern methods of control into India, but many years of intensified effort will be required materially to reduce the incidence of leprosy in India as a whole.

CEYLON: In 1921, before the use of modern methods, 577 cases of leprosy were recorded in the Colonial Report as known in Ceylon, which then carried out compulsory segregation. In 1932 the too rigid provisions of the leprosy ordinance were suspended and isolation limited to open infectious cases. Two and a half years later, on a second visit to the island colony, R. Cochrane reported considerable progress through a survey followed by education, propaganda, training of medical officers in early diagnosis and the establishment of clinics for the treatment of uninfective cases. Also leprosy hospitals and settlements had been established for infective patients and arrangements made for the repeated examination of all contacts with known infective cases. The surveys demonstrated that 85 per cent of cases resided in the humid and more densely populated area five miles along the coast. As a result of these measures, by 1939 the number of known cases had risen to 3,618, 70 per cent of which had been discovered by the surveys; 1,031 infective cases were isolated against 654 of all types in 1933, and modern treatment was being supplied both in the settlements and the clinics.

MALAYA: Rigid compulsory segregation was in operation in this area up to 1933, when the policy was adopted of allowing early cases of leprosy to be treated as out-patients "at special clinics without being arrested and fined" as formerly. In the Federated Malay States a modern settlement has been provided near Kuala Lumpur under Dr. Ryrie—who has courageously remained on during the recent invasion by an aggressor nation—with 818 cases in 1927, including latterly some early ones attracted by the

facilities for their treatment. At the same period 700 male and 40 female cases were segregated in the Straits Settlements.

AUSTRALIA: There is little leprosy in Australia except in the more humid parts of Queensland and the Kimberley district in the Northwest Territory. R. Cilento has reported that in 1931 the Federal Health Council had made arrangements for a survey of the problem with the result that in five years up to 1935 twice as many cases were detected as in any of the previous six five-year periods. A Health Act of 1937 gave new powers to examine suspects and contacts of known cases, and all the infected families in any new focus of infection in Queensland are being examined every three months for new cases. Fifteen suspicious cases have been thus revealed among natives of this colony. Between 1931 and 1937 the known cases have increased from 80 to 167, bacteriologically-positive cases have been isolated and treated and those becoming negative can now be discharged on probation.

In North-Western Australia a survey led to the yearly notifications in 1908-1932 of 2 to 7 being raised in 1933-1936 to 41 to 58, but the number fell to 19 in 1937. New South Wales recently had 95 known cases, 19 of which were isolated.

In FIJI compulsory segregation is in force under a Leper Ordinance of 1900 but 394 patients have been discharged after being bacteriologically-negative for two years, and of 16 per cent relapses about one-fourth cleared up with further treatment. Hydnocarpus oil is obtained from trees raised from seed supplied by B.E.L.R.A. to this and a number of other colonies with suitable climates. In recent years a number of admissions have been made at the Fiji Makogai Island Settlement from New Zealand and its dependencies, Tonga and the Gilbert Islands; an economical arrangement which might well be followed by the British West Indian Islands. The admissions as yet show little sign of diminishing but cases are now coming at an earlier stage. This institution appears to be popular under the superintendency of C. J. Austin.

The control of a very serious outbreak of leprosy in the island of NAURU in the South Pacific is of special interest. The first case among the indigenous people was a patient who had lived near a leprous woman who arrived from the Gilbert Islands in 1912. By 1920 three more indigenous infections had arisen from the first one. Following an epidemic of influenza in 1920, aggravated by dietetic deficiencies, the disease spread so rapidly that an examination of the whole population in 1925 revealed symptoms of leprosy in 30 per cent of the indigenous Nauruans, with a total of 368 cases. Of these, 189 who had already reached an infective stage, were isolated on one side of the island and the 176 classified as uninfective were treated at an out-patient clinic. A large proportion of the whole were maculo-anaesthetic cases. Three years later Bray reported a reduction of 40 per cent in those showing symptoms of leprosy and in 1933 A. Grant recorded a decline of nearly two-thirds. In the last available report, of 1937, T. M. Clouston recorded that the total

cases had been reduced to one-third of the number in 1927 and that approximately two-thirds of the remaining 159 cases were uninfective. By that time the total of bacteriologically-positive cases that had been isolated amounted to 284 and the early negative outpatient ones to 193, making a total in all of 477. There remained only 57 segregated infective and 102 uninfective clinical cases which were all being treated, making approximately 10 per cent of the population in place of almost 30 per cent in 1924 and 14 per cent at the end of 1933. The small number reaching an infective stage points strongly to the advisability of early and continued treatment, for only four of the large number of originally uninfective cases had gone on to nodular formation under treatment, and in the last six years five only had become infectious skin cases, but not nodular ones. On the other hand, 32 nodular cases had been released after becoming bacteriologically-negative, approximately 11 per cent, while 12 more cases had lost their nodules. Such facts speak for themselves.

In the SOLOMON ISLANDS a laborious survey by J. Ross Innes estimated the total cases at 900 or 1.02 per cent of the population. In 1938 an attempt to control the disease by the colony system with outlying dispensaries was considered to be promising.

BRITISH WEST INDIAN ISLANDS: In the absence of surveys the number of leprosy cases in these islands can only be roughly estimated at about 5,000, of which 770 were isolated at a recent date, most of them at the Chacachacare Island Settlement of Trinidad under compulsory laws. In most of the smaller islands very little has been attempted in the ways of organizing modern methods of prevention, partly no doubt on account of financial difficulties and the absence of any combined effort of the small communities concerned. Visits to the islands now being made by E. Muir will, it is hoped, lead to serious attempts to control and eventually eradicate the disease.

BRITISH GUIANA: Presents a noteworthy and most encouraging exception in this region, for it was the first of our colonies to adopt the advice of B.E.L.R.A. to modify their compulsory segregation laws to permit early uninfective cases of leprosy to be treated as out-patients at special dispensaries. In 1923 there were 267 cases segregated at the Mahaica Leprosy Hospital but with the relaxation of the Leper Ordinance three dispensaries for early cases were opened and surveys carried out. Many of the new infective cases thus discovered went voluntarily to the Mahaica institution for care and treatment, so that 747 cases were in residence by 1932 under F. G. Rose, to whose devoted work during fifteen years the present improved condition is due. The importance of prolonged and regular treatment is shown by the fact that 71.4 per cent of the cases which received from 61 to 100 per cent of the prescribed course became "arrested" within 37 to 48 months, against only 16.7 per cent of those who received only up to 60 per cent of the course. An after care village near the settlement accommodates

a number of recovered patients who cultivate and do other paid work for the inmates of the settlement. The child cases occupy a separate building and the Lady Denham Home cares for healthy children of patients. Ten nursing sisters of a religious order work at Mahaica. E. Muir visited the colony in 1941 and saw many formerly advanced lepromatous cases which have been free from infection and active symptoms for a number of years. There are now nearly 400 cases in the settlement and 500 early cases out of an estimated total of 1000 are being treated at nine clinics. The yearly notifications of past years of from 40 to 100 had fallen in 1939 to only 39, and E. Muir states that: "There is good reason to believe that this decline in notification is the result of an actual decrease of leprosy in the colony."

AFRICAN BRITISH POSSESSIONS: Tropical African colonies present the most difficult leprosy problem for, although the total number of cases may be less than in India, the rates per mille and the proportion of the highly infective lepromatous type are much greater. Poverty and the backward civilization of the scattered populations add to the difficulties. Also variations in local conditions have necessitated adoption of different methods of application of the principles of modern leprosy prophylaxis, as may be illustrated by the following examples.

The Sudan: In the southern Equatorial Province of the Anglo-Egyptian Sudan yearly surveys of the population showed much leprosy. The writer was consulted on the difficult problem presented by the scattered population in an area, much of which was inaccessible during the rainy season, and the following measures were adopted and carried out by the Principal Medical Officer, O. F. H. Atkey. A survey revealed no less than 6,500 cases, or 5.3 per cent of the population. Of these 4,800, classed as infective, were removed during 1927 to 1930 to large settlements where they built houses and cultivated land for their own support. By 1932 the cases in the settlements formed 82 per cent of the total numbers in the area dealt with. In 1934 E. D. Pridie recorded that within five years 7,075 cases had been admitted to the leprosy settlements and that 3,679, or 52 per cent, had recovered owing to the large proportion detected in an early stage; and, further, that annual surveys showed that very few new cases were appearing in the original heavily infected area. The medical report for 1936 stated that the big and small settlements were functioning satisfactorily and leprosy throughout the Sudan was well under control; that the methods had been extended to the Central Sudan and on a large scale to the Nuba Mountains, and that settlements formed near dispensaries were working well, but that improved diet and standards of living would be necessary for the permanent eradication of the disease. By 1939 the number of cases in the large settlements had decreased considerably through the discharge of many of the arrested cases, who are being kept under close watch for relapses.

East Africa: West Uganda, bordering on the Belgian Congo,

is severely infected with leprosy. In a large mission settlement on the Island of Bunyonyi and in other settlements 1,469 cases were being isolated and cared for in 1938. Much good work is being done in treatment among the populations of Uganda, Kenya and Tanganyika in a number of small settlements and at hospitals and dispensaries, mostly under medical missionaries.

Basutoland presents another difficult problem among a poor population scattered over a mountainous country with very difficult communications. Compulsory segregation has long been relied on but it has been modified in recent years to permit uninfective cases to be treated at a dispensary. At the central settlement at Botsabelo 669 cases were being cared for in 1937 and, in spite of a number of new admissions resulting from a survey, the number remaining showed a slight decrease owing to discharge of convalescent patients. Noteworthy features are that the duration of symptoms on admission did not exceed one year in 55 per cent of the cases; in only 25.6 per cent did the period exceed two years, and 71 patients were discharged with the "disease arrested." Recent progress in discovering and treating new cases is attributable to the employment of trained native inspectors to visit outlying villages and persuade the affected to go to the settlement, as it is not practicable to provide local dispensaries near their villages.

South Rhodesia: In 1935 B. Moiser estimated the total cases in this colony at 6,500, of which 1,359 were in agricultural settlements. In 1940 the central Leprosy Hospital at Ngomahuru contained 869 cases; 204 were admitted during the year, 42 re-admitted and 200 discharged with the "disease arrested." Large doses of up to 10 c.c. of the ethyl ester moogrol two or three times a week gave very satisfactory results, and relapsing patients returned promptly under the voluntary system for further treatment. If improved cases are added to the arrested, 80 per cent benefited materially from treatment. Owing to the difficulty of feeding infants artificially, children are removed from their infected parents after breast feeding by their mothers for one year; in eleven years not one of them had been admitted with signs of the disease. The excellent climate of South Rhodesia may favor these good results.

Nigeria with some 20,000,000 inhabitants, and at least 200,000 cases of leprosy according to an estimate by E. Muir, presents by far the most serious problem in Africa and one which has received special attention from B.E.L.R.A. Compulsion in West Africa is worse than useless, for some two decades ago Robineau reported that an attempt to round up persons with leprosy with the aid of gendarmes led to their all being hidden and effective treatment of early cases rendered impossible. Instead agricultural colonies have been established to accommodate infective cases, with clinics radiating round them to provide economical treatment of large numbers of less advanced cases. Advantage has also been taken of a local custom to found villages for advanced cases which supplement the settlements without additional cost.

The earliest of the large settlements at Itu in South Nigeria was founded in 1926 by Macdonald with 1,500 inmates. In his report on a West African tour in 1935, E. Muir recorded that fourteen Government supported settlements accommodated 2,229 cases and seven medical missionary ones 2,793, making a total of 5,022. At a leprosy conference in 1939 the Director of the Nigerian Medical Service, Sir Rupert Briercliffe, stated that "the success of the voluntary system of segregation as practised in Nigeria is evidenced by the constantly increasing demand for admission to the leper settlements" and that the inmates of these had increased from 2,500 ten years previously to nearly 7,000 and would be much larger if money was available. Still more recent progress may be illustrated by the remarkable development of the Uzuakoli Settlement, founded in 1932 in the Owerri Province of South Nigeria. In 1941 T. F. Davey reported that 1,072 cases were isolated in the central settlement, many of them being in want of hospital treatment. A further 2,000 infective cases were also voluntarily isolated in ten model leprosy villages in houses constructed by the patients under the instruction of the settlement staff, on sites given by the Chiefs near clinics in which the cases receive regular treatment. The villagers cultivate land for their own support. Twenty-nine clinics had been established up to 1941, with four more to be opened before the end of that year; in these 7,183 cases, mostly early favorable ones, were receiving regular treatment within five miles of their villages. In starting work in a new area a clinic is first opened for treating cases and, when confidence has been established, a house to house survey of the neighborhood is made which generally leads to about three times as many cases attending the clinics. As there are usually six to ten times as many early as advanced cases, good results accrue from clinic out-patient treatment, at a very small fraction of the cost of compulsory segregation.

Davey reports that in some areas of the Owerri Province nearly all the leprosy cases are being cared for and that full control of the disease has been established; it is now only a question of providing larger funds to ensure the indefinite extension of the control of leprosy in the severely infected South Nigeria. All this has been accomplished by two medical men with the assistance of lay Toc H workers and nursing sisters, who have trained 70 male nurses to work in clinics and a number of educated leprosy inspectors to carry on surveys and superintend construction of model leprosy villages.

THE UNION OF SOUTH AFRICA: Here the conditions are much more favorable than in any of the countries yet discussed because of the large and wealthy European community which provides funds for public health work. Compulsory segregation had been relied on in Cape Colony since 1817 but a century of its use had failed even to prevent a steady increase in the number of cases of leprosy (see Rogers and Muir, p. 109). In 1923 bacteriological examinations of the 2,501 cases in the old type prison-like leprosy

asylums revealed that one-third of them were negative and uninfective. In the next three years, 862 were released on this account, against only 275 in the seven years prior to 1917. The long condemned Robin Island leprosarium at Cape Town was closed, a new one of the settlement type opened not far from Pretoria and the others improved. The medical authorities did not consider it feasible to provide for out-patient treatment of early cases over the huge affected territories among a backward native population. Patients began voluntarily to enter the improved settlements in the earlier stages and the beneficial results of the modern treatment became increasingly evident. A steadily increasing proportion of the total cases were released as no longer infective and the last report for the twelve months ending June 30th, 1941, states that the intradermal injection of iodised ethyl esters produces such "very rapid and satisfactory changes" that "isolated local lesions of the neural and tuberculoid varieties are entirely obliterated within a month or two." This report records that in 1940-41 cases in the five institutions numbered 2,208, those awaiting admission 32, and home segregated 7, making a total of 2,247. The total number up to date who had passed through the institutions and been discharged with the disease arrested and no longer infective numbered 5,818, or 72 per cent of the known 8,065 cases. Of the discharged, 2,231 were still under surveillance but the remaining 3,587 had been released from this after remaining free from activity for five years. The last year's admissions of new cases amounted to 699 and of recrudesced cases to 80, so no decrease is yet evident in either the yearly admissions or in the total number in the institutions. In view, however, of the much larger proportion of patients entering voluntarily in the earlier stages there is now good reason to hope for a reduction.

The above review will suffice to establish the soundness and success of the general principles of employing voluntary measures where compulsion is not already in force, and of modifying compulsion in other areas to permit early uninfective cases to be treated as out-patients at hospitals and clinics. The great progress made during the last two decades in the control of leprosy is essentially based on the discovery of more efficient treatment by injections of suitable preparations of chaulmoogra and hydnocarpus oils, and on studies of the epidemiology of the disease, by means of which the whole outlook of the unfortunate sufferers from leprosy has been immeasurably improved.

References

(1) Edinburgh Med. Jour. 37 (1930) 1.

(2) Leprosy Review. 5 (1934) 54-108.

(3) Trans. Royal Soc. Trop. Med. & Hyg. 16 (1923) 440.