

# LEPROSY REVIEW

The Quarterly Publication of  
THE BRITISH EMPIRE LEPROSY RELIEF ASSOCIATION.

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VOL. XI. No. 2.

APRIL, 1940.

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Enugu Leprosy Conference

Leprosy in Nigeria

Problems for Research Work  
in Leprosy Institutions

Leprosy in Benin and Warri  
Provinces of Nigeria

The Potassium Iodide Test  
in Leprosy

A Visit to Three Leper  
Settlements

Reviews      Reports

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Edited for the British Empire Leprosy Relief Association, 115 Baker Street, London, W.1, by E. Muir, C.I.E., M.D., Medical Secretary, to whom all communications may be sent. The Association does not accept responsibility for views expressed by the writers.

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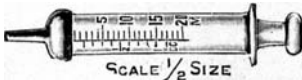
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## EDITORIAL

## THE MYCOBACTERIA

The peculiar response of the tissues of the host to Mycobacteria or acid-fast bacilli is *monocytic*. This is the central lesson brought out in a series of illuminating articles recently published in the form of a symposium.\* (See also p.109).

The Acid-Fast Family consists of the various strains of tubercle and leprosy bacilli, the organism of Johnne's disease, and a number of acid-fast strains which do not produce disease, such as the timothy grass and smegma bacilli. In all the diseases caused by these germs there is one feature in common, the response of the monocyte to the invasion of the host. This cell may respond in one of two very different ways. It may regard the mycobacterial invader as a friend, grant it hospitality in its interior, supply it with nourishment, allow it to multiply, and convey it through the body. At last, vacuolated and bloated with multiplying rods in its cytoplasm, it comes to a standstill and dies, and its burden of bacilli may give rise to a new focus of disease. On the other hand, the monocyte may take a hostile view of the invader and do its utmost to surround, localise and destroy its enemy. Rapid mytotic division gives rise to multiple cells which, as they ingest and destroy bacilli, produce the characteristic epithelioid cells and, if many bacilli have to be dealt with, may produce a few multinucleated cells of the Langhan's type. The epithelioid cells surrounded by lymphocyte infiltration take the form of compact tubercles; with clear-cut margins, generally ranged round small blood vessels.

The relative degree of tolerance of the cells for the bacilli found in these two types depends on a number of factors: (1) The nature and virulence of the organism and the consequent resistance which it can offer to the host. More or less virulent strains of tubercle bacilli can be dissociated by growth on media of varying pH. Whether a similar dissociation of lepra bacilli could be achieved if once we had a strong *in vitro* culture, is a question which must for the present remain unanswered. (2) The toxicity of substances released by the destruction of the acid-fast bacillus. Not only do these substances cause tissue destruction, but they also

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\* *Tuberculosis and Leprosy, the Mycobacterial Diseases*, published by The American Association for the Advancement of Science, 1938. The Science Press Printing Company, Lancaster, Pennsylvania.

sensitize the monocytes and increase their power of resisting and destroying the invader. (3) The natural or acquired resistance of the host to the particular mycobacterium by which it is invaded. In some this resistance is so strong that the organism cannot multiply at all, as the bovine bacillus in the fowl, or human leprosy in any genus but that of man; in others the growth is rapid and unrestricted; while between these two there is resistance sufficient to restrict, but not to exterminate, the invader. Later, the tolerant host may become sensitized with the production of acquired immunity, or the resistant host may become desensitized.

The nature of the disease produced is dependent partly on the natural or acquired resistance of the body to the germ, and partly on the selectivity of the latter for certain tissues of the body. Thus in the resistant human subject human tubercle bacilli affect chiefly bone, skin and lymph nodes, in the less resistant the lungs and other internal organs. The germ of human leprosy differs from all other mycobacteria in its affinity for the peripheral nerves. While nerves are invaded by bacilli both in patients with high and in those with low resistance, it is in the former (the neural type) that inflammatory reaction is chiefly produced, followed by blocking and destruction of nerve fibres. Similarly, Johne's bacillus has an almost exclusive affinity for the bowel.

Allergy in tuberculosis differs from anaphalactic sensitization to foreign protein. The former is a result of sensitization of the cell itself to the protein products of the tubercle bacillus, in which the role of anti-bodies cannot be demonstrated; the latter is a result of the interaction of demonstrable antibodies with antigen where sensitization of the cells is not demonstrable.

We may take it that immunity in leprosy is associated with allergic rather than anaphylactic sensitization. There is possible evidence of local cell immunization. The tuberculoid lesion spreading at the margin and healing up in the centre may be explained on the assumption that the infection in its march leaves behind locally immune tissues. But this local immunity is not necessarily dependent on sensitized cells; Topley\* states that "it would seem that any treatment which induces a local mobilization or concentration of histiocytes will confer on the treated area an increased resistance, which will last as long as the local cellular changes persist." The activation of lepromatous lesions known as "lepra reaction" does not as a rule affect all the lesions of the body simultaneously or even all parts of any one lesion. This also would suggest local sensitization. On the other hand, when

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\**Outlines of Immunity*, W. W. C. Topley, p. 237.

reaction of the major tuberculoid takes place it is common for the lesions all over the body to react simultaneously; it would appear that a sudden and universal sensitization has taken place of the cells in the vicinity of the bacilli, and so strong is this sensitization that spontaneous healing not uncommonly occurs.

Phospholipin, a lecithin-like substance derived from different strains of tubercle bacilli, when injected into the pleural cavity of the rabbit produces tubercular tissue in the pleura consisting of epithelioid cells closely packed and infiltrated with lymphocytes; that is to say, it produces lesions histologically like the hard tubercles of tuberculosis and the tuberculoid lesions of leprosy.

This useful series of articles, embodying much of the most recent work done on the subject, brings into perspective the relationship of these diseases, which have so much in common and yet differ so materially from each other. One can understand the origin of human tuberculosis from that of the lower animals; but what of the origin of human leprosy? Was it originally a disease of animals now extinct?

. . . . .

A distinct stride forward was made in the improvement of the classification of leprosy at the Cairo Conference. Many of us have, however, felt two difficulties about the terms there devised. (1) The term "neural" may be taken by the uninitiated to imply that the nerves are not involved except in the neural form, whereas the infection of the nerves may be even more severe in the lepromatous than in the neural type, although that severer infection calls forth less tissue response, and therefore produces slighter sensory and trophic changes. Also, the typical tuberculoid lesion does not end in the skin, it spreads up into the nerve, producing essentially the same histological changes there. Even when the skin is not affected the pure nerve lesion is still of a tuberculoid nature as much as is the lesion affecting only the skin. Why then not term the resistant form of leprosy "tuberculoid"?

(2) There are many cases which are hard to classify under either of the two main types; at least this is so in India and Africa, and I have recently been told that the same holds good in Malaya. This is the case in a large proportion of lepromatous cases which begin with sensory and trophic signs, accompanied by swelling and tenderness of nerves; also in well established cases with tuberculoid lesions which not infrequently develop lepromatous lesions; and, at least in some countries, there are many indeterminate cases between the two main definite types (see Dr. Davey's paper p.92). Dr. Pupo's suggested changes in the present

classification (see p.117) following on the lines put forward by Jeanselme, meet both these difficulties in a practical manner.

It is questionable, however, whether it would not be better on the part of the South American leprologists to delay action, and adhere to the classification adopted at the Cairo Conference, until such time as further general discussion at a future international conference may lead to general agreement. The advantages of a universally accepted classification more than outweigh any slight inherent defects.

. . . . .

The life of the leper is one that is full of discouragements. It is therefore incumbent on those who are in any way connected with his treatment or hopes of recovery that they should be particularly careful not to raise false hopes in his mind, which may later lead to cruel disappointment. Many errors have been made in claiming the efficacy of anti-leprosy drugs, either as the result of the sanguine temperament of the doctor, or on account of his lack of familiarity with the course of leprosy, which has led him to mistake anergic suppression of lesions for real and permanent improvement. Much more culpable is the conduct of those who, for commercial reasons, make big claims which have not been fully established by carefully planned and controlled experiments.

. . . . .

Reference was made in the last number of *Leprosy Review*, p. 43, to the severer type of leprosy in Europeans as compared with Bantus. In considering the possible reasons for this, the abstract on *Negro Skin* (p.115) is of interest.

## THE ENUGU LEPROSY CONFERENCE

T. D. F. MONEY

Under the auspices of the Nigeria Branch of the British Empire Leprosy Relief Association a conference of whole-time anti-leprosy workers and others concerned was held in Enugu in South East Nigeria from 28th-30th August last. The medical superintendents of each of the 14 leprosy settlements in Nigeria attended as well as two Toc H leprosy workers and three other representatives from



missions doing anti-leprosy work. There were also present the Chief Commissioners for the Northern and South-Eastern Provinces, together with representatives of the Administrative, Medical, Educational and Agricultural Government Services. The imminence of war prevented the attendance of the Director of Medical Services and several other Government representatives who would otherwise have been present. This was very much to be regretted.

The conference was timed to coincide with a visit to Nigeria of Dr. Muir, Medical Secretary of the British Empire Leprosy Relief Association, who, in opening several of the sessions and contributing to all discussions, played a leading part in the proceedings.

The expenses of the conference, owing to the considerable distances delegates had to travel, were heavy. A special grant was made by the British Empire Leprosy Relief Association towards these and the balance was borne by the Nigeria Branch of the Association.

The first two days were devoted to the consideration of a number of subjects upon which discussion was opened by set speakers before becoming general. Only a general account of the proceedings of the conference is given here, but two of the most important speeches follow. Reference to the programme of the conference, given at the end of this article, will show the subjects considered.

On the third day the delegates visited in the morning an out-patient clinic of the Oji River Settlement and saw something of the application in Nigeria of the Propaganda-Treatment-Survey system based on that used in India. They then went on to the Settlement itself and were given a clinical demonstration of cases by Dr. Muir. After lunch the Settlement was open to inspection and there was a demonstration of the histology of leprosy arranged by Dr. Muir in the laboratory. There followed the final session of the conference after which it dispersed.

The conference passed a number of resolutions which are given at the end of this article.

It is early to assess the fruits of the conference. Not only so, but their ripening cannot but be affected by the present war. It is, however, certainly not too much to say that the conference was of great value in bringing together anti-leprosy workers in Nigeria. Hitherto workers have had little contact and opportunity to learn from one another.

As the Director of Medical Services has pointed out, the conference has revealed certain defects of training and organisation. The resolutions of the conference draw attention to some of these

and at the October meeting of the Executive Committee of the Nigeria Branch of the British Empire Leprosy Relief Association special consideration was given to the resolutions numbered 1, 7, 8, 9, and 10.

Although there was no special resolution dealing with the subject, there was a feeling amongst several of the delegates that a special course of training for medical men doing anti-leprosy work would be valuable. In India such a course is provided annually at the Calcutta School of Tropical Medicine. There are special difficulties attaching to providing such a course in Nigeria. Nevertheless a course adapted to West African conditions is desirable and already the form and syllabus of the course is under consideration. It is much to be hoped the means for putting this plan into effect will be available.

Having strayed into the expression of a personal opinion in the preceding paragraph, perhaps one further such opinion may be added. Since first embarking upon anti-leprosy work in Nigeria two things have increasingly stood out in my mind as being of importance. Both of these were discussed in the conference and it is to be hoped that, if nearly all else is forgotten by those who attended, these two things will but be the more prominently in mind. Firstly, the resistance of the individual to the organism of leprosy is a matter of paramount importance. What are the factors, internal and external to the individual, that govern whether infection is followed by lepromatous, neural or no apparent leprosy at all? Secondly, the control and ultimate eradication of leprosy in Nigeria is essentially a matter for the African himself. Europeans can organise and advise but the fight against the disease can never succeed until the Africans realise and accept the problem of leprosy as one permeating native life and demanding for its solution measures which are related to native life in a natural manner.

Resistance is related, so far as present knowledge goes, to such things as diet, social habits, intercurrent disease, age, and probably a number of other factors not yet understood. The application of what is known and the elucidation of what is still obscure concern workers in various fields.

The control of leprosy, at least in South East Nigeria, where the incidence is very high, cannot be achieved by a series of surgical operations on the body of the community. Surgical operations may be expensive. Leprosy cannot be excised from the people by means of European-run Settlements. The treatment is medical. As in the body of the individual, so it is in the body of the community—the body itself must isolate the foci of the disease. It is this matter of resistance over again, but this time of communal

or social resistance. In medicine the aim is to encourage and strengthen the natural resources of the body. The analogy holds. The aim must be to educate and assist the community in native forms of resistance to the disease by such means as local isolation on his own patch of land of the infected member of the family.

Enough has been said to show that not only the whole-time anti-leprosy worker but also the medical officer of health and the administrative officer, the educationist and the agriculturist, are all called upon to assist in resisting aggression by the leprosy bacillus. It is a totalitarian war.

There emerged in the conference this ideal of co-operation between all who are working for the betterment of African life. It is to be hoped it may not disintegrate and be lost.

### PROGRAM OF THE CONFERENCE

AUGUST, 1939.

- MONDAY 28th — 10 a.m. Address of Welcome by H.H. The Commissioner, Eastern Provinces, G. G. Shute, Esq., C.M.G.
- 10.15 a.m. Introductory—Chairman, Dr. Naudi, S.M.O. Kano.
- 10.30 a.m. Settlement Organisation.  
Dr. Muir, B.E.L.R.A., and Dr. A. B. Macdonald, Itu Leper Colony.
- 2.30 p.m. The Organisation of control in Nigeria with a review of proposals and difficulties.  
Dr. T. D. F. Money, Oji River Settlement.
- TUESDAY 29th— 9.30 a.m. Some problems for research work in leprosy institutions.  
Dr. F. Davey, Uzuakoli Settlement.
- 11 a.m. The organisation of leprosy workers in Nigeria with reference to the use of lay workers.  
Dr. Muir, B.E.L.R.A., and Dr. A. B. Cook, Zaria Leper Settlement.
- 2.30 p.m. Field survey work in connection with research and control.  
Dr. Muir, B.E.L.R.A.
- WEDNESDAY 30th—9 a.m. Visit Awwa Out-patient Clinic on route to Oji River Leper Settlement.
- 11 a.m. Diagnosis, including differential diagnosis of leprosy as seen in Nigeria, with Clinical Demonstrations.  
Dr. Muir, B.E.L.R.A.
- 2.30 p.m. Consideration of resolutions of Conference.  
Closing Session.

The following ten resolutions were passed unanimously.

RESOLVED :—

1. That powers be taken to enable control of the area surrounding a leper settlement to be made effective for the creation and preservation of healthy conditions.

2. That this Conference recommends that the form of financial and statistical returns adopted by the Nigerian Branch of the British Empire Leprosy Relief Association be used in all leper settlements.

3. That this Conference commends to the attention of provincial Leprosy Boards the statement in the Cairo Leprosy Congress Report that " the present view is that the open case constitutes the greatest danger to the public health and therefore such cases should be prevented from contact with healthy persons, especially children."

4. That apart from a general enquiry through the existing services detailed surveys employing special staff are undesirable if not associated with the offer of treatment, and this Conference commends to the attention of the Provincial Leprosy Boards the Propaganda-Treatment-Survey System (Reference—Leprosy in Nigeria—Muir, 1936).

5. That we desire to stress the importance of research work in leprosy, particularly the assessment of the factors which comprise the resistance of the individual to the disease and the relationship of resistance to such questions as the type of disease, age groupings, nutrition and complicating diseases.

6. That all leprosy workers in Nigeria be encouraged to submit to the scientific sub-committee of the Nigeria Branch of B.E.L.R.A. reports (preliminary or final) of investigations or observations which they have made.

7. That each province (where it does not already exist) appoint as soon as possible a representative Leprosy Board to formulate and carry into effect schemes for leprosy control and relief upon a provincial basis.

8. That administrative officers should be invited to co-operate to a greater extent in anti-leprosy work, and that facilities should be provided for their training at leper settlements.

9. That the Education Department should be represented on Provincial Leprosy Boards and should be kept informed periodically of the development of leprosy work in the various provinces, that special training should be given in training colleges including visits to leper settlements, that it is desirable that leprosy should be included among the subjects upon which teachers are examined.

10. That facilities should be provided for leprosy lay workers, as need arises, for obtaining special courses of training under the Agricultural, Forestry, P.W.D., Health, Veterinary, and other Nigerian departments, and that organisations sending out lay workers to leprosy institutions should consider arranging for courses of instruction at home in such subjects as bookkeeping, building, photography, carpentry and scouting.

## \*LEPROSY IN NIGERIA

SIR RUPERT BRIERCLIFFE

I wish in the first place to associate myself with the words of welcome which His Honour has extended to Dr. Muir and yourselves, and then I am sure you would wish me, as Chairman of the Conference, to thank His Honour for coming here today to open our proceedings. His interest, and the presence here of His Honour the Chief Commissioner, Northern Provinces and of a number of Residents are sufficient indication of the importance of leprosy as an administrative problem in Nigeria.

*The problem.* In a population of about twenty million people we have, at the lowest estimate, some 200,000 lepers; an incidence of at least ten cases per thousand of the total population. Of the countries of the world probably only India and China contain a greater number of lepers than Nigeria, but even in those two countries the incidence of the disease is probably not so high as it is here. The problem we are faced with is, therefore, one of vast proportions and is beset with the greatest difficulties.

*History.* We can trace the history of our present leprosy policy and organisation back to the year 1926. The Leprosy Ordinance of 1916 has played a comparatively small part in shaping policy, and many of its clauses are now a dead letter. If they were not, it would have been necessary many years ago to have changed the Ordinance. We do not, for example, regard our Settlements as places for confining lepers who have been convicted as idle or disorderly persons or as rogues or vagabonds, though these are the actual words of Section 20 of the Ordinance.

It was about 1926 that the leprosy work of the Medical Missions began to take shape as the result of the lead given by Dr. Macdonald at Itu, and it was in 1926 that the British Empire Leprosy Relief Association began to take an interest in Nigeria and sent out its Secretary to visit the country. This visit resulted in the formation of the Nigeria Branch of the Association in 1928, and Government has come to regard the Executive Committee of the Branch as its chief advisor on leprosy problems. That position was strengthened by Dr. Muir's visit in 1936, and his report "Leprosy in Nigeria" has been officially accepted as the basis for future action, on the understanding that the pace at which its recommendations can be implemented must be governed by the

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\*Address of the Director of Medical Services to the Leprosy Conference held at Enugu, S.E. Nigeria, August 28th-30th, 1939. This was read after H.H. the Chief Commissioner had welcomed the delegates.

general financial position and that the policy must still be regarded as largely experimental and liable to modification in the light of experience.

*Government Control.* The International Congress held in Cairo last year, emphasized the fact that "the control of leprosy is the unescapable responsibility of the governments concerned." In Nigeria the disease is one of our major public health problems, and it is essential for the Central Government to accept responsibility for the general direction of the leprosy work of the country. The Central Government, as represented by the Nigerian Secretariat in Lagos, exercises its control over this work through two main channels. The first—the administrative—proceeds via the Chief Commissioners to the Residents who are the Chairmen of the Provincial Leprosy Boards where these exist, and so to the Settlements and the Missions managing them. Through this channel pass such matters as the agreements between Native Administrations and the mission accepting the management of a Provincial Settlement, the provision of land, the annual contributions of the Native Administrations, requests for financial assistance or the technical help of Government departments on subjects such as the development of a water supply, the most suitable type of agriculture or the opening of a settlement school.

The other—the medical channel—is from the Central Government through the Director of Medical Service and Senior Medical Officers to the Provincial Settlements and their Medical Superintendents. The Director of Medical Service, as Chairman of the Nigeria Branch of the British Empire Leprosy Relief Association, keeps Government and the Association in touch with one another. This channel deals with scientific investigations, experiments in control, treatment, the supply of anti-leprosy drugs, propaganda and similar technical matters, and also with the annual grant of £5,000 made by Government to the Nigerian Branch, and with Toc H personnel.

There are cross channels between the Chief Commissioners and the Director of Medical Services and between Residents and the Senior Medical Officers, who are members of the Leprosy Boards in the Provinces where they exist.

The Executive Committee of the Nigeria Branch of the Association has the Honorary Adviser on Leprosy to assist it in the consideration of technical subjects and also a scientific sub-committee which examines reports and proposals of a scientific nature.

*Provincial Settlements.* Let me now refer to the present position of the Provincial Settlements. Dr. Muir states in his report

that there should be one first grade leper settlement in each province where the incidence of leprosy is high and that in provinces where the incidence is lower it might be more economical to have one settlement for two Provinces. There are twenty-three Provinces, and fourteen of them have settlements which can be classed as Provincial Settlements, though some of them are not yet first grade.

The success of the voluntary system of segregation as practised in Nigeria is evidenced by the constantly increasing demand for admission to the settlements. The number of inmates has increased from about 2,500 ten years ago to nearly 7,000 at the present time, and would be much larger if more money was available.

The accepted principle is that the Native Administrations should pay for the upkeep of the Provincial Settlements, when they are able to do so. The usual practice is for Native Administrations to contribute 1s. 3d. a week in respect of each of their indigent patients in the settlement. They also provide the land in the first instance and often contribute towards the cost of housing the patients and of the drugs and dressings. The annual cost of upkeep of the Provincial Settlements varies from less than £3 per patient to more than £5, and depends very largely on the size of the settlement and the extent to which it has become self-supporting.

Two Provincial Settlements require substantial grants each year to supplement the Native Administration contributions. These grants are made by the Nigeria Branch of the British Empire Leprosy Relief Association from the funds placed at its disposal by the Government. I should like to say here that the Nigeria Branch much prefers to expend its limited resources on grants for capital works, on the supply of anti-leprosy drugs and on investigations and experiments in control. In several settlements in the Southern Provinces the fees collected from paying patients form a useful source of revenue, and where a medical mission has accepted the management of a settlement the mission frequently provides the European staff at its own expense, and in the Northern Provinces occasionally makes a cash contribution in addition. Mention must also be made of the contribution made by the British Empire Leprosy Relief Association in providing free of cost to Nigeria the services of twelve Toc H leprosy workers.

Much progress has been made since Dr. Muir's last visit in placing the management of Native Administration Provincial Settlements in the hands of medical missions. This policy, accepted perhaps with some hesitation in the first instance, is proving increasingly helpful. It conforms with one of the findings of the

Cairo Congress, viz.: "that the maintenance of leprosaria should not be continued indefinitely by voluntary agencies but should increasingly become an obligation of governments . . . though their management can often best be undertaken by voluntary organisations." The policy was also supported by the West African Medical Conference held in Lagos last November. That Conference considered that (i) the management of leper settlements can with advantage be entrusted to medical missions responsible in so far as the settlement is concerned to the authority, whether Central Government or Native Administration, which is mainly responsible for the financial support of the settlement; (ii) it is essential that Government exercises central control over policy; (iii) the initial cost of establishing a settlement, viz.: the grant of land, cost of buildings, water supplies, sanitation, etc., should be met by the controlling authority with whom ownership would remain, the mission being regarded as the agent of the controlling authority.

So much for the Ordinance and its Regulations. I shall not refer to them again because, as I have stated, their general outlook towards leprosy is that of a by-gone age.

*Work outside the Provincial Settlement.* So far I have spoken only of Provincial Settlements, but as Dr. Muir has pointed out, "the leper settlement alone does not get down to the root of the problem." It is only part of an organisation to control the spread of leprosy. I regret to say there is little real leprosy work being done outside the Provincial Settlements. The difficulties of forming clan settlements have hitherto proved too great, and only small progress has been made in other measures of control. During the past two or three years very valuable surveys of small areas have been rapidly carried out by the staffs of several settlements in the south, and small-scale experiments in control are being undertaken in the neighbourhood of two or three of these settlements. But as yet no intensive survey has been made to give us a clear-cut picture of the leprosy situation throughout a whole province. For such large scale work, wholtime units under expert direction are required. Without careful surveys, epidemiological investigation is impossible, and I am afraid that in this matter Nigeria has not kept pace with certain other countries. The organisation of control is to be discussed later by this Conference so that I need say no more about it now.

*Treatment.* In Nigeria there is a great amount of indiscriminate treatment given outside the settlements by dispensary attendants and lay workers. It is carried on all over the country, but every medical man here knows that the haphazard administration



of hydnocarpus oil or its esters is a waste of time and may do harm. Our resources are so small that we cannot afford to allow money and effort to be expended in useless directions, and I trust our discussions will show how the personnel now engaged in this unprofitable form of treatment may be trained and employed to do useful work in the campaign against leprosy.

With regard to the drugs to be used in treatment, the Cairo Congress reported that "No proprietary preparation of hydnocarpus oil or esters or any other proprietary preparation at present on the markets is more effective than the pure oil and esters prepared in institutions. For this reason and because of their greater cost, the preferential use of such preparation is not recommended." Last February, notes by Dr. Muir on the Creosoted Hydnocarpus Oil Mixture were circulated to all medical men engaged in the treatment of leprosy in this country, and the Nigeria Branch of B.E.L.R.A. is therefore limiting its free issue of drugs to hydnocarpus oil, the creosote-oil mixture and the ethyl esters prepared in the Laboratories at Yaba.

*Propaganda.* We know how important it is to deal with malnutrition and bad social conditions in the fight against leprosy, and propaganda can do something in this direction. Just as in England, the campaign against tuberculosis has proved of enormous value in teaching the public the importance of fresh air and sunlight, so in this country where hygiene and sanitation are of such a low grade, the campaign against leprosy can be of great help in educating the people in the elementary rules of health. A certain amount of educational work in leprosy is done outside the settlements. The Nigeria Branch has distributed 3,000 copies in English of Dr. Muir's booklet on Leprosy Control and has had the book translated and printed in Hausa for use in Northern Nigeria. It is widely read in the schools and elsewhere and has been much appreciated.

*Humanitarian aspect of Leprosy Work.* I have perhaps in what I have said stressed the purely administrative and public health side of our leprosy work at the expense of the humanitarian side. I do not wish you to think I ignore that side of it. The medical profession turned its attention to the alleviation of suffering long before it dealt with the prevention of disease, and it is the humanitarian aspect of leprosy work that has appealed so strongly to the public in civilized countries and brought their medical missions into this field of activity.

*Lack of Funds.* What is the main handicap to the development of the anti-leprosy campaign in Nigeria? The answer is lack of funds.

Although Nigeria contains more than one third the population of the British Colonies, it has only one-eighth their revenue. Taxation amounts to about 5s. 10d. per head of population, which is less than in any other African Colony with the exception, I think, of Nyasaland. The annual expenditure of Government on its medical and health services is only 5½d. per head of population, while the Native Administration contribute another 1d. Government expenditure on these services has actually decreased during the past ten years owing to falling revenue, but I am glad to say expenditure on leprosy by the Government and Native Administrations has risen from less than £8,000 in 1928 to nearly £20,000 in 1938. To this latter amount Government contributed about £6,300, the Native Administrations of the Northern Provinces £7,600, and those of the Southern Provinces £5,950. Nearly 4% of the Government and Native Administration expenditure on medical and health services is for leprosy. These sums leave out of consideration the contributions of the medical missions and of the B.E.L.R.A. in London; but even so the annual expenditure on leprosy works out at only a little more than 2s. per leper if we accept 200,000 as the number of lepers in Nigeria.

Nigeria, unfortunately, is again passing through a period of severe financial stress and there is no immediate prospect of either the Government or the Native Administration increasing their contributions for leprosy. I trust, however, that in the course of our discussions suggestions will be made for raising funds to extend the scope of our work, particularly of the work outside the settlements.

We all know the fight against leprosy is going to be a long and very difficult one and that it must continue for generations to come.

To quote Dr. Muir again, the aim is to evolve a policy which however long it may take to put fully into action will gradually control and eventually eliminate leprosy. We are fortunate in having him present at this Conference to advise us and give us the benefit of his experience. During the past eighteen months he has travelled extensively in Tropical Africa and has gained an insight into some of the most economical ways of dealing with leprosy in highly endemic areas, and his account of these matters may be of very great help to us in Nigeria. This Conference has for the first time brought together from all over the country, Government officers and unofficial workers in leprosy, and its object will be attained if as the result of our discussions we can formulate more effective measures for attacking the disease, with the limited resources at our disposal.

## \*PROBLEMS FOR RESEARCH WORK IN LEPROSY INSTITUTIONS

T. F. DAVEY

Leprosy is one of the oldest diseases known to mankind, yet until recent years, apart from the discovery of the bacillus by Hansen, it remained one of the most neglected. Now at last the attention of research workers has been drawn to the disease and the last decade has witnessed a tremendous and ever increasing mass of research work designed to elucidate its many problems. So numerous are these that leprosy may almost be considered a research worker's paradise. Whether we refer to its etiology, pathology, symptoms, diagnosis, prognosis, treatment or prevention, every one of these aspects of the disease presents its challenging question marks. It remains almost the only infectious disease of known etiology, the bacillus responsible for which, has never been cultivated with any certainty, though there are those who maintain that the familiar *B. leprae* is not the causative agent at all.

An exhaustive study of the problems awaiting research in connection with leprosy would occupy a very considerable time and be quite outside the scope of this discussion which is concerned with leprosy work in institutions. I propose therefore to deal briefly with some of the problems which interest me and which I think are of importance to leprologists in Nigeria.

The opportunities for research work in leprosy institutions are of necessity limited. Most of us rather regretfully wish, that after the mind-absorbing routine of every day we could sit down and devote time to some of the practical problems associated with the disease. Some branches of study are totally within the province of the full time expert who is above the reach of clamant patients. We must leave to him such subjects as the cultivation of the bacillus, animal inoculation with human leprosy and the academic but very interesting study of the relation of leprosy to the ductless glands, especially with regard to the pigmentary changes associated with the disease. It is very unlikely that there is opportunity for studies such as these in Leprosy Institutions in Nigeria. What subjects are then available?

### 1. THE STUDY OF CASES OF LEPROSY

In the first place I think that there is an urgent need for the

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\* Paper read at the Leprosy Conference, Enugu, S.E. Nigeria, August 28th-30th, 1939.

simple straightforward study of cases of the disease, not on one occasion only, but on repeated occasions. Although found throughout the world, leprosy shows not inconsiderable changes in its manifestations from one country to another, and up to the present, throughout the literature, comparative studies have one serious lack, namely that Nigeria is excluded. All of us have a lot still to learn simply from the study of cases, and this needs to be pursued both in the laboratory and in the field. Such a study must be associated with what is the most important practical problem in connection with leprosy, namely the recognition of infectious cases.

(a) *Laboratory Investigations.*

All will agree that the most important practical problem associated with leprosy is, "which are infectious cases?" It is only when we know which cases are responsible for the spread of the disease that we can embark with confidence on any scheme of control. This question is as yet unsettled. It was included in the preliminary agenda for discussion at the Cairo Conference, but received scant attention there. The generally accepted view is that all cases that are bacteriologically positive on routine examination of the skin and nasal mucosa, may be considered as infectious. This very simple and easily proved criterion is in practice not as simple as it seems. Let us consider the different types of leprosy.

Commencing with neural leprosy, all are familiar with the resistant individuals in whom the disease takes the form of tuberculoid macules, commonly accompanied with nerve enlargement. These people are uniformly bacteriologically negative except when in a state of reaction, when they may be harbouring numerous bacilli in the lesions. This is a temporary phase and often initiates the process of resolution. Are these cases to be regarded as infectious at this time? If so, we have to agree to the existence of temporary infectious phases in leprosy. This is not a very important matter in the case of tuberculoid cases, as reacting tuberculoids are not very common, but it is of great importance in connection with other manifestations of the disease.

The next group of leprosy lesions comes under the heading of pale, flat macules, and together with the tuberculoid lesions completes, for practical purposes, the picture of neural leprosy in Nigeria. I have reason to believe that cases which exhibit neuritis without the appearance of macules are rare in this country, and are not of practical importance.

Pale flat macules constitute a most heterogeneous group of

lesions, the largest single group in Nigeria. On the one hand they include all tuberculoid lesions which are resolving for these elevated lesions must pass through a flat stage in the process of resolution. Leaving these on one side there remain all those lesions which are flat, hypopigmented, and exhibiting signs of nerve involvement. You may see an individual who presents a few large macules, discrete, clearly outlined, with a hypopigmented edge, well marked sensory loss in the lesions, and often return of the pigment and sensation in the centre of the macules. These cases, though lacking the massive cell response of the tuberculoids, are resistant and almost invariably bacteriologically negative. Their course is very chronic, and there is a marked tendency to self-healing. On the one hand, one sees not infrequently the person who is literally covered with small flat macules which spread radially, show little or no healing, and ultimately coalesce with neighbouring macules. Finally almost the entire body surface may be covered, and it is possible, if the sensory changes are not realised, for them to be considered not cases of leprosy at all, but simply individuals with a pale skin. These cases are not invariably bacteriologically negative, especially in the nose. The former type may revert to this type if the resistance of the individual deteriorates.

Turning to the lepromatous manifestations of the disease, no difficulty arises with nodular and diffuse forms. The resistance of these people is negligible and the skin teems with bacilli. One and all may be considered infectious. It is worthy of note that, as cases are considered in which the process is less active and the thickening of the skin less pronounced, a point is reached when the thickening is very slight. Hypopigmentation is not invariable in these cases, and it is easily possible for such a case to be overlooked altogether.

When we turn to cases with lepromatous macules, the problem of infectiousness rises to its full intensity, and in this connection the Cairo Conference is not very helpful. Its definition of the leproma includes the following : " as a rule lepromatous lesions are more ill-defined and diffusely outlined than the leprides, and they do not exhibit the same tendency to radial extension or the same changes of colour and sensation." This definition overlooks many cases of leprosy in Nigeria. It is an everyday experience to come across individuals who give a history of the sudden onset of numerous hypopigmented macules. At their onset these are usually very small and numerous, clearly hypopigmented, sometimes erythematous but almost invariably possessing a characteristic ruddy colour, due in all probability to minor degrees of erythema.

The lesions present a multitude of appearances, sometimes raised, sometimes flat. They are commonly, but not necessarily associated with thickening of the ears, and the skin is usually thickened. To the casual observer they may appear identical in appearance with pale flat macules or even with tuberculoid plaque lesions, but they are invariably positive bacteriologically. Anaesthesia is very common, but is ill-defined, not limited to the lesions. The skin between the lesions is also usually bacteriologically positive. As the disease progresses, the thickening of the skin may decrease. At the same time coalescence of the lesions occurs, and at last a point is reached where they become indistinguishable from the coalescing type of pale flat macule, and exhibit widespread pallor, frequent nerve involvement, and a slightly positive bacteriological result, often only on repeated examination.

Now lepromatous lesions have a characteristic histology, endothelial proliferation around blood capillaries in the neighbourhood of the infecting focus of bacilli being the first step. These endothelial cells together with local connective tissue elements become macrophages which are unable to cope with the rapid proliferation of the bacilli, and the typical lepra cells are produced. These cells, some vacuolated, others containing masses of bacilli maybe in a state of symbiosis, constitute a characteristic picture. This appearance is uniform in nodular and diffuse cases, but what of lepromatous macules?

Turning to neural lesions, Wade and others maintain that these also have a uniform histology of an essentially tuberculoid nature, marked in major tuberculoid cases, slight in pale flat macules. This appearance is distinct from the leproma.

We have seen that clinically and bacteriologically the two great sub-divisions of leprosy meet, and somewhere at their junction lies the dividing mark of the infectious from the uninfected case. If the two types have a distinct histology, what is the histology of those cases near to the concurrence of the two types? These are the cases which need further elucidation. There is a great need for a clinical, histological and bacteriological study of these cases which are between the lepromatous, acknowledged infectious cases on the one hand and the neural, uninfected cases on the other. If only infectious cases are to be segregated, it is essential to know on which side of the line these cases stand. The Lepromin Test may be of considerable assistance in the elucidation of this problem. There is no record of its use in Nigeria, and an unexplored field of research is awaiting investigation in connection with it.

We have, however, not yet exhausted the possible lines of research concerning the infectiousness of leprosy. Granted the

existence of borderline cases, is it not at least possible that there occur temporary infectious phases in cases which may be bacteriologically negative on a single examination? In S.E. Nigeria I have been impressed with the fall in the general resistance of the public to infectious diseases which occurs at certain times in the year, particularly between the months of May and July. The diet is poor, consisting largely of cassava, and the onset of the wet season brings mosquitoes, and with them malaria as a further factor in decreasing resistance. Oberdorffer has suggested that a periodic variation in resistance occurs, and this inevitably has a bearing on leprosy. The resistance of the individual is the key to the problem, and it is reasonable to expect that a lowered resistance may induce a case which is just above the threshold of infectiousness to cross that threshold and become infectious for a time, returning over the threshold when his resistance is improved.

It would be of interest to test the Sedimentation Index of a large group of people at intervals through the year and so ascertain the extent and time of the lowered resistance which is believed to occur.

(b) *Field Investigations.*

The other great sphere for the study of cases of leprosy is the village where the leper lives. A multitude of possible lines of research is available here. Survey work is in the nature of research and gives a complete picture of leprosy in an area such as the study of cases in an institution never can give.

Statistics relating to incidence, childhood rates, sex rates, type rates, contact rates can be assessed, and there are as yet scarcely any adequate data of this sort relating to leprosy in Nigeria. The observation of untreated cases over a period, the following up of contacts, the establishing of sources of infection, all these matters are of importance and can only be carried out in and around the homes of lepers.

Two other subjects remain for investigation in field studies.

(a) Reference has already been made to the bacteriologically positive case who presents little or no obvious thickening of the skin and also no hypopigmentation. Their existence among the general public would vitiate any scheme of control unless they were discovered. It would be of considerable interest to take a limited area in a neighbourhood where leprosy is known to be rife and test everybody bacteriologically. It is only by such a study that these cases could be revealed.

(b) In India, children suffer from a form of leprosy which is of great interest and which mainly consists of vague pale macules

which are often of a temporary nature only. Vague pale macules from numerous causes are found in Nigeria, but the possibility of leprosy being responsible in some cases needs to be investigated.

## 2. THE STUDY OF THE FACTORS COMPRISING THE RESISTANCE OF THE INDIVIDUAL TO LEPROSY

Returning to the Institution, the next great consideration awaiting study is that of the resistance of the patient to infection with leprosy. There can be no doubt that the key which opens the door to recovery in every case is the building up of resistance, and that is our primary aim in treatment. Many factors are concerned, for example, hygiene, exercise, intercurrent disease, and diet. The relation of leprosy to *craw-craw*, to worm infections, to avitaminosis, to malaria, to anaemia, all these things need working out. It may be that we should emphasise one factor more than another in treatment. Certainly an institution gives one an admirable opportunity for the study of leprosy in relation to diet. This is an important matter in Southern Nigeria, where the diet of the people often leaves much to be desired. This and similar studies are of considerable importance because the significance of the resistance of the individual in the progress of the disease cannot be exaggerated.

## 3. THE TREATMENT OF LEPROSY

Quite apart from the building up of the resistance of the patient so that he offers a barren soil to the bacillus, innumerable methods of specific treatment are possible. None of those available at present can be regarded as entirely satisfactory, and there is room for a great deal more research in this direction. Such research was especially advocated by the Cairo Conference, particularly with the use of dyes such as fluorescin. Leprosy Institutions offer the best field for studies of this description, which should be directed not only towards the discovery of a specific remedy for the disease, but also the relief of its complications, trophic ulcers, etc.

There are various other highly interesting fields for research in regard to leprosy, the problem of *Leprosy Reaction* for instance still remaining in doubt, but the lines of study which have been indicated are, I consider, those which should first exercise the minds of leprologists in Nigeria.



## LEPROSY IN BENIN AND WARRI PROVINCES OF NIGERIA.\*

L. LANGAUER.

In order to start propaganda, survey, treatment, in 1938 we announced that free treatment would be given to lepers who could not or would not be admitted to the settlement. The reaction was very curious. The chief of the nearest village brought me many patients, but not one leper! He was disappointed when I refused to treat them. He said there are some lepers around and he will let them know, but he would rather prefer that I opened a dispensary for all other diseases. In his opinion it was much more important. Then some lepers arrived, they were chiefly lepers from very far who were seeking admission to Ossiomo Leper Settlement and being disappointed, established themselves around the settlement along with some lepers dismissed from Ossiomo Leper Settlement for stealing, fighting, etc. Having no definite means of existence, being strangers in the area, they did not despise any means of earning money. For instance, women were prostitutes for lepers of the settlement. Ossiomo Settlement is surrounded in the vicinity of 5 miles chiefly by camps of strangers from all parts of the province, and even from other provinces, having their own excellent reasons for staying there. There are no real native villages nearby, which makes our outside work very difficult.

However, 82 lepers were registered to attend outside treatment, 11 were admitted to Ossiomo Settlement; 10 stopped coming after a few injections, three died, the others continued to come more or less regularly. Two only showed definite signs of improvement. The majority of these lepers coming for treatment needed chiefly food. I visited some of the huts where people were living. They were appalling. From the survey point of view the results were nil, because these lepers were chiefly strangers in the area. From the propaganda view there was no improvement, therefore the lepers and the healthy population could not see any advantage in the treatment. And as regards the treatment, without regular observation, without improving their health and giving decent food and lodging, in my opinion it was even harmful. Some of the patients were getting definitely worse.

Amongst all of them there were only two lepromatous (contagious) cases. Because of the reasons mentioned above, and as

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\* This is part of a report by the doctor in charge of the Ossiomo Settlement, Benin Province. A description of this settlement appears on page 62 of the last number of *Leprosy Review*.

some unpleasantness in the settlement, such as repeated burglaries, led to the suspicion of these outside patients, and as the healthy population around began to complain that too many lepers had established themselves around and were troublesome in the area, I decided to stop the out-patient clinic at Ossiomo and to establish it in some normal village where chiefs would be willing to cooperate. I proposed to one village in Agbor District, where I knew the incidence of leprosy was very high, to discuss what could be done for lepers. When I arrived there heavy rain started, which naturally prevented lepers coming. I asked the chiefs about the population of the village based on the tax-paying members, because they could not tell it otherwise. Out of a total of 600 inhabitants, 60 lepers arrived; out of these 11 were of the L3 type (contagious). The chiefs declared that they were much more numerous, but the rain prevented them coming, and also they were afraid.

Then, for the first time, I heard the following story about the first year of the Ossiomo Leper Settlement. In 1931 the general population and the lepers were convinced that inside the settlement was a big hole into which lepers were pushed and buried alive. This explains why at the beginning very miserable or ready-for-anything lepers arrived at Ossiomo Settlement. Now the settlement has won their confidence, but any attempt to count lepers still arouses suspicion, and outside free treatment is considered a trap. However, I had a talk with the 60 lepers who were present, and all of them said they would be willing to build a separate compound if they received injections; they asked nothing more. As for the chiefs, they put immediately the question of finance: "If Doctor comes, she will need a shed; who will pay for it?" "If Doctor comes, she will need a man to help her, it must be a man of our village and of course he must be paid."

I asked if familial segregation was practised, and they said it was in the old time, but now lepers are too numerous and too "bold" and resent strict measures which (being perhaps rather barbarous) might meet also the disapproval of "white men." It confirmed my own information and the statements of several District Officers of our provinces. I refused to discuss any financial problems with them, mentioning that I was willing to undertake treatment gratis, but that would be all I could promise them. I proposed also to train a boy of the village to do propaganda work against leprosy, and the chiefs sent me a boy who is now finishing his training with me. He received from me courses on leprosy, first-aid, general hygiene concerning villages, habitation, tropical diseases and their prophylaxis. I was going to start injections in this village, but, unfortunately, the officer in charge of the

medical stores informed me that it was not advisable to ask for extra supplies of hydnocarpus oil as there might be a shortage of supplies due to war conditions.

I decided then to start anti-leprosy propaganda through education of the people. I noticed before that my lepers themselves are the best propagandists, and I particularly insisted in the settlement on their having the right ideas about leprosy. Usually each of the inmates goes on leave for two weeks every year, and their obvious improvement, cleanliness and confidence in treatment make an impression on the population. Very often lepers returning from home bring one or two lepers for admission to the settlement. They have begun to understand that early cases are rather easier to cure, that the lepromatous type is contagious, that children are particularly sensitive to leprosy, that good food and cleanliness are important in the treatment of leprosy, and they carry these ideas to their villages. Very often they bring me people to examine to be sure whether it is leprosy. Natives of this area have poor general health, due probably to deficiency of food and the general unhygienic conditions of life. Many villages in Warri Province are surrounded by swamps and this dampness is certainly favourable to the increase of leprosy. The peculiar mentality of the natives of this area contributes to the progress of leprosy. They marry lepers, they don't insist on isolation, and don't seem to be anxious for treatment. There is also a lot of inertia. They are glad if something is done for them, but they don't want to make any effort themselves, and if they let themselves be persuaded at the moment, their enthusiasm fades away very quickly. Moreover, there is much superstition; for example, some of the chiefs declare that they are able to cure leprosy themselves and see in Ossiomo Settlement a rival! I have a very curious letter about this. Nevertheless, very slowly we are succeeding in introducing right ideas on leprosy into the people. It is also through our patients of Benin Division that we could bring the right kind of patients to out-patient clinics which we re-opened in October, 1939, at Ossiomo Settlement.

Eighteen patients are now attending regularly this clinic, but I refuse treatment to those from outside the area and to lepers whose general health is very deficient (there were five in number). I advised them to improve their health by good food, exercise and cleanliness, promising to put them on the list of out-patients if I see any improvement. Several of these out-patients belong to the families of our inmates from Benin Division. It is curious to observe that from the same family we treat sometimes three or four persons, and they are not vague "brothers," but close

relations. Now and then out-patients receive some drugs and dressings which we succeeded in collecting at home, because Ossiomo funds cannot afford to contribute anything for the out-patient's clinic. Due to paucity of the population and the mentality of natives, the number of these patients is not big (though increasing). Not one of them is of L. type. But the number of patients asking for admission to Ossiomo Settlement is increasing, and there are days when we refuse admission to three to five lepers, and they continue to knock at the door.

Out of the total patients at Ossiomo, 62 are paying patients. They pay for their maintenance at Ossiomo Leper Settlement, drugs and clothing included, and contribute towards administrative expenses by their work. They pay £2 6s. od. per year. Their number is growing. I regret that so many patients are admitted to the Settlement with Paupers' Certificates, when they positively could pay this amount. I consulted this year several District Officers on this subject, but they were all rather pessimistic. Families " would not like " to pay for the lepers. I expect we will be able to accommodate 500 patients without asking for extra funds if all new admissions are of the paying-patients category. But we must not forget that our aim is not to segregate in the Settlement a few hundred from thousands of lepers in our provinces. Our problem is how to stamp out leprosy in our provinces.

The Enugu Leprosy Conference expressed the wish that this work should be carried on on the basis of propaganda-survey-treatment method. Those who know the conditions of life in the Provinces of Benin and Warri know their special difficulties. We must not, therefore, copy slavishly the methods of other provinces, but adopt plans, as recommended at the Enugu Conference, according to the conditions of our provinces, making of Ossiomo Leper Settlement a big inter-provincial centre of the anti-leprosy campaign, as is done in the other provinces.

## THE POTASSIUM IODIDE TEST IN LEPROSY

B. MOISER.

Several years ago in Nigeria, I decided to try the Pot. Iod. Test, but almost my first case met with disaster, the result being that I have been too scared ever since to make a second attempt.

It was, therefore, with considerable trepidation that I undertook to carry out a series of tests here at Ngomahuru, at the request of Dr. Muir, who was then visiting this hospital. I expected to be let in for considerable trouble; but nothing of the sort occurred, and I was agreeably surprised to find case after case finish the test without any untoward signs whatever.

The cases, both men and women, were chosen from amongst those whom I considered to be ready for discharge.\* All were in good health and of robust build, and nearly all had been negative to the microscope for some time.

The patients were kept in hospital under observation, temperatures were taken morning and evening and a close watch was kept on the skin, and on the condition of the nerves and old residual lesions.

The drug was given once a week, and the dose doubled each time so long as not contraindicated. The initial dose was 5 grains, second week 10 grains, third week 20 grains, and so on till the 7th week, when 320 grains were given in about a pint of water.

Several patients objected to these large doses, but all were persuaded to swallow them down, though with considerable grimace. A few complained of abdominal pain, which soon passed off, and was of no consequence. Some had a feeling of tightness in the throat, and I was astonished to find that none complained of coryza or tearfulness. There was occasional pain over the frontal sinus, but no skin eruptions were seen in any case, and no albuminuria occurred. In fact there were practically no symptoms of iodism, and the whole experiment was so ordinary in every way as to be almost unworthy of note.

Only one patient could not finish the course, and he was a man who had been admitted a couple of years ago with active syphilitic ulcers and bone disease as well as leprosy. He had been treated with N.A.B. and bismuth metal and become negative to Wassermann, and showed no active signs of leprosy. He was not, however, a very robust patient and was evidently, as events showed, not yet fit for the test.

It would be tedious to quote each case individually, so I will just give a summary.

Thirty-three men and seven women were put through the test. In not a single case was there any exacerbation of skin lesions, or painful or swollen nerves, the only cause of discontinuance being

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\*The patients chosen for the iodide test were former lepromatus cases which had become and continued negative on repeated bacteriological examinations. For particulars of this test, and the dangers associated with it, see *Leprosy Diagnosis Treatment and Prevention* (E. MUIR, 6th edition, pp. 181).

rises of temperature with general malaise. This occurred in eight men and three women. In each case an interval of a month was allowed, and the test continued without further interruption, except for the old syphilitic case, mentioned above, who ran an evening temperature of under  $100^{\circ}$  from the beginning, to be followed later by temperature up to  $103^{\circ}$ , with marked general malaise.

All these patients have now been discharged from hospital, and my confidence has been regained to such an extent that in future the test will be applied to every patient who is being considered for discharge.

During 1939, no less than 170 patients have been discharged with the disease arrested. I should like to call them "cured," and time will show if I am right or not. With the voluntary system in vogue in this country, any who discover signs of recurrence of the disease will surely return for further treatment, of their free wills. There is no need to seek them.

I feel much indebted to Dr. Muir for instilling sufficient courage into me to carry out a test which had previously filled me with alarm. The two cases are, however, not on a parallel. In Nigeria results of treatment were nil. In S. Rhodesia results still cause wonder, for in 10 years 53.9% of patients have been discharged, and have not returned.

Only 69 returned for further treatment, each of his own desire.

## A VISIT TO THREE LEPER SETTLEMENTS

J. HOWARD COOK.

At the end of May last year I returned from a five months' tour, through Uganda and the Sudan, deeply impressed by the value of co-operation in the prevention and treatment of leprosy.

There are many partners in this great co-operative venture—The British Government, the Native Administration, B.E.L.R.A., Toc H, the Mission to Lepers, and Missionary Societies like the C.M.S. and R.C. Missions—all working, or helping the work, in the areas I visited.

Compulsion is no longer found necessary in the treatment of leprosy, attraction has taken its place. Hence, lepers come at an earlier, and more amenable, stage of the disease. This gives new hope to the once hopeless patient, and attracts others. Occupa-

tional therapy gives an added interest to life and reduces cost of maintenance. Education fits the leper for a share in the administration of his colony and in the treatment of fellow-lepers.

Three places that I visited specially show the value of co-operation, and the generous help that has been given by B.E.L.R.A. in many ways.

I. C.M.S. LEPER SETTLEMENT, BWAMA ISLAND (L. BUNYONYI),  
UGANDA

This island was visited by Dr. Muir on May 17th and 18th, 1938, my visit was nine months later, March 3rd, 1939. Dr. Muir's report,\* which I had with me, was a great help, for I was able to go through it, point by point, with the staff, and see how far his recommendations had been carried out.

The West end of the island, including the two promontories known as Jericho and Nazareth, have been set apart for the isolation of infective cases of leprosy. Twelve advanced nodular cases, found by Dr. Muir in the school at Bethany (East end of the island), were on his advice transferred to the quarantine area. Four more cases, which he suspected, but regarded as "non-proven," were later found to be bacteriologically positive, and were quarantined. A general survey of every case on the island is now made at least once a year. At the time of my visit there were over 90 cases isolated as a result of slides having been taken and found positive by nasal or skin tests.

Children hitherto living with infectious parents have, since Dr. Muir's visit, been housed at night with non-infectious families, and during the greater part of the day they are also parted from their parents (e.g., during school hours, or sports). Contact only arises through the children at present having to help their parents cultivate and at meal times.

Seven recommendations for treatment made by Dr. Muir have been carried out with benefit. The diet of the patients has been improved. Two fishermen are employed exclusively for the island. Eggs are obtained for the Crèche children. Fresh vegetables and fruits are increasingly grown.

Since Dr. Muir's visit, 42 cases that became "symptom-and-sign-free" had been discharged by the time of my visit, making room for fresh acute cases.

I spent a considerable time at the Jericho end of the island, where I found 93 cases of leprosy quarantined. I am satisfied that no compulsion had been used to get 90 of these to go to the island for treatment. Three wished to leave, two because they were discouraged at not making more progress and "wanted to die at

home." The third, I think, had a legitimate grievance. He had left his crops in the ground with no one to look after them, and when his chief advised him to go to Bwama for treatment, he took this to be a command. It isn't always easy to distinguish between advice and moral compulsion, if the advice comes from one's chief! On my suggestion he was allowed to go back to secure his crops.

Another example of B.E.L.R.A.'s help was the sending to this colony of an experienced Toc H man—Mr. Lambert—some months after I had left. I have no doubt that the help thus given will prove of inestimable value, both for agricultural development and the initiation of occupational therapy.

## II. KUMI AND ONGINO (E. PROVINCE, UGANDA)

The Ng'ora Leper Mission (C.M.S.) includes two settlements, one at Kumi—popularly known as the Children's Home—and the other at Ongino, about three miles distant. The latter is for acute adult cases. Formerly this branch of the work was at Kapiri, 15 miles from Kumi to the North, near Lake Salisbury.

The Kumi home was founded by Dr. C. A. Wiggins, and opened on February 1st, 1930. It is a bit of a misnomer to call it by a name which suggests a single institution. It is really a settlement with many institutions—homes, schools, hospital, dispensary, sports grounds, etc. There is also a settlement for healthy children, separated from the leper children by a broad road, and the careful vigilance of a very competent staff.

Dr. Wiggins started the work at Kapiri by the erection of a hospital for nodular cases. This was opened on November 8th, 1930. The work was transferred to Ongino in 1935.

Both settlements owe a great deal to the generous help of Government, Mission to Lepers, and B.E.L.R.A.; and to Dr. Muir's helpful visit, May 31st-June 4th, 1938.\*

Since this visit, and the high commendation that Dr. Muir was able to give to the work at Kumi and Ongino, I found the staff cheered and encouraged, and fired with increased zeal to try out new methods, and implement all the helpful advice he had given.

Government, which has always taken a keen interest in the work, had prior to my visit made increased grants, and the Governor had visited both settlements, shortly before my arrival in Uganda.

At Ongino the social side of the settlement has not been overlooked. A shop is provided at which lepers can for a small outlay purchase books and other commodities. Healthy lepers are encouraged to cultivate small garden plots, thus securing food



for the colony, and healthy exercise for the able bodied lepers. There are 400 lepers in the settlement.

At Kumi, shortly before my visit the staff had been strengthened by the transfer of a trained C.M.S. Nursing Sister, Miss A. F. Kent, to join the Superintendent, Miss Laing.

Nearly all the building in the Kumi settlement is done by non-infectious leper boys from the upper classes in the school. There is a model farm of cows, pigs, goats, sheep, ducks and poultry, also in charge of leper lads. Orchards of fruit trees provide a rich variety of vitamins, and a fringe of cassia trees surrounds the site where untainted children are reared.

The water problem has been solved along the lines suggested by Dr. Muir. The intermittent supply of rain water from roof-tanks is supplemented in the dry season by the sinking of a new well, and the importation of a pump, which I found installed, and in use.

I was struck by the up-to-date methods of record keeping in the office of the Kumi settlement. This is based on Dr. James Maxwell's work on leprosy (Shanghai, 1937) the records being plotted out as graphs on a chart.

Perhaps the most spectacular thing I saw was the daily massage drill with hydnocarpus oil, and the charming games and dances performed by happy little groups of children.

### III. \*LUI (C.M.S.) S. SUDAN.

At the time of my visit, April 4th, 1939, there were 75 lepers in the colony, the majority being "burnt-out" cases—sadly deformed and helpless; but, from a leprosy point of view, non-infective and to a large extent free from the disease. Only 20 were of the nodular type.

There is a leper school with leper teachers, supervised by Mrs. Fraser, who has lived nineteen years among the Moru tribe at Lui. Occupation therapy is encouraged. The able-bodied lepers cultivate their food in half-acre plots. Football and sports are encouraged.

Plans have been initiated for a P.T.S. (Propaganda-Treatment-Survey) investigation of the needs of the district. The C.M.S. are sending a doctor to work with Dr. Casson, and B.E.L.R.A. has sent one of its Toc H experts to help in developing this research, and initiating plans for treatment. Government is prepared to co-operate and make substantial grants, though possibly the war may interfere with this. A C.M.S. house is ready for the new workers and the local Mission authorities thoroughly approved, and Dr. Casson is very keen on the whole scheme.

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\* *Leprosy Review*, Vol. X, No. 1, Jan. 1939, pp.19, 20, 31, 41.

## REVIEWS

**International Journal of Leprosy, Vol. 7, No. 3, July-September, 1939.**

J. N. Rodriguez and H. W. Wade begin a series of important articles in which cases examined and described in detail five years ago are reported on as to their present condition. During that time they have been living in their own homes and have had little or no treatment. The skin lesions of 52 neural cases are described, dividing them according to the condition of lesions when first seen. The changes are summarized in a table as follows:—

Lesion Group	Cases		Changes of lesions			
	Original number	Number seen in 1938	Residual or gone	Improved not residual	Stationary	Worse
1. Anaesthesia only ...	3	3	3 <sup>b</sup>	—	—	—
2a. Residual, without atrophy	7	7	7 <sup>c</sup>	—	—	—
2b. Residual, with atrophy ...	6	5	5	—	—	—
3a. Simple, quiescent ...	8	7	2 <sup>d</sup>	1 <sup>e</sup>	1	3
3b. Simple, active ...	11	10	3	1	1	5
4. Papulate ...	9	8	7 <sup>f</sup>	1 <sup>g</sup>	—	—
5. Minor tuberculoid ...	4	4	1	—	1	2
6. Major tuberculoid ...	4	2	1	1	—	—
TOTALS ...	52	46	29	4	3	10

- a. Not including cases followed for from one to three years.
- b. Not considering purely neural changes.
- c. In one instance (Case 4) the original lesion is gone but a slight new one present in 1938. Two cases (Nos. 7 and 9) with aggravated polyneuritis.
- d. Lesion removed entire in one case (No. 24).
- e. New recent lesions have developed (Case 20).
- f. Including Case 42, now with a new solitary lesion.
- g. Case 44; only a little left, but not wholly inactive.

It is considered that “whether the lesion be simple or tuberculoid, there is a much better chance that a case will clear up when there are only one or a very few leprids (i.e. the lesser *Nr* cases) than when such lesions are multiple and extensive. That is rather strikingly brought out in the active simple group, in which four of six with solitary lesions have cleared up or are really improved, while only one of the four with multiple ones has improved.” “An intriguing though common feature of the process of improvement in this form of leprosy is the way in which forces favourable and antagonistic to the disease process vary locally in various parts of the skin. Inactivation and healing in one lesion may occur simultaneously with progression in another, and such differences occur even in different parts of the same lesion.” It is remarked that “workers in India lay much stress upon thickening of the cutaneous nerves that supply the areas of the leprids, due

to direct extension upward of the tuberculoid process. In our 1936 examinations we gave particular attention to this matter and our findings confirmed previous experience that, in the Philippines, important thickening of the cutaneous nerves in relation to the leprids is uncommon. In only one of the major tuberculoid cases was a notably affected superficial nerve found; histologically it was typically tuberculoid, with caseation." "A related feature that we have encountered is polyneuritic affection of a single extremity, on which there has been a leprid. In such an event the question arises whether the deep nerve trunk was affected by continuity through the cutaneous nerve and lateral spread from that part of the trunk to parts that supply the muscles, or by accidental metastatic seeding from the blood stream. If the latter course is the actual one, it seems a strange coincidence that in not less than four of our cases there is unilateral polyneuritis of the same members that have had macules, and not a single definite instance of that affection in a limb without a macule. If the lesion does reach the trunks by way of the cutaneous nerves it often, if not usually, does so—in Philippine cases—without producing gross enlargement of those nerves."

A. A. Stein writes a second article on the *Morphology of the Lepra Reaction* and describes especially the histological changes in existing lepra lesions when they become activated.

A valuable practical paper by G. A. Ryrie describes *Plantar Hyperalgesia and the Prognosis and Treatment of Leprosy*. "Plantar hyperalgesia does not appear to be a significant feature of general, nonleprotic disease. It is, on the other hand, a usual feature of lepra reaction except where the disease itself has caused impairment of sensation. It occurs in a large number of non-reaction lepromatous cases, in general among those whose histories show that they are not doing well. In twelve cases where reaction was carefully induced with potassium iodide, it proved to be the earliest objective evidence of activity." . . . "What may be termed the P.A. method of determining individual dosage in lepromatous cases is now being tentatively employed in Sungei Buloh. When deep plantar sensation is normal, the dose is pushed up to what is considered to be a satisfactory maximum, and it is lowered when there is the slightest indication of hyperalgesia. When plantar hyperalgesia is elicited, patients are examined for concomitant ailments—pyorrhoea, helminthiasis, anaemia, septic foci, etc., and prophylactic antireaction treatment is given. In addition, resistance is reinforced as far as possible by diatetic

means. The aim is to get the patient back to a state of normal plantar sensation. The assumption is made that every patient with PA+ or PA++ is to be regarded as in danger until by general and specific methods his hyperalgesia is lowered." Hyperalgesia was found in varying degrees in 477 out of 1,117 lepromatous cases which on further analysis indicated that they formed at least four separate groups :

(1) Cases with plantar analgesia and anaesthesia of varying degrees; these are classified as PA —. This group was found to be a heterogeneous one, which can be put aside for the time being.

(2) Patients with normal plantar sensation, on testing first with cotton wool and then by heavy stroking; these are classified as PA+.

(3) A group in which varying degrees of definite hyperalgesia were elicited by heavy plantar stroking; these are classified as PA+ and PA++, according to the degree of pain.

(4) Leprosy reaction cases with severe pain on heavy stroking; these are marked cases, PA+++.

The method used to elicit the plantar response is as follows:

"With a coarse wisp of cotton wool, brush lightly and without pressure over the plantar surface to determine if tactile sensation is intact. Hyperkeratosis if present has to be allowed for. Then with the wooden end of a pen or some similar instrument, stroke firmly and evenly along the plantar surface from heel to toes. It helps if an assistant talks to the patient while this is being done. The normal sensory response is a feeling of pressure and ticklishness.

"There are certain minor difficulties connected with the test. In some languages and with some patients 'pain,' 'ticklishness' and 'normal sensation' are not easily differentiated. This is especially the case where interpreters are employed, because of the almost universal tendency of interpreters in the East to avoid giving an exact translation of what has been said. It also arises when doctor and patient are using a *lingua franca* foreign to both. Nervous withdrawal of the foot sometimes occurs, more frequently, with Indians than with Malays or Chinese, and this can be a real obstacle with some patients. The nervous effect may be marked—rarely there may be uncontrollable laughter, and in two instances I have seen the test cause spontaneous micturition.

'Nervous withdrawal of the foot occurs immediately on the first touch or pressure; pain on the other hand occurs during the actual stroking. Response to pain varies considerably in different races and individuals, and this has to be allowed for. A Chinese patient, for instance, may state quite truthfully that the test has caused considerable pain although there has not been the slightest flicker of muscular response to indicate it. A Malay or Indian, on the other hand, may display a marked motor response to a lesser degree of pain. Another minor difficulty in practice is that patients in a queue tend to imitate the person previously examined, in their anxiety to do what is apparently expected of them.

"Patients with anaesthesia of the foot are difficult to assess, and each case must be considered individually. Obviously anyone with anaesthesia of the soles and algesia on heavy stroking is beyond the reach of this test; the prognosis, however, at this stage is usually obvious. On the other hand a patient may have anaesthesia but be PA+ on heavy stroking. Here the overlying anaesthesia may have dulled a response that might have otherwise been acutely painful. This has been observed in cases of actual reaction. The patient's statement that his feet are not anaesthetic is no criterion; it is surprising how many patients are unaware of anaesthesia of the soles. Such cases may be masked PA+, and would then have to be treated accordingly. A little practice enables one to form a fairly accurate judgment of them.

"The results of this test in advanced cases require further elaboration. The prognosis and the response to treatment of L<sub>3</sub> cases is unfortunately only too well known, without any test. It is, however, desirable to

know if an advanced case is likely to develop a reaction. The results of the test in these cases are somewhat confusing to begin with. For instance, an L<sub>3</sub> case may show obvious clinical activity and yet be PA<sub>+</sub>. In general the more advanced the case the more feeble does the pain response or intensity index become. A PA<sub>+</sub> in the L<sub>3</sub> case must usually be interpreted as PA<sub>++</sub>, and the PA<sub>+</sub> must often be regarded as PA<sub>+</sub>. As stated, the test is mainly of value in the L<sub>1</sub> and L<sub>2</sub> cases.

"Although a PA<sub>+</sub> or PA<sub>++</sub> reaction indicates a poor prognosis so long as the patient remains in that state, normal plantar sensation should not be interpreted as indicating a hope of cure. I believe that condition to be an indication that the progress of the disease is slow, or that it is quiescent for the time being, or that there is improvement. Clinically normal plantar sensation indicates that the patient will stand a good deal of therapeutic interference without any special risk of harm. Patients with plantar hyperalgesia may improve, but as long as they remain PA<sub>+</sub> they are in the danger zone and improvement cannot mean much. The case with more or less continuous plantar hyperalgesia is on the reaction threshold all the time; he has accelerated the pace and will probably reach the burnt out stage more quickly.

"Plantar hyperalgesia may be elicited in the tuberculoid variety of neural leprosy, but this has not been found to be of practical value. In such cases anaesthesia and deformities are much more common than in lepromatous cases, which renders the test more difficult. But to the experienced eye tuberculoid activity is at once obvious, without any test. Furthermore, the treatment of that condition in practiced hands is so much more satisfactory than that of the lepromatous type of leprosy that special tests are not of the same value.

"In actual application in Sungei Buloh the test has proved extremely satisfactory. With a little practice it gives patient and doctor confidence in the individual dosage. It takes little time, calls for no special equipment, and can be done by any reasonably intelligent and careful patient. Where the staff is limited it is a quick method of selecting those patients who need special attention."

In a short paper R. C. Germond writes on *The Differential Diagnosis of Circinate Tuberculoid Leprides and Polycyclic Syphilides*. He summarises the following morphological features as the most characteristic:

"Tuberculoid leprotic lesions are not strictly polycyclic. They may consist of interrupted rings, but these are never formed by the more or less close juxtaposition of small semi-lunar elements.

"The surfaces of raised tuberculoid 'rings' are nearly always granulated, either finely or coarsely, though in some cases where infiltration is more deeply seated it may become smooth, as in syphilis.

"The coexistence of polycyclic syphilides with black pigment. This pigmentation may be uniform or finely punctate; it may be situated on the sites of 'healed' lesions, or it may run along the base of active, raised syphilides, forming, as it were, a shadow of the lesions. Such a disposition I have not observed in leprosy.

"The crinkled 'tissue-paper' appearance of healed tuberculoid leprides is pathognomonic. It is very exactly comparable to the film which gathers on the surface of a cup of tea or coffee as it cools. Both appearance and colour are identical. The syphilitic scar is very different, while the leprotic scar often coexists with active leprides, which thus betray their nature."

F. A. Johansen and J. A. Trautman write on *Fever Therapy in Leprosy*. Fever was induced in the Kettering hypertherm, in most instances the temperature of the patient being maintained at 105° or 106° F. for five hours. In 15 out of the 18 cases complications caused the termination of treatment in less than scheduled time.

Since receiving the fever treatment 13 of the patients have become worse, 2 have remained stationary, 1 has been paroled, 1 died of pneumonia and 1 died of carcinoma. "It is our opinion that fever therapy has been of no benefit in the treatment of these cases, the disease having progressed as would have been expected otherwise, without interruption in its course. The treatment was helpful in clearing up secondarily infected ulcers and mycotic infections of finger nails and toe nails."

R. G. Cochrane, C. G. Pandit and K. P. Menon give *A Preliminary Note on Inoculation of Monkeys with Human Leprosy Material after Splenectomy*. Of the eight *Macacus sinicus* monkeys used, two died of complications. The results in the other six were not conclusive. It was considered that there was a greater chance of success if the animal was splenectomised two months after insertion of the nodule intra-abdomenally, with re-inoculation at the time of the second operation. "These experiments reveal the possibility of individual variability of the factor of resistance, and many monkeys may have to be used before one is found that is actually susceptible to the infection. Monkey No. 1 in our Series A may have been such an animal."

An article by E. Muir on *Leprosy in East Africa* is a precis of the findings of the tour in East Africa which appeared in *Leprosy Review*, January, 1939.

A valuable editorial by Dr. Wade appears on *Mycobacterial Diseases*. This editorial has been called forth by a publication, by the section on Medical Sciences of the American Association for Advancement of Science. Nineteen papers have been published in a volume entitled *Tuberculosis and Leprosy*. Abstracts from these papers are published under *Current Literature*, and the whole subject is discussed in the Editorial. The outstanding features of what is called "mycobacteriosis" are that the organism, whichever it may be, thrives inside the macrophages, and "that upon these cells depends the localisation of the process, as in the lungs in tuberculosis and in the skin and nerves in leprosy" . . . "Among other conclusions that have been arrived at through studies of the effects of different chemical fractions in animals, one is that the bacillary lipids act as stimulants for the mononuclear phagocytes. This is undoubtedly true, and the reaction of the tissues to a foreign substance or organism which gives rise to the 'tuberculoid' change has long since been called the 'lipoid reaction.'" A particularly interesting example is drawn from one of the articles.

" That of intravenous inoculation of rabbits with the avian tubercle bacilli, which produces for a time a condition—the Yersin type of infection—that is reminiscent of lepromatous leprosy. That condition, however, is not maintained, for if the animal survives the diffuse condition is replaced by one characterised by discrete tubercles; to carry the analogy to leprosy again that condition would suggest, however distantly, the neural tuberculoid form. Since more or less similar differences of infections can be produced with mammalian tubercle bacilli under proper conditions, Lurie asks if it may not be that these two phases—the diffuse (nontoxic, nonsensitized) and the nodular (toxic, allergic)—are developed in all of the mycobacterial diseases, in different degrees and at different rates."

### **Leprosy in India, Vol. XI, No. 4, Oct. 1939.**

Dharmendra and S. N. Chatterji write on *Total Excision of Early Neuro-Macular Lesions*. They summarise their results as follows:—

" Neuro-macular lesions in 22 cases of leprosy have been completely excised. It has been possible to keep only 18 of these cases under observation. In all but one of these 18 cases the only macule the patient had was the excised one. Out of the 18 cases kept under observation there have been signs of relapse in four cases—relapse at the site of excision in three cases and new lesions appeared elsewhere in the fourth case. There has been no relapse in 14 cases. Of the 14 cases showing no relapse 9 have been under observation for 1 to 7 months only, the remaining 5 having been under observation for 14 to 32 months. In most of the cases the period of observation is too short to allow any definite conclusion to be arrived at. It can, however, be said tentatively that, if cases are suitably selected, the complete excision of a lesion is not likely to be followed by a local recurrence of symptoms or by the development of lesions elsewhere, at least in a certain percentage of cases. It is considered that the procedure would have a definite place in the treatment of very early cases of leprosy even if it did good to a small percentage of the cases so treated. Anyhow, it is quite clear that the operation is free from any harm and there seems to be nothing against its being given a trial in suitable cases."

D. P. Rishi gives the results of re-examining cases discharged as "disease arrested" from the Chandkuri Leprosy Hospital, Central Provinces. As many as 324 cases were declared "disease arrested" during the years 1928-37. 128 of these were children and they had been periodically re-examined. 13 of these children relapsed, the relapse-rate being 10%. Of the cases declared arrested from time to time 202 were available for re-examination this year. Out of these 22 had relapsed, giving a relapse-rate of 10.89%. The relapse-rate in 154 neural cases was 8.5% while that in 48 lepromatous cases was 18.5%. In this series there was practically no relapse in cases arrested with slight or no deformity, while the relapse-rate in cases arrested with marked deformity was 20%. Chances of relapse beyond 10 years after arrest appear to be rare.

J. S. Narayan reports on *Neem Oil in the Treatment of Leprosy*. Sixteen cases were selected and the oil from the seeds

of *Melia azadirachta* was injected intradermally and intramuscularly. Clinical improvement was apparent in 6 of these 16 cases, 4 were slightly improved, 3 did not improve and 3, though improving, did not complete the treatment.

An article by J. Lowe is reprinted from the Indian Medical Gazette of August, 1939, on *Leprosy and Tuberculosis*. The following are some abstracts:—

“ In tuberculosis much work has been in recent years on complement fixation and similar work has also been done in leprosy. For complement fixation in leprosy we find that the best available antigen at the present moment is what is known as the WKK antigen which is prepared from tubercle bacilli, and there is considerable evidence to show that the immunological reactions of these two diseases have very much in common and that the two bacilli are antigenically related.

“ You will have heard about allergic reactions in tuberculosis and their significance, how they may produce a temporary increase in the clinical signs, and how the occurrence of these reactions is not necessarily a bad sign, for in some cases (but perhaps not in all) allergy goes hand in hand with immunity, and allergic reaction may be followed by quiescence and arrest of the disease. Similar reactions are also seen in leprosy and they may produce alarming symptoms which, however, always subside in time without any special treatment. These reactions are not infrequently followed by long inactivity and sometimes by arrest of the disease. The failure to recognise allergic reactions in both leprosy and tuberculosis, and the failure to attribute to these reactions their proper significance, is one of the commonest causes of errors of clinical judgment in dealing with these two diseases.

“ There are some indications that these two diseases are occurring in India in the form of long-period epidemics, and there are certain things which suggest that the epidemic of leprosy may be past its height, while the epidemic of tuberculosis may be now on the up grade. The available evidence is based on information concerning the incidence and severity of the two diseases.

“ Let us first consider leprosy. Statistics in India are very inadequate and unreliable, but such as they are, they do not suggest that the incidence of leprosy is increasing in India as a whole. The number of lepers reported in India in the census of 1871 was about the same as was reported in 1921 in spite of the very large increase in population during this period. (Recent census figures are nearly 50% higher probably as the result of more accurate enumeration). Another point is that work in recent years has shown, I think, conclusively, that the average case of leprosy seen in India is much milder than the average case seen in some other countries. These two facts, the mild form of the disease and the available statistical evidence, poor though it is, suggest that leprosy may be past the epidemic peak and may be on the downward grade. This does not mean that anti-leprosy work is not needed in India. On the other hand, it may mean that conditions are favourable and that we may be able to accelerate any natural tendency in the decline in the leprosy rate.

“ A study of leprosy in families shows that of young children living in contact with open infectious cases, a high proportion, sometimes between 50 and 80 per cent or more, sooner or later develop signs of the disease, and the disease tends to be severe; whereas of adults living under similar conditions, only about 5 per cent develop the disease, and the disease is often in a mild form. These findings indicate that children are more susceptible to leprosy than adults and that most serious infections are acquired early in life. Even when the disease appears relatively late in life it is often the result of an infection acquired early in life, an infection which has long lain latent.

“ I believe that similar studies of tuberculosis in families have given somewhat similar results. It is found, for example, that if a mother



is an open case of tuberculosis, she may infect child after child and the children often get severe tuberculosis, but the husband who is living with such a wife usually does not get the disease at all, or else gets it in a relatively mild form. These facts show the relatively high degree of immunity in adults. I have been interested to read that an increasing number of workers on tuberculosis is tending to regard adult tuberculosis as often being the late result of an infection acquired in childhood, although some workers think differently. At any rate it is clear that adults get the disease much less readily than children, although the difference may not be so marked in India as it is in Europe. The relative immunity of adults to tuberculosis is usually attributed to repeated subliminal infections early in life. It is, however, very difficult to explain the relative immunity of adults to leprosy on this basis. It appears to be a common natural development with age.

"I have given you some of my ideas about these two diseases, the 'twin diseases' as they have been called, leprosy and tuberculosis. My knowledge of tuberculosis is very limited and some of my ideas about this disease may be wrong. I do hope, however, that I have been able to do one thing, namely, to show how tuberculosis and leprosy are linked together and to the whole realm of medicine and public health. What does this mean in practice? It means several things. It means, firstly, that those of us who are specialists in one subject should keep in touch with other subjects, particularly allied subjects, and as far as possible with the whole realm of public health work. It means secondly that anti-tuberculosis and anti-leprosy work and other similar activities should not develop entirely independently of public health activities in general. They may be started by special organizations but they should keep in touch with general public health work and in course of time they may be incorporated in them. Thirdly, it means that the public health system should ultimately include anti-leprosy and anti-tuberculosis work as an integral part of itself. There is far too often a tendency on the part of medical and public health authorities to regard these two diseases, and particularly leprosy, as something apart from their general sphere."

**Treatment of Leprosy by Oxygen under High Pressure associated with Methylene Blue**, by A. C. de Almeida and H. M. Costa. *Revista Brasileira de Leprologia*, Vol. VI, 1938.

The authors describe their method of treatment which consists of some 6 intravenous injections of a one per cent solution of methylene blue, followed by 6 applications, totalling about 8 hours, of oxygen at 3 or 3.5 atmospheres. The immediate clinical effects are described as follows:—

"Immediately after the applications, on coming out of the apparatus, all the lesions appeared congested and slightly edematous; around the reddish tubercles, a very dark halo could be seen. On the days following, in some cases one could ascertain a decrease in the elevation of the infiltrated areas, increased softness of the lesions, some tubercles with a small scab in the centre, while others were in full suppuration period with partial elimination. After a lapse of time varying from 3 to 11 days, on an average after one week, on all patients the appearance of small, red pruriginous and short-lived patches was noted, located on the lesions or on apparently healthy skin. When these patches occur over a tubercle, this tubercle immediately shrivels or suppurates as a result. These patches appeared successively, at times overlapping, at others spaced at long intervals, and in some cases took the form of rashes."

The following clinical improvements occur in stages:—

"A marked decrease of the infiltrations, with consequent wrinkling of the skin, a softening of the lesions, a decrease or disappearance of the

tubercles through shrinkage or atrophy of the skin, leaving a crater-like aspect, or by inflammation and elimination leaving dark scars, which remind one of treated impetiginous or ecthymiform lesions. Although naturally incomplete owing to the insufficient lapse of time during which the cases have been observed, these results are in many instances of great interest, since they would have been difficult to achieve by any other means of treatment, the more so if the severity and extension of the disease in our cases is taken into account."

Much stress is laid on staining changes (diphtheroid and other forms) which are described as taking place in the bacilli after treatment, and the significance of these changes is discussed. Two opinions are contrasted: one indicating that these changes indicate destruction and elimination of the bacilli in a healing process; and the other that they occur in an exacerbation of the disease and are resistant, spore-like forms, indicating that the disease is increasing.

Possibly both views are to a certain extent correct. These changes are found in reacting major tuberculoids where the disease is being definitely eliminated, as many of these cases heal up spontaneously. In the reacting lepromatous case the irregularly-staining forms may also indicate destruction of bacilli; but in the latter the resistance of the patient is often brought to such a low ebb that fresh bacilli spread rapidly by multiplication and take the place of bacilli destroyed. In studying the details of the nine cases one notices that cases III, V, VII and IX, described respectively as C<sub>3</sub>, C<sub>3</sub>, C<sub>2</sub>N<sub>1</sub> and C<sub>2</sub>, have all negative skin findings before treatment. It is surely usual to find bacilli in the skin of cases classed thus. These negative findings are somewhat perplexing in trying to form an independent estimate of the effects of this treatment. In judging whether the changes described as taking place clinically and in the bacilli are different from those produced by a moderate dose of potassium iodide, one would require a more detailed description of the cases.

**Alfon.** We have before us a copy of a lecture delivered by Dr. J. M. Gomes, of the Instituto de Higiene, Universidade de Sao Paulo, Brazil, entitled *Three Months' Treatment of Leprosy with "Alfon."* Claims are made for the efficacy in Leprosy of Alfon, which is described as "a new therapeutic substance, a carotinoid, probably carotene 3 beta." It is made up according to the formula Carotin 0.1, Eucalyptol 15.0, Cotton seed oil 100 c.c., and 5 c.c. is injected thrice a week to begin with, and, later, every day. After 30 injections there is a rest of 10 days. It is stated in somewhat vague terms that great clinical improvement is made, but the chief claim is that

"Fifty-six of the 332 patients examined had shown negative results alternated with positive ones, when we began the new treatment. With

'Alfon' the negative results continued to be observed, while 60 more showed similar results, making up a total of 116 negative cases.

'In the third month there were 19 relapses, three of which had been negative in the hospital, with one, two or three bacilli in the whole smear. This is a remarkable result in the short space of three months, and the more so since besides a negative examination there was also a markedly improved clinical condition.'

A report of the Sao Paulo Leprosy Association on *Efficacy of Alfon in the Treatment of Leprosy*, appearing in *Revista Brasileira de Leprologia*, VII, 4, Dec. 1939, p.456, is not so reassuring. The following is an English abstract from the Portuguese made by Dr. J. W. Lindsay:—

"Alfon" is the trade name of a "Carotene" product prepared in the Pharmaceutical Laboratory of Mr. Renato Fonseca Ribeiro, a State official of the Public Health and Food Control Department. In August, 1938, the Sao Paulo Leprosy Prophylaxis Service received a request that a certain number of leper patients be placed at the disposition of Dr. José Maria Gomes, of the Institute of Hygiene, for the application of his new treatment by "Alfon." The Director of the Leper Colony of Santo Angelo (Sao Paulo) complied with this request and a total of 640 cases were submitted to the treatment. The experiments were begun the following month, September, 1938.

It was noticed that from the very beginning the experimenter, Dr. José Maria Gomes, was always accompanied on his visits to the Leper Hospital by the Laboratory Proprietor, Sr. Fonseca Ribeiro. Within twelve days of the beginning of the experiments, "Alfon" began to be advertised in the public press and broadcast on the wireless as a most marvellous specific for the cure of leprosy. Public lectures on the subject were also given in different parts of the country. So intense was this propaganda that the medical authorities began to wonder what it meant, and the Director of the Leprosy Prophylaxis Service published a protest against "a scientific experiment" being converted into a "commercial enterprise." Extraordinary and sensational claims were being made for the efficacy of "Alfon," "a remedy," it was said, "that could raise up in twelve days lepers who had been bed-ridden for months." This article does not reproduce the favourable reports that must have been given of the many cases that had been quoted to support the claims of the efficacy of "Alfon." After a year's trial (August, 1939) the Director of the Leprosy Prophylaxis Service ordered the suspension of the experiments because of the many disastrous results of the treatment, that were stated to have been observed.

In reprisal the promoters of the "Alfon" treatment threatened legal proceedings against the Director of the Leprosy

Prophylaxis Service and began a campaign against the methods of the recognised Leprosy Institutions.

In this article are given the names of over fifty Brazilian Leprosy specialists subscribing to the conclusions arrived at as the result of the observations made by them during the year of experimentation with "Alfon" in the Santo Angelo Leper Colony. They found that the experimenter had not exercised due care in the initial examination of the patients and no proper records were kept. No routine examination had been made or recorded during the course of the treatment; only subjective symptoms were recorded. Their findings were as follows:—

(1) That the "Alfon" treatment is distinctly "reactivant" of the disease, especially in its cutaneous form.

(2) Contrary to what the experimenter himself published, 'Alfon' was found to have no effect upon leprosy reaction or the neurites—rather did it promote these complications with more frequency, and sometimes with unusual virulence.

(3) Violent reactions were produced in the eye affections, very grave cases of ocular lesions occurring, and a percentage of 2.93 cases of blindness.

(4) In nasal cases "Alfon" produced considerable increase in ulcerations and nodules, a result which explains the intense positivity of the nasal mucosa immediately after the employment of the drug.

A detailed analysis is given of the clinical and bacteriological observations made during the period of observation of the 640 cases experimented upon.

**Negro's Skin.** *The Tropical Diseases Bulletin*, 37, 2, Feb. 1940, p.100, reviews a series of articles on this subject by L. J. A. Loewenthal, appearing in the *Jl. Trop. Med. and Hyg.* As there appear to be differences between the leprosy of dark skinned and that of light skinned people (see *Leprosy Review*, XI, 1, Jan. 1940, pp.4, 46, 70), the racial differences described in the anatomy of the skin may be of interest in this connection.

'No exact definition of a 'negro' is possible nor is it attempted. The term really includes all peoples with deeply pigmented skin, 'kinky' hair and some skeletal peculiarities. In dealing with the anatomy of the skin the following points are stressed. There is some relative thickening of the horny layer whilst the corium has a richer blood supply and the vessels lie nearer to the surface than in white skins. Most noticeable, however, are the large numbers of sweat and sebaceous glands; indeed the apocrine glands are three times more numerous than

they are in the white skin. The sebaceous glands are often independent of follicles, even attaining a very large size when connected merely with lanugo hairs. Actually lanugo hair is sparse and the coarse hairs of the body, scalp and beard show a 'frizzy' appearance consequent on elliptical cross-section and the fact that the follicles are themselves curved with the concavity directed towards the surface. Pigmentation in the nails is diffuse and increasing years often result in its appearance in longitudinal strips. Certain physiological functions receive special notice and among these the question of heat regulation is perhaps of greatest importance, for black surfaces absorb heat more readily than do others. Yet the negro stands tropical heat better than does the European. The relative abundance of subcutaneous fat, the superficial position of the vessels and the numbers of sweat glands suffice to explain the adaptation. The pigment protects against the effects of excess of actinic rays and additional fluorescence is given by increased sebum. The problem of actual colour and tinting shows considerable degrees of variation. It may be said that the darkest tribes are those who have lived on poor soil for generations whilst groups that have led forest lives tend to have lighter skins. The blood mixtures of immigrant tribes modify all the considerations, whilst in mulattoes the colour varies in a way by no means proportional to the blood mixture but rather as though the higher grades of pigmentation are incompletely dominant over the lower. The difference in depth of colour in different parts of the body is well-recognized but this inherited factor follows two general rules: the trunk is dark dorsally and light ventrally, the extensor surfaces of the limbs are dark and the flexor aspects are light. It is obvious that the degree of laxity of the skin is of importance, *e.g.*, bending the knee lightens the colour by reducing the amount of pigment per square inch as the skin is stretched. Normally paler areas are the palms, soles, back of the heels, clavicular region, the sternal area, the midline of the back, the supraorbital ridge, upper eyelids, malar prominences, tip of nose and chin, in front of and behind the ears and, lastly creases. Increased colour is seen in the nipples, the genitalia, back of neck, lower part of belly, lower eyelid, upper lip and the centre of the cheeks. The pigment concerned is of course melanin and it is surprising that the total amount thereof is yet less than one gram. The mode of its formation, chemistry and distribution are fully discussed. Its presence in mucous membranes is interesting, thus 89 per cent. show patches in the centre of the gum surface, 40 per cent. show pigment in the cheeks, 38 per cent. on the hard palate, 33 per cent. on the tongue, 30 per cent. on the lips and 26 per

cent. on the soft palate. Many children have a distinct rufous tinge in their hair which may not be lost until puberty, although it never persists after that age.

‘ Certain dermatoses are particularly common among negroes. A fibroplastic diathesis is seen in the ease with which keloids are formed, the hypertrophic scarring formed round chronic ulcers and in the perineum in uncomplicated gonorrhoea. Lichenoid lesions occur because the lichenoid papule is a common reaction to many different stimuli, a change which often renders exact diagnosis almost impossible. As a consequence few cases of prolonged irritation escape lichenification. Dermatitis papulosa nigra is naevoid and has never been reported in an individual of non-negro descent. On the other hand certain dermatoses are definitely more rare. Resistance to external irritants is increased, trauma from light is unusual and a natural resistance to certain diseases is believed to exist. Thus psoriasis, rosacea, eczema and seborrhoeic dermatitis are uncommon, whilst alopecia senilis and prickly heat are definitely rare. It is obvious that these people are less subject to cancer consequent on light and other external factors, but statements that melanoma and other forms of internal carcinoma are less common are much open to doubt. The author believes that individuals react to itching as diversely as do whites. The detection of the simpler lesions may be fraught with difficulties. A macule is easily overlooked but pure erythema can be seen to darken the affected area whilst local epithelial oedema lightens it. Often purpura cannot be diagnosed unless the mucous membranes or other organs are affected. Papules tend to be paler than the surrounding skin and post-inflammatory changes may include depigmentation, most marked in the achromia seen after yaws. A greyish appearance is given when the superficial layers are disturbed by scratching. Other colour changes may be due to fungi *e.g.*, the darkening seen in the presence of *T. nigrum*.”

**Critical Review of Classification of Leprosy by Anatomical Systems**  
by J. A. Pupo. *Revista Brasileira de Leprologia*, Vol. VII,  
No. 4, Dec. 1939.

The author criticises the classification of the Leonard Wood Memorial Conference. “ The Manila Conference, in 1931, unifying the campaigns of prophylaxis against leprosy in the West, adopted a simplified classification distinguishing two primary clinical forms: the cutaneous and the nervous, with mixed or combined types. This classification oriented according to prevalent ideas, mainly on the infection of the cutaneous tegument and the peripheral nervous system, presented the serious drawback of a

simplification that does not agree with the clinical facts. Under the prophylactic point of view the Manila Conference advantageously adopted a method of symbols and numeral expressions for a brief representation of the clinical forms and evolutive stages of the disease. The classifications based on anatomical systems have been maintained for a long time in the mind of clinicians. The initial mistake consists in considering the lesions of the peripheral nerves as a condition non-existing in the tuberous (lepromatous) form, believing them peculiar to the condition that develops the tropho-anaesthetic form, a misconception evidenced by the modern histo-pathological and immuno-biological studies of leprosy."

He recommends a classification according to histo-pathological findings as a basis of an anatomico-clinical classification. This he bases upon the recommendations of Jeanselme in his work on leprosy, which are as follows:—

" 1. Amorphous uncharacteristic inflammatory changes, often as a perivascular cuff loosely formed, and with a few single bacilli to be found after much seeking. Examples of this type are early lesions and unthickened macules of the skin.

" 2. Neoplasms more or less delimited, not in masses of bacilli and globi affecting, like the miliary follicles of tuberculosis, the skin mucous membranes, nerves and internal organs. It is this that I have in view when describing the typical elements (lepra cells) and the structures of leprous tissue.

" 3. Lesions, the histological appearances of which recall more or less the lupus of Willan, cutaneous sarcoids of Boeck or the subcutaneous sarcoids of Darier and Roussy; they are localised in the skin and the nerve trunks."

The author goes on to say: " Considering the reports presented to the Cairo Congress by Ed. Rabello and Rabello Junior of Brasil, and by Balina and Basombrio of the Argentine, that favour the clinical form of leprosy classification based on an anatomico-clinical criterion, and reviewing our clinical observations of 583 cases of leprosy, we came to the conviction that the three histopathological types described by Jeanselme are the surest base for the orientation of an anatomico-clinical classification that represents the real tendency of the South American leprologists. Now the subject is being studied in Brasil and Argentina and comments are asked for in the *Revista Brasileira de Leprologia* with the following initial base:—

Primary Classification	} Lepromatous Simple inflammatory (undifferentiated) Tuberculoid
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" This classification, including the intermediate and uncharacteristic type, emphasises Rabello's conception of the ' polar forms ' for the lepromatous and tuberculoid cases, on account of the relative stability of the corresponding clinical types. These forms

present very well differentiated clinical aspects, however much they may show early atypical forms, the diagnosis of which depends on histopathological verification.

“The undifferentiated form, corresponding to the simple inflammatory condition of leprosy, shows less stable clinical aspects. It comprises transitional evolutionary phases towards the polar forms, dependent on the modifications in the process of the defence of the body, with either allergic tendency (pre-tuberculoid) or anergic tendency (pre-lepromatous) constituting combined or transitional forms of the disease.

“Jeanselme’s histological pictures do not present any preference for anatomical systems, but determine various clinico-morphological pictures in the skin as well as in the peripheral nerves, justifying the sub-classification of clinical forms that have been described.

‘The present classification adopts the histopathological criterion, admitting the lepromatous as primary form, and including the tuberculoid as a sub-type of the primary neural form: thus the Cairo classification corrected one error of the Manila classification, but did not recognise the clinical and immuno-histological individualization of the tuberculoid form, maintaining the vagueness of the neural or tropho-anesthetic forms of Leloir.’”

## REPORTS

### **The Mission to Lepers. A Report of Work in India for 1938-39.**

This report of the 65th year of this mission shows a rising expenditure, being Rs. 8,42,535 in 1938. More than half of this was met from voluntary gifts. The mission was able to maintain 7,565 lepers and 834 healthy children in their thirty-four Homes. There are now 560 children with leprosy under their care and this side of the work is being expanded. A simple account is given of the kind of way in which money is raised for the mission’s work:—

‘Another friend of the needy lepers of Madras Presidency is Francis Cardinal, a London postman, who died at the beginning of January this year. It is impossible to give more than a brief reference to the extraordinary record of self-sacrificing giving of this humbly-placed worker, and of the consequences of his



generosity in the life of the Leper Home at Manamadura. In his youth he had served as a soldier in India and even then, seeing the tragic lot of destitute lepers, had felt the urge to do something for them. It was many years later that, having inherited a small legacy of £30 from a poor woman who had been a faithful supporter of the lepers, he began to augment that sum until he had saved enough to provide the amount required to enable a memorial ward for twelve women to be erected. 'I had to put by nearly £2 a week out of my wages of £3 10s., but I was able to do so by living very simply and I had only myself to keep,' he once wrote. One who knew him set down this record of Francis Cardinal's austere regimen: 'No luxuries adorned his table; onions, some rice, eggs, tea and margarine formed the major part of his menu. Pasted on the inside of a cupboard was a bill of fare which he religiously adhered to, such was his passion to save for the lepers'.

"The building of this ward so quickened the interest of other British Postal workers that they contributed funds for another ward. Then the Indian Postal workers followed, and they have raised over Rs. 1,300 towards an Assembly Hall. Mr. Cardinal himself went on living the same frugal life after the ward for which he had given funds was erected, and from his further savings three wells were given. When he died it was found that the lepers had a place in his Will, and when his small estate had been divided up some £70 more was realised for the work at the Manamadura Home.'

**Leprosy in the Punjab.** The Report of the Punjab Branch of the British Empire Leprosy Relief Association for 1938 shows that there are 873 cases in the five leper hospitals at Palampur, Ambala, Subathu, Tarn Tarn and Rawalpindi, and 1,074 cases were treated at 124 out-patient clinics. 294 doctors and some others have received special training in leprosy. Surveys in certain districts showed in a population of 1,310,545, distributed over 3,101 villages, that 237 villages contained lepers, the total number of whom was 456, making 0.35 per mille. This number is high, as the Punjab is the Indian province with fewest lepers.

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