

LEPROSY REVIEW.

VOL. VIII, No. 3.

JULY, 1937

EDITOR

E. MUIR, M.D.

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The Association does not accept responsibility for views expressed by the writers. Communications may be sent to the Editor, at 131 Baker Street, London, W.1.

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DAMIEN THE LEPER

BY

John Villiers Farrow

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HUGH WALPOLE

who writes:

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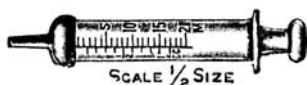


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Editorial

The British Empire Leprosy Relief Association holds a very definite place in the campaign against leprosy. Its objectives as enunciated at the recent Annual Meeting of the Association, are as follows:—

1. The study of leprosy and of the conditions under which it exists and spreads.
2. Helping the leper, by care, tr
3. Combating leprosy with a view to its final control.
4. Interesting, rousing and educating the British Public in the problems of leprosy.

With regard to the first: we can say confidently that we now know far more about this disease than we did 13 years ago when the Association was begun; and the Association, in co-operation with others, has taken no small share in this advancement of knowledge. Without referring to the more technical matters which have been elucidated, we have now a much more accurate idea of the widespread distribution of leprosy and of the various factors which govern its incidence. Study of the disease itself has shown that, while the majority of those who suffer from leprosy are not infectious, yet a minority of highly infectious cases have the power to spread the disease to many others, and thus one generation infects the next.

It is now generally acknowledged that leprosy is largely a child problem, and that those infected in their early years furnish the majority of the serious and infectious cases which spread the disease to the next generation.

With regard to treatment it is now recognised that though medicines are of value, the main remedy lies in healthy occupation and sound nutrition.

Psychological and sociological studies have shown that compulsory segregation and compulsory treatment are generally worse than useless. The leper must be led, not driven. Compassion not fear, will secure his co-operation, and without that co-operation neither effective treatment nor limitation of the infection can be secured.

While the B.E.L.R.A. formerly laid emphasis on special treatment and the supply of special drugs, it now lays its chief stress on personal service, and seeks, with the co-operation of Toc H, to supply doctors and lay workers, men with the spirit of service, who will give themselves to the work of helping the leper and combating leprosy.

The second objective is helping the leper. Since last year the Association has, with the co-operation of Toc H, sent out no fewer than six workers to Nigeria, so that there are now double the number there were last year. Of these, four are lay workers who are supported by five-year sponsorships supplied through Toc H. In addition, there was sent out in the beginning of this year a young doctor who offered his services for this work, and an honorary worker, a lady, who had already had considerable experience of medical work in West Africa.

The first five men sent out have returned, or are returning for well-earned leave. The excellent work they have done has helped to demonstrate the value of occupational therapy, and has helped to open up the way to the undertaking of leprosy work by others; so that in a short time there will probably be seven or eight well-staffed leper settlements in Northern Nigeria, where till recently there was only one.

Good reports are received of our one representative in India who is stationed at the large and progressive leper settlement of the Methodist Mission at Dichpali, in the Nizam's Dominions.

There is now a need for more lay workers, not only in Nigeria, but in other parts of Africa, such as Tanganyika and Rhodesia and later possibly in Sierra Leone. A lay superintendent has been requested for Cyprus and a sponsorship has been offered for a lay worker in Jamaica. So the Association's sphere of usefulness in this direction is gradually expanding.

* * * * *

However urgent the call to help the leper may be, there is a yet more urgent objective before the Association—that of combating the disease of leprosy itself. Throughout the Empire various missionary societies are undertaking this work with the aid of local Governments. The Association, in addition to supplying workers and giving grants, seeks to advise Governments and Missions as to the most effective methods of treatment and control.

Only a very small fraction of those capable of spreading infection are at present isolated—not sufficient to control the disease to any appreciable extent. In India, with its million lepers, only some 7,000 are found in leprosy institutions. In Nigeria there is accommodation for less than one in forty. It is clear that by itself segregation in settlements and similar institutions can never do more than touch the

fringe of leprosy control—at least in poor and densely populated countries.

Well-equipped and well-staffed settlements can, however, be used as centres for an educative campaign in the villages. The more intelligent patients in these settlements can be trained during the years that they spend under treatment, so that when they recover and return home they may help in the campaign against leprosy. *School teachers and other intelligent village dwellers can also be taught how to take an active part in demonstrating to the inhabitants of their villages the very simple measures that are necessary to stop the spread of leprosy. In fact, it may be said that the most important function of a leper settlement should not be merely sheltering the leper and giving treatment, important though these are, but its chief undertaking should be to act as a centre of training and enlightenment in the district in which it is situated. It may take many decades before this educative work can show demonstrable results, but it is only along these lines that leprosy can in the end be controlled.

* * * * *

The fourth objective is to gain the support of the British Public. The Association has spent much energy during the past year in interesting the public in the tasks it has set before it, and in this Toc H is taking an increasingly larger share. A new and influential branch has been begun in Sheffield and we hope soon to form active branches in Manchester and other cities in the North.

Much interest continues to be aroused by the Exhibition which was shown last year at eleven centres. But far more remains to be done in interesting, rousing and educating the public of this country. Many, when they first hear of the Association and the work it has in hand, are astonished that they had not heard of it before, and at once hasten to give all the help they can.

Our Report for the year emphasises the fact that leprosy is a "Problem of Colonial Development". We are proud of these overseas dependencies of ours, and it is up to us who have undertaken responsibility for the backward races that inhabit them to see to it that we do our utmost to control and in the end eliminate this terrible scourge which causes so much suffering and distress.

*A well-illustrated booklet on "The Control of Leprosy" is available for the use of teachers and others in endemic areas.

*The Annual Meeting of B.E.L.R.A.

SPEECH BY LORD HALIFAX.

It falls to me to say a word or two, as your President, before calling on others who can speak with much greater knowledge and more direct acquaintance with what we have in hand than I can claim. I will not stand in their way more than a few moments.

It will, I am sure, be a matter of sincere congratulation to all members of the Association that the loss that we, along with a great many other Associations in the British Empire, suffered by the death of the late King George V who took a deep interest in the work of the Association, has, as you know been repaired by the patronage that his present Majesty, King George VI, has been good enough to extend to us. I am sure that we can feel certain that the work of the kind that this Association does, which is so directly and so vitally concerned with the well-being of his people in the different parts of the Empire, will have His Majesty's warmest sympathy and encouragement. I think this is the first annual meeting at which we have had an opportunity of welcoming the new Chairman, Sir William Peel, late Governor of Hong Kong. He succeeds, as you know, to the post that was for many years well and successfully and untiringly discharged by Sir Edward Gait. He was succeeded for a brief interval by Sir Samuel Wilson who, owing to the pressure of other claims, asked to be relieved of this office, and I think the Association feels that it is very fortunate in having secured Sir William Peel as its Chairman.

I think that a great many people in this country are apt to think of leprosy and its consequences as something rather remote and outside their immediate avenue of thought. They forget that there were days when leprosy was, I suppose, all too common a disease in our own country; indeed, we have evidence very often when we travel about or visit different parts of the country and see the peep holes in churches enabling those who were afflicted by the disease to find relief for mind and soul by attendance at church services even though they were not able to get relief for body. In a great

* Held at the India Office on APRIL 15th, 1937.

many people, I think, their knowledge of leprosy is perhaps confined to rather dim recollections of the story of Gehazi. I am not sure that everybody in this room would be able to pass an examination on Gehazi, or the other ten lepers who stood afar off and were miraculously healed, but it is not after all so very long ago that leprosy was very prevalent in England—in the Middle Ages—and I believe that I am right in saying that in those days there were some hundreds of special houses set apart for lepers in our country. Now of course we know it practically no more, and it has become a more imperial problem with which this country must be vitally concerned. I believe that of the estimated total number of lepers in the world—something like five million—somewhere about half are held to be within the borders of the British Empire, and therefore it is no exaggeration to say that it is in every sense of the word a great imperial problem, and it is still one of the most distressing and most destructive of scourges to which the life of man is exposed, causing an immense volume of suffering both to mind and body. And how weighty this influence is anyone can see at a glance from the Report for 1936 which contains reports from all over the world. They tell the tale of what it means in their own boundaries. This great imperial responsibility is one that is laid upon us here in England as a direct consequence of all that stands at the back of our relationship with backward and native peoples the world over. We seek to pride ourselves, and justly, upon the fact that it has been the distinction and privilege of this country to be the means of conferring great benefits of all kinds on these backward peoples, with whom we have, under the hand of Providence, been brought in contact. Yet nowhere is an opportunity of that sort of service more directly given than in the field of leprosy. We shall have an opportunity of hearing something from Dr. Muir, the Medical Secretary, who can, I suppose, speak on this matter with as great authority as any other man alive to-day, and he will speak to us of the definite policy which is being pursued with regard to the work for which this Association exists. That policy consists of study in the first instance, treatment, giving advice to governments, and of joining hands, as we have been doing during the last six months with Toc H, to send volunteers out to a number of places, and lend their aid in the treatment and in the work that is being pursued. I think it is certainly true, and certainly full of encouragement, that there should be, and I am sure there are, a great many people, both men and women, to whom the appeal of the name of Father Damien

does not by any means fall on deaf ears in this 20th Century.

That is all that I want to say beyond reminding those present, and asking them to make it known to others, the great necessity that this work lies under of securing very much wider support. We need more branches and assistance from those branches.

And now, ladies and gentlemen, with your permission I am going to ask Sir William Peel, the Chairman of the Executive Committee, to present the Annual Report and address the meeting, and I am quite sure that we shall all give him, on the first occasion on which he does this, a most hearty welcome.

SPEECH BY SIR WILLIAM PEEL.

It has fallen to me as Chairman of the Executive Committee of the British Empire Leprosy Relief Association to present the Annual Report for 1936. I find myself somewhat at a disadvantage inasmuch as I only joined the Committee in November last, so was little associated with its labours during the past year. This fact however enables me to pay a very sincere tribute to the excellent work done by the Committee without my running the risk of being charged with self-commendation.

The general activities of the Association have progressed so favourably that we were advised by our lawyers that we should seek incorporation as a company limited by guarantee under the Companies Act of 1929. Steps have accordingly been taken to carry this into effect and we meet to-day for the first time as an incorporated body. This will of course imply no change in the objects and activities of the Association, but it will now be possible to hold and deal with property more efficiently; and, should occasion arise, the Association will be able to take action in a corporate form. Members of the Association will carry no liability beyond that of a sum not exceeding £1, should the unlikely event occur of our ever being forced to wind up our affairs.

I am here to-day in place of Sir Edward Gait, who last year presented the Annual Report. Sir Edward Gait had acted as Chairman since the founding of the Association, during which 12 years he guided its affairs wisely and well. I wish to express on behalf of the Association our gratitude and appreciation of his service. Sir Samuel Wilson agreed

to act temporarily as Chairman, but was unable on account of lack of time to undertake this work permanently. We wish to thank him for his service both as Chairman of our present Committee, and as Chairman of the Special Committee, which dealt formerly with the joint affairs of Toc H and B.E.L.R.A.

This Special Committee has now been amalgamated with the Executive Committee of B.E.L.R.A., as it was felt by both bodies that there was under the old arrangement a considerable amount of duplication of effort. Under the new regime things are working smoothly and more economically, and both at headquarters and throughout the country B.E.L.R.A. and Toc H are co-operating whole-heartedly.

I wish to refer to the appointment of Mr. Gilbert as Business Secretary of the Association. Under his supervision we are confident that the affairs of the Association as an incorporated body will be run on the most business-like and economical lines.

One of the important functions of this Association has always been to advise Governments, missionary societies and others taking part in anti-leprosy work as to the best methods of carrying out this work. With this in view Dr. Muir, the Medical Secretary, paid a visit to three of the British Dependencies in West Africa—Nigeria, the Gold Coast and Sierra Leone. An account of this visit is given in the Report. Even in the few months since this visit action has been taken along the lines which he recommended, especially in Nigeria.

On the invitation of the Leonard Wood Memorial, a body which takes a leading part in anti-leprosy work both in America and in a world-wide sphere, our Medical Secretary was invited to pay a visit to the United States last November. He was able to advise them with regard to their future policy, and arrangements were made for him to deliver lectures to several scientific bodies and at many of their leading universities.

Dr. Muir, as General Secretary, will tell you presently something about these matters and about the general activities of the Association, but I wish to refer particularly to the work of the Leprosy Exhibition. This Exhibition ordinarily is held in a town for some five days, and short talks are given every afternoon and evening dealing with the different aspects of the leprosy problem. The public in this country generally has little cognisance of the disease, but the keen interest evinced at places where the Exhibition has been held is a definite sign that the problem has only to be

presented in an acceptable form to arouse support and interest in the Association's fight against this dreadful scourge. Arrangements have been made for the Exhibition to be shown at Enfield, Aylesbury, Bristol, Trowbridge and Sheffield during the remainder of this year.

The Indian Council of B.E.L.R.A. continues to carry on an active campaign in that country. In the School of Tropical Medicine in Calcutta its Research Worker, Dr. Lowe, is conducting research into the various yet unsolved problems presented by this difficult disease, and the various provincial branches are taking a leading part in field work in their respective areas.

The "Leprosy Review", of which Dr. Muir is Editor, has been published quarterly and letters of appreciation have been received from readers of this journal throughout the Empire, as well as from other countries. The Review is partly a scientific journal, but many of its articles have a wider interest, and it is being read in recent months by numbers of doctors and laymen in this country who are seeking to furnish themselves with more accurate knowledge of leprosy, with a view to interesting others and rousing the attention of the British Public.

Our Medical Secretary also acts as the Honorary Secretary of the International Leprosy Association, and in this capacity he has an opportunity of helping in the more general campaign against leprosy throughout the world. In this connection he is at present organising an International Conference to be held in Egypt in March of next year.

I have mentioned a few of the activities in which our Association is engaged. For further details I refer you to the Report*. In conclusion I appeal for sympathy and practical support. The terrible scourge of leprosy exists in our Empire to an extent that is little appreciated at home. Local Governments in many parts of the Empire are doing a great deal but their resources are limited. An immense amount remains to be done, and this can only be achieved with the help of people in this country. You who are here to-day give, by your presence, evidence of your interest in the work, and I would ask you to do your utmost to enlist the help and support of others.

* The Report will be supplied to readers on application.

Some Results at Ngomahuru Leprosy Hospital, S. Rhodesia.

B. MOISER.

At this voluntary Government hospital patients are photographed upon admission, and at suitable intervals, as it is considered that photographs constitute the best means of recording progress.

The patients have averaged on 1st January being 515, with 407 on 31st December, a difference of 108. 79 new cases were admitted; 6 returned for further treatment; 3 were re-admitted for economic reasons, i.e. they found that their home had disappeared whilst they were in hospital, and they had no friends to go to; 159 were discharged; 32 died; and 5 deserted.

Leprosy is a very mild disease in Southern Rhodesia, the majority of cases being N¹ C¹ or N² types. Many abortive cases occur. The purely cutaneous type is non-existent, and I have come to the conclusion that every case begins in this country with neural symptoms.

The number of cases who show little or no improvement, or who retrogress, is very small.

All are natives of Africa, including 2 Dutch, and 1 Coloured.

The routine treatment for natives has been with intramuscular injections of Burroughs Wellcome's Moogrol, in doses of 5 to 10 c.c. over periods of 6 weeks, followed by fortnightly intervals.

The Dutch and Coloured patients have been given Bayer's Preparation No. 4828 A.J. for most of the time, but this has lately been changed to Bayer's "Jantol", under which one patient, N¹ C¹, is making remarkable progress after only 10 weeks treatment.

CASE I. MAVONERA, (see figs 1 and 2) *native woman aged about 40*, type N¹ C² Admitted 20.1.34.

Gives a history of only 1 year—probably longer. Nodules on face, both forearms, thighs and legs. Both ulnars and both peroneals thickened and tender.

Anaesthesia. Both uppers. Back of both hands and 5th fingers. *Loweres*, lower $\frac{1}{3}$ of both peroneals and dorsum of both feet. *Lft. Ear*, Plus 1. Only one group seen. *Rt. Nose*, Negative. *Nodule*, Plus 5.

28.5.34. Nodules and infiltrations very large. *Lft. Ear*, Positive. *Masses*.

1.10.34. Very great improvement. All nodules almost disappeared, leaving only discolouration.

Anaesthesia, As before; Lft. Ear, Negative.

7.6.35. No skin signs; Lft. Ear, Negative; Lft. Nose, Negative.

9.9.35. Both ulnars still enlarged, but no tenderness; Peroneals not enlarged or tender.

Anaesthesia, Backs of both hands; *Lower*, Both from mid-thigh down; Rt. Ear and both sides nose, Negative.

17.2.36. No nerve thickening or tenderness.

Anaesthesia, *Both Uppers*, Back of both hands and all digits.

Lowers, Both peroneal areas from knee; No skin signs whatever; Rt. Ear, Positive Plus 1; Very scanty small groups; Lft. Nose, Negative.

5.10.36. No skin signs and no nerve thickening or tenderness.

Anaesthesia, As before; Ear and Nose, Negative.

22.2.37. No signs; Ear and Nose, Negative; Remains in hospital.

CASE II. NDAYABAYA, (see figs. 3 and 4) native woman aged about 35. Has 7 children all healthy. No mutilations. Admitted 25.2.34. Type N² C².

Gives history of few months only. (Histories are notoriously unreliable.)

Skin, Shows large areas of infiltration and nodulation on face, ears, and outer aspects of all limbs, especially the Lft. upper; Hands and feet much swollen; Large perforation nasal septum; Palate thickened and hypopigmented; No ulceration.

Nerves. *Uppers*, Both ulnars a little thickened and a little tender; Lft., more so; *Lowers*, Rt. peroneal thickened, and both tender.

Anaesthesia. *Uppers*, Rt. Ulnar border, back of hand and all digits; Lft. from shoulder, back of hand and all digits; *Lowers*, Outer aspect, both lowers from hip down; Ear, Nose and Skin, All plus 4.

4.10.34. Much improved; Nodules on cheeks, neck, Lft. upper arm are smaller and many disappeared.

11.6.35. Remarkable improvement; Nodules and infiltration very largely disappeared from face and upper arms.

Nerves, No nerve thickening or tenderness.

Anaesthesia. *Uppers*, Rt., Nil; Lft. Back of hand and all digits.

Lowers, R. Nil; Lft. Lower $\frac{1}{2}$ peroneal area and dorsum; Rt. Ear plus 3; Numerous globi and masses.

20.2.36. Rt. Ear plus 3; Large groups; Bacilli showing fragmentation.

25.2.37. Rt. Ear plus 3; Large and small groups; B much dotted; Skin less infiltrated and nodular.

This woman has shown continuous improvement since treatment started, and I have hopes that she will eventually become negative and may even be discharged.

In all smears, a careful note is made of the appearance of the mycobacteriae, for I am of opinion that this is a measure of progress. Advanced cutaneous cases, such as this one, always show at first large closely-packed globi, which stain deeply. As progress takes place, the globi become less dense, and more loosely packed (what I call "groups"), and the bacilli become smaller, and appear dotted, instead of as continuous rods. Finally, it is quite common here to find merely small dots, which may or may not be arranged in a linear fashion.

CASE III. MADHLEDZO. (See figs. 5 and 6). *Tuberculoid variety*. Admitted 1.3.35. Native woman aged about 30. Gives a history of 2 months.

Skin, Large raised hyperaemic macule, much thickened, and scaly in parts. Margins very well defined, and markedly raised, and those on the face have the peculiar purple appearance which I have become accustomed to regard as typical of the tuberculoid variety of leprosy.

A good deal of general infiltration of face, especially upper eyelids, lips and nose; Feet much swollen; T.99.

Nerves. *Uppers*, Slight thickening of both ulnars, and some tenderness; *Lowers*, Both peroneals markedly thickened and tender.

Anaesthesia, All maculae, and practically both ulnar and peroneal areas; Some nasal ulceration on both sides; Ears, Nose, Maculae, All negative. Impossible to find a bacillus anywhere by usual methods, even in nasal smears.

18.6.35. Remarkable improvement; All puffiness of face, and raised condition of maculae gone; Ears, nose, maculae, negative.

19.3.36. Maculae still plainly visible, only slightly hypopigmented, and edges raised in parts only; No enlargement or tenderness of ulnars; Rt. peroneal a little tender, pain referred to 5th toe.

Anaesthesia, Much less; All smears again negative.

25.2.37. No nerve thickening or tenderness.

Anaesthesia. *Uppers*, Rt. 1.4 and 5 digits; Lft. Ulnar border from elbow, 4 and 5 digits; *Lowers*, Rt. Dorsum of foot.

Lft. Lower $\frac{1}{2}$ of leg and dorsum; Ear, nose, maculae, all negative.

These notes have necessarily been condensed from the case book, but they are sufficient to indicate the notable improvement, which is much better shown in the photographs.

This is a typical case of tuberculoid leprosy, as seen here. Such cases are rare here, but they appear to be the most easily amenable to treatment.

The above 3 cases are good examples of results obtained here, but they are not by any means unique. Several others could be quoted, but I have purposely chosen 3 advanced cases, whose changes can be exhibited photographically.

Early cases do well here. They are all neurals without any striking skin changes, which would be evident in monochrome photographs.

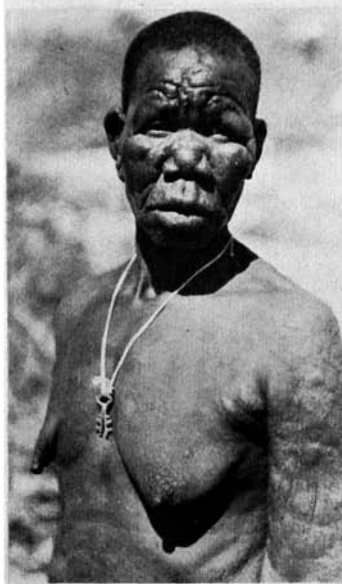
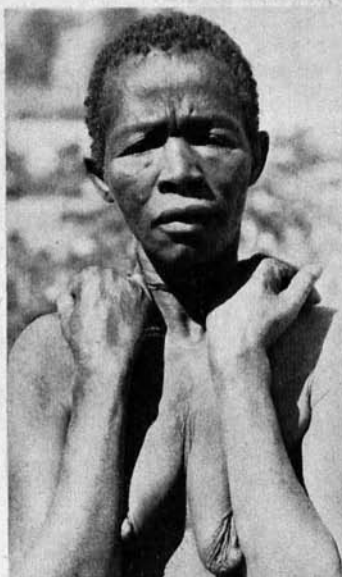
I have now been here for eight years as full-time leprologist, after 20 years in Northern Nigeria, where leprosy was only a part of my duties, but where I nevertheless had a good deal of experience of the disease, with entirely negative results, so that there are evidently one or more factors at work in Southern Rhodesia which produce such gratifying results. This, however, cannot be discussed here.

Whatever these factors may be, it is certain that we have a very fine climate here, and it has been suggested that this large Estate of about 9,000 acres, which comprises the grounds of Ngomahuru, could be put to good use by making it a leprosarium for the British Empire.

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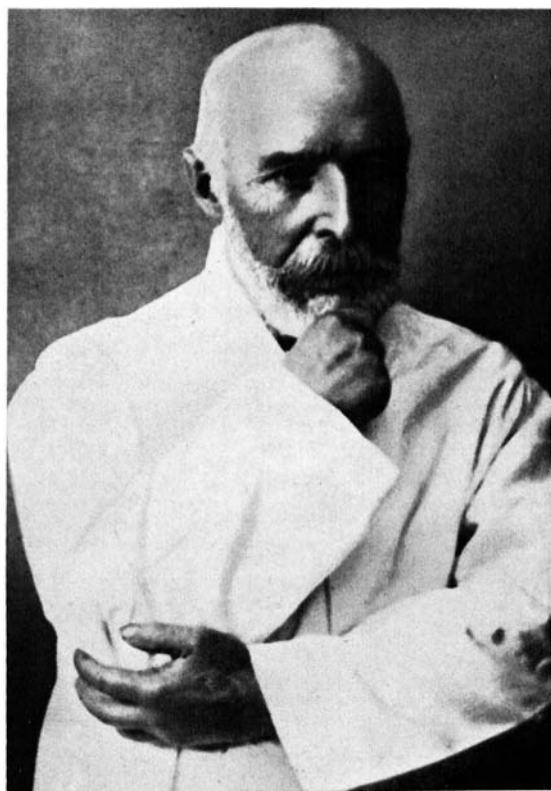
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6

Figs. 1 and 2 show effects of treatment in Case I.

„ 3 and 4 „ „ „ „ „ Case II.

„ 5 and 6 „ „ „ „ „ Case III.



DR. ARMAUER HANSEN

*Famous Norwegian Dermatologists

H. P. LIE.

Danielssen maintained his fundamental conception of the humoral pathology of leprosy to the end, though he had difficulty in reconciling this with modern theories. But Armauer Hansen was a typical representative of the ideas which characterised the era of Pasteur, and took an active part against the accepted ideas of the epoch in which he began his study of leprosy.

Hansen was born at Bergen in 1841 and belonged to a family of 16 children, most of whom made their mark in different vocations. Through force of circumstances he had, to a very large extent, to support himself during the course of his studies, and this greatly fortified his ideas of independence and prepared him for his hard work and the joy of fruitful labour. Already at the outset of his studies he was highly thought of by his companions on account of his brilliant intelligence and his great courage, and a very honourable scientific career was predicted for him. From the beginning he felt himself particularly attracted by pathological anatomy, but when he became assistant doctor to Danielssen at the Lungegaard hospital towards the end of 1860 the study of leprosy soon occupied his entire interest. The leprosy clinic had been so well organised by Danielssen that there was not much more to discover in that domain, and Hansen did not find himself particularly attracted towards clinical studies. He occupied himself little or not at all with private practice except in the earlier years.

The etiology of disease and hygiene became his field of labour. Except in leprosy this work was of a theoretical nature, but in everything that he produced one is struck with the simple clarity of his logic and the perspicuity of his scientific conception. In everything he had the faculty of expressing his ideas in a fashion which was simple, clear and persuasive, not only orally but especially in writing. And as his character was open, honest and frank, so was his critical sense acute. All these qualities created his success when he set out on the discovery and exposure of the cause of leprosy.

It is right to make clear that this work was far from

*This is the second part of the translation of a paper read at the 9th International congress of Dermatology and Syphilology at Budapest in 1935; the first part appeared in the last issue.

easy at first,

ous and often contradictory opinions. *Danielssen and Boeck*, whose opinion was authoritative, thought of leprosy—as we have seen above—as a dyscrasia of the blood, which was not due to any specific cause but which could result from a series of circumstances unfavourable to life. Spontaneous origin was, in their opinion, an exceedingly rare phenomenon.

In most cases leprosy was transmitted by heredity; though, strange to say, there might at times be several healthy generations interspersed. They admitted, however, that there should always have existed one leper in the direct line of descent. As this did not always occur, *Bidenkap* extended the conception of heredity to include collateral lines. Contrary to this *J. J. Hjort* opposed absolutely the principle of heredity and believed that every case was produced spontaneously. *Holmsen* also rejected the theory of heredity, but he thought the disease was specific and produced by a miasma which existed in certain regions. Lastly *Lochmann* said that leprosy was a specific disease spread most commonly by heredity, but rarely by contagion.

By deep theoretical reasoning and by conscientious examination of all that was known of the subject of heredity and of specificity of diseases from the scientific point of view, Armauer Hansen arrived at the result that it was necessary to establish a frank distinction between heredity and specificity. A specific disease, due to the action of a determined poison either of a chemical nature or organic, whether vegetable or animal, is not able to transmit itself by heredity, using this word in the scientific sense. It is then absolutely inexact to designate as hereditary a case of congenial syphilis; such a case is due to infection *in utero*, not to heredity. Thereafter he submitted leprosy as it was found in Norway to a profound and detailed examination, visiting and studying on the spot the places infected with leprosy throughout the whole country. As a final result he arrived at the conclusion that *leprosy should belong to the specific diseases which are spread by contagion*.

He conceded however, that at the moment (in 1873) he could not give any decisive proof in any direction, but he believed that he had collected as evidence certain phenomena appearing in the disease which found their most natural explanation if one admitted contagion, but which remained entirely inexplicable if one supposed heredity.

In support of his hypothesis of contagion he made in rabbits a series of inoculations with material from leprous nodules, but the results were absolutely negative. He began

to look for a specific cause of the disease. Although Danielssen had already searched for bacteria in leprosy without arriving at any result, Hansen resolved to continue in this direction. Hansen has himself written: "in this epoch which according to Cohnheim is 'mycophile' my research should be in this direction."

The result of this research was the discovery, now universally acknowledged, of the bacillus of leprosy. Hansen does not recollect exactly when he first saw the bacillus, but it would be in the year 1873. It was in the leprous deposits of cutaneous nodules and in the cellular elements specially described by Danielssen which Hansen called "the brown elements" that he first saw the microscopic rods, which he also found later in leprous deposits in the internal organs. He was tossed about between hope and fear; hope that he would make a remarkable discovery, and fear that he had committed a mistake.

The greatest difficulty was the lack of proper methods of staining, as the staining of bacteria was still very primitive at that time. Hansen employed a solution of osmic acid; but it was the staining of tubercle bacilli by Robert Koch which gave the excellent help in diagnosis of lepra bacilli which we have to-day.

The first demonstration of lepra bacilli was long in obtaining the entire approbation of his colleagues. They spared him neither doubt nor ironical expressions on the subject of his discovery, but his deep conviction of exactitude and of the importance of his discovery kept him busy with his indefatigable research to demonstrate bacilli in all undoubtedly leprous tissues. And after long years of investigation he succeeded and silenced all doubt and criticism. This was the first time that it had been demonstrated that a chronic disease could be caused by bacilli. It is useless to emphasise here the importance of this fact. It should be added here that Hansen himself emphasised that he had found confirmation of his opinion in the description of the evolution of leprosy in Surinam by Drogat-Landre in his book *La Contagion Seule Cause de la Lèpre*.

Hansen was not only a zealous partisan of Pasteur's ideas; he became also rapidly a convinced Darwinist, and he made himself in his country one of the most decided champions of Darwinism and of his conception of life. That is nothing remarkable for a man in modern times, but it was very difficult at the time of Hansen's youth. It then constituted a revolt against old, established theories, especially in the domain of religion. And in the course of the conflict

Hansen experienced how terrible and bitter the judgment passed on such a revolt can be. One particular reason, on account of which he fought the old conception of life and sought to defend the rights of the new scientific theories, was the *religious fatalism* which he met among the public in his campaign against leprosy. His constant and intense reminders of the necessity for prudence in coming in contact with lepers, as the disease could be transmitted by contagion, were often followed by rejoinders such as these: "it is predestined", or "that depends on God and not on you". Though he criticised strongly the unhygienic kind of life in the leprous districts, yet he was very popular and one to whom one could speak freely. It is pleasing to recount how the peasants often considered him a very ingenious person. When he explained to them that it was his intention to extirpate leprosy they asked him: "But how long do you expect to live then?"

Armauer Hansen was a handsome man, solidly built, and one who quickly drew attention even in a crowd. He was not exactly eloquent, but he possessed a remarkable gift for putting forward his opinions in a simple, short, clear manner, which procured the attention of his hearers. As a popular scientific author he possessed the same excellent qualities which gave him great importance as a propagator of new contemporary scientific ideas among the masses of the people.

Armauer Hansen died in 1912 at the age of 70 in the course of an official voyage. He died happy and content, with the conviction that his life work had been useful to his country and to humanity, and certainly this fact is incontestable.

In testimony of his universal renown his bust was erected through international subscription in the garden of the Bergen Museum on his 60th Anniversary in 1901.

Already in 1895 they had erected by international subscription a plaque in honour of Danielssen, which is now placed above the door of the leprosarium at Bergen.

Obituary

We regret to announce the death of Prof. Edvard Lauritz Ehlers on May 6th, 1937, in his 75th year. Prof. Ehlers was one of the leading leprologists of the last 50 years. He was Secretary of the First International Leprosy Conference held in Berlin in 1897, and was Editor-in-chief of the *International Archives of Leprosy*.

Leprosy and Tuberculosis— A Comparison

E. MUIR.

There are so many points in common between these two diseases, and so many points of variance that it may be of profit to compare them in some detail.

The bacilli show a considerable resemblance in their morphology and staining reaction. Stained by Ziehl Neelsen's method *B. leprae* is somewhat less acid-fast than *B. tuberculosis*, and has a greater tendency towards bipolar staining. The former also tends to take up a formation in "globi", i.e. masses of bacilli lying in parallel formation, but rounded into the form of a globular cell. This is probably the result of intracellular multiplication of bacilli. The lepra cell, so typical of the cutaneous form of leprosy, is apparently the result of the low toxicity of *B. leprae* and the slight degree of response which it calls forth from the tissues. Ingested bacilli instead of being phagocytosed are able to multiply in the cytoplasm forming the lepra cell and later the "globus". The greater toxicity of the tubercle bacillus does not seem to encourage intracellular multiplication, and growth is confined to the intercellular spaces.

The histopathological picture in the neural type of leprosy much more closely resembles that of tuberculosis. The so-called "tuberculoid" macule has frequently been mistaken for a leprous lesion by those not closely conversant with the latter disease. In both there are the small cell infiltration, epitheloid cells and multi-nucleated giant cells. In both there is the slowly spreading lesion, active at the margin and self-healing with scar formation at the centre; only that the latter (the forming of scars) is as a rule much less marked in leprosy. The main distinguishing feature, however is the nerve involvement in leprosy. In practically every case in which there would otherwise be doubt in the differential diagnosis, there is marked sensory nerve thickening and/or definite loss of sensation, if the lesion be leprous; whereas in the tubercular lesion sensation is practically unimpaired. Why the infection should spread up the sensory nerve branches in the one disease and not in the other in spite of the similarity of the skin lesions is a problem worthy of study by cytologists.

Both diseases affect the lymph nodes; but the pathological changes caused by leprosy are generally easy to distinguish,

both macro-and micro-scopically, from those of tuberculosis. In leprous patients with high resistance to *B. leprae*, i.e. those of the pure neural type in which typical "tubercloid" macules occur, the lymph nodes are seldom affected to any marked extent, the infection being as it were sealed up within a few sensory or mixed nerves. In the cutaneous and mixed types with comparatively low resistance, the infection filters up from the skin through the lymph channels and lodges in the lymph nodes. There it produces lesions of the cutaneous type, characterised by lepra cells. In such cases mixed leprous and tubercular lesions may occur side by side, the macroscopic appearance of the former showing yellowish streaks and the latter whitish tubercles.

An interesting comparative study of these two diseases is found in the respiratory organs. Whilst the gravest tubercular lesions are those of the lungs, there is grave doubt as to whether these organs are ever seriously affected by leprosy. Both of them affect the larynx, but as has been shown by Lie (1936) the trachea and bronchi may be much more seriously affected by leprosy. The reason for this is probably that tuberculosis of the larynx is generally a secondary infection due to prolonged expectoration of *B. tuberculosis* from the lungs, and occurs in comparatively advanced cases in which there is little time for invasion of the trachea before death takes place. Whereas in leprosy the spread takes place downwards by gradual invasion from the mouth and throat, and there is abundant time for infiltration of the trachea and bronchi as such cases often survive for many years.

The genito-urinary system gives another interesting comparative study. Leprosy affects the male genital organs even more than tuberculosis, probably because a fatal result is not caused in the former and there is time for entire destruction of glandular tissue to take place. In contradistinction to the sister disease, leprosy does not affect the bladder and ureters, and the kidneys are affected more by waxy degeneration following on toxæmia from a mixed infection elsewhere in the body, than by actual invasion with *B. leprae*, the latter being comparatively slight even in severe cases.

While tuberculosis of the suprarenals is a serious and generally fatal condition, leprosy of these organs, though it does occur, does not appear to affect their function to a noticeable extent.

Leprosy of the liver and spleen, though extensive and capable of causing marked enlargement, especially during

lepra reaction, does not, as far as we are aware, interfere with their function.

Likewise, in contrast to the condition in tuberculosis, the gastro-intestinal tract, though involved to a mild extent in severe cases, never shows macroscopic lesions; and the digestive and absorptive complications in leprosy are due to secondary causes.

Allergy. Another marked contrast between tuberculosis and leprosy centres round this subject, still so imperfectly understood. The injection of lepra bacilli into the tissues of those already infected with leprosy does not call forth a reaction at all comparable to Koch's phenomenon. The reaction to such an injection is delayed and is almost entirely local. On the other hand, *lepra reaction* or lepra fever appears to be of allergoid nature, being a general reaction accompanied by wide-spread focal swelling and engorgement. Lepra reaction is seldom caused by injecting lepra bacilli, though in advanced cases in a debilitated condition any slight depressing factor may be sufficient to induce it. In mild cases of leprosy, or in those in thoroughly good general health, it does not occur. Here, however, we have another contrast with tuberculosis: the fact that a leper with moderate or even extensive lesions, may be in excellent general health, whereas the tubercular patient with even a fraction of the same degree of infection or tissue involvement is almost invariably in a precarious state of health.

We may summarise the various factors which appear to underlie the main contrasts between tuberculosis and leprosy:—

The tissues involved;
The degree of virulence;
Allergic reaction and mixed infection.

(1) *The tissues involved.* If the lungs, urinary system, gastro-intestinal tract and supra-renals were affected no more in tuberculosis than they are in leprosy, it is possible that the former would be reduced to the low degree of fatality of the latter, which differs from it in avoiding vital organs, or at least in not directly seriously affecting their function.

Leprosy attacks not the *vital organs* but those which are vital from the social standpoint—the face and the limbs—the organs which express personality. That is why it is more dreaded than tuberculosis.

(2) *The degree of virulence.* It has been proved that various strains of *B. tuberculosis* are more active than others, and the virulence of the disease depends partly on the strain

and partly on tissue resistance. Available evidence tends to show that the virulence of leprosy depends entirely on the latter factor, but direct proof of this must wait till actively growing *in vitro* cultures of *B. leprae* can be obtained.

It is in their least virulent forms, and when a common tissue—the skin—is invaded, that the two diseases can most closely resemble each other, producing respectively lupus and the “tuberculoid” lesion of leprosy. In both of these the tissues succeed, or almost succeed, in holding up the advance of the invading enemy. In the more virulent forms of each disease in which the resistance is less, their respective characteristics diverge more widely.

Immunity. Small infections appear to produce a slight degree of immunity in both diseases, resulting in types with mild and limited lesions—such as surgical tuberculosis, and the neural and especially the tuberculoid form of leprosy. The prognosis is good and they are amenable to treatment.

On the other hand, severe infections tend in both diseases to produce the graver types in which signs of immunity are absent, the prognosis comparatively bad and treatment much more difficult.

In both diseases children are more susceptible than adults. Tuberculosis is fatal in a large proportion of child infections; but in survivors latent infection tends to show itself, as it does in leprosy, at adolescence, due to the increased physical strain at that period of rapid development.

(3) *Allergy and Mixed Infection.* *B. tuberculosis* produces a more virulent disease, though this may be chiefly or entirely due to its attacking more vital organs and the seriousness of allergy and mixed infection in these vital organs. It is on account of this virulence and the consequent fatality that this organism never attains the enormous concentration in the body that *B. leprae* does.

We have referred above to the differences between tuberculosis and leprosy as regards allergy. Mixed septic infection takes many forms in leprosy, but the most common is in perforating ulcers of the feet. Folliculitis and other forms of dermatitis, and septic conditions of the nose, gums, etc., are much more common than is realised. Absorption from septic lesions has a profound effect in leprosy, producing degenerative changes in the internal organs and predisposing to the increase of the leprous infection; but it has not the rapidly fatal effect often seen in pulmonary tuberculosis.

Tuberculosis complicating Leprosy. In some countries this is a not uncommon cause of death in leper institutions. Like so many complicating diseases, tuberculosis often produces an apparent amelioration of leprosy lesions. This is probably due to its debilitating effect on the tissues which diminishes their power of reaction to *B. leprae*; but it is doubtful if the actual leprosy infection becomes less when tuberculosis intervenes.

Treatment. In the therapeutic field leprosy and tuberculosis resemble each other closely. We have referred above to the resistant forms of both diseases, so much more amenable to treatment than the progressive forms with low resistance.

In neither have we the aid of immunity progressing *pari passu* with the severity of infection. In neither have we—nor are we likely to have—a specific remedy.

The main treatment in leprosy, as in tuberculosis, may be summarized as follows: restoration of general health by rest, healthy surroundings, improved nutrition, removal of accompanying and predisposing diseases and other debilitating factors, desensitization, progressive exercise.

The last of these—progressive exercise—can as a rule be brought into force much more rapidly in leprosy than in tuberculosis. Occupational therapy is now recognised as the most important asset in treating the former disease.

Certain of the heavy metals, given in small doses, have long been recognised as valuable in leprosy. Chief among these are arsenic, antimony and gold. The writer, however, considers that their action is more that of a desensitizing agent than of a destroyer of the causal germ. Possibly the action of sanocrysine and other gold preparations in tuberculosis is of the same nature.

In tuberculosis there is no drug which takes the special place of chaulmoogra oil in leprosy, sadly limited though that action may be. Until recent years leprosy was considered an incurable disease. We may now state, however, that, comparing corresponding types, leprosy is at least more amenable to treatment than tuberculosis.

Comparative Epidemiology. Leprosy belongs to a more primitive stage of human development than tuberculosis. In India leprosy is uncommon among aboriginal races, but appears when they leave their mountain and jungle life and mix with more civilised peoples. It is therefore a disease of semi-aboriginals, or of those who are emerging from aboriginal life. It is primarily a disease of villages and only

secondarily of towns. It would tend to die out of towns if the number were not constantly replenished from the villages.

Tuberculosis, on the other hand, is primarily a disease of towns and industrial centres. It tends to spread to the villages from towns.

In England leprosy as an endemic disease vanished centuries before tuberculosis began to become a serious problem.

At the present time in countries like India and Africa, where communications have been opened up rapidly and industrialism and the more superficial attributes of Western civilization have not had time to grow, but have been introduced wholesale, we find tuberculosis racing after and making up on leprosy, so that the two diseases are found side by side.

Control. Tuberculosis is now gradually becoming eliminated from England and other countries where it was once so prevalent. This is the result largely of an educative campaign accompanied by better nutrition, more hygienic methods of living, and wisely planned and gradually applied sanitary regulations. In planning the control of leprosy among backward races we must be guided by similar principles, though the details will necessarily vary according to circumstances. These two sister diseases are among the most dreaded of the evils to which mankind is heir. But dread of them has had a powerful effect in driving humanity towards more healthy and natural living. On this account they may be regarded as not altogether unmixed evils.

Reference: LIE, H. P. *Tracheitis and Bronchitis Leprosa*. Internal. Lep. JI. Vol. 4, No. 3, July-Sept 1936, pp. 281.

***Some Causes, other than Leprosy of Loss of Skin Sensation, Paralysis and Deformity**

J. LOWE and S. N. CHATTERJI.

In some parts of India, it is common knowledge among ordinary people that loss of skin sensation is usually due to leprosy. We have on many occasions been consulted by patients, usually village people, who, because of very slight loss of cutaneous sensibility perhaps in small areas of skin,

have themselves made the diagnosis of leprosy and come for treatment and advice to a leprosy clinic. Careful clinical examination has usually verified the patients' diagnosis. Enquiries from such patients have revealed that the knowledge that a loss of skin sensation is usually due to leprosy is part of the traditional knowledge of the disease which has been handed down from generation to generation. We have frequently had occasion to remark that many village people know more than many doctors know about the early diagnosis of leprosy.

While skin anaesthesia with or without paralyses and deformities in India is practically always due to leprosy, occasionally we come across cases where it is due to other causes. In this brief article we discuss a few such cases:—

1. *Peripheral neuritis*. The commonest example of this condition resembling leprosy is undoubtedly *Bernhardt's* disease which is a neuritis of the lateral femoral cutaneous nerve, producing partial and sometimes complete loss of sensation in the skin on the lower and outer part of the front of the thigh. This disease has previously been fully described in *Leprosy in India* Vol. VI pp. 89. In the Leprosy Clinic of the School of Tropical Medicine about twelve such cases a year are seen. In the *International Journal of Leprosy*, Vol. 2, p. 451, there is an interesting editorial note about such a case occurring in a worker on leprosy; this case was regarded for some time as being possibly one of incipient leprosy, but as the direct result of the publication of the article in *Leprosy in India*, the diagnosis of Bernhardt's Disease was made and subsequent developments have confirmed this diagnosis.

Dr. A. Gupta, Dermatologist of the Medical College, Calcutta, has recently drawn our attention to another cause of neuritis which may be associated with, or followed by, anaesthesia of the skin. This condition is *herpes zoster*. The notes on Dr. Gupta's case are as follows:—About seven years ago the patient had a typical attack of *herpes zoster*, with neuritis of the intercostal nerves in the affected area on the left side of the chest, and the formation of bullæ in the skin in the distribution of the nerve. After a time the condition subsided, but it was noticed that in the affected area of skin there was loss of sensation, and this has continued till the present time. At present the slight scars of the old lesions of herpes are visible, and in an area measuring about 7 inches by 5 inches there is an almost complete loss of skin sensation (see Fig. 1).

Another condition which affects the peripheral nerves and which is reported as causing loss of cutaneous sensibility is *polyneuritis (beri-beri)*, but this condition is rare in India and we have not actually seen any such cases in Calcutta. In the Far East where polyneuritis is common it may not infrequently be confused with nerve leprosy and one of us (J.L.) has seen two cases of leprosy which had been erroneously diagnosed as polyneuritis.

Still another type of peripheral neuritis which may cause, among other symptoms, paralysis and loss of skin sensation is *lead poisoning*. One definite case and one suspected case of this condition have been seen in the leprosy clinic here during the last few years. The definite case was in a type-founder who showed radial palsy (wrist drop) and some loss of cutaneous sensibility on the radial side of the hand and wrist. He had a definite "blue line" on the gums. The suspected case was in an electric wirer, who stated that sometimes while working he held lead-covered wire in his mouth. He showed signs of neuritis and loss of sensation in the arms, and a definite suggestion of a "blue line" on the gums. In lead poisoning, the paralysis is usually much more marked than the loss of sensation.

2. *Conditions arising outside the nerves but affecting them.*

(a) *Trauma*. Cutaneous nerves and nerve trunks are subject to trauma and pressure which may damage them and produce anæsthesia in their skin distribution.

We have seen several cases in which *incised wounds* have damaged or severed nerves, with the development of anæsthesia and trophic lesions in their distribution, these symptoms having given rise to the mistaken suspicion or to the definite diagnosis of leprosy. A toddy-drawer fell from a tree and the tip of his knife pierced the skin of his arm making a small wound and severing his ulnar nerve. Anæsthesia and claw hand developed and later a diagnosis of leprosy was nearly made when examination revealed the scar of the small wound, and enquiries elicited the history of injury.

In another case, a motor driver had an accident causing incised wounds on the forearm. First anæsthesia and later claw hand developed. About 8 months later, the patient was sent for examination because leprosy was suspected (see Fig. 2).

Occasionally deformity due to trauma, and leprous lesions may be found in the same patient. Figs. 3 and 4 show scarring of the wrist and deformity of the ulnar side of the

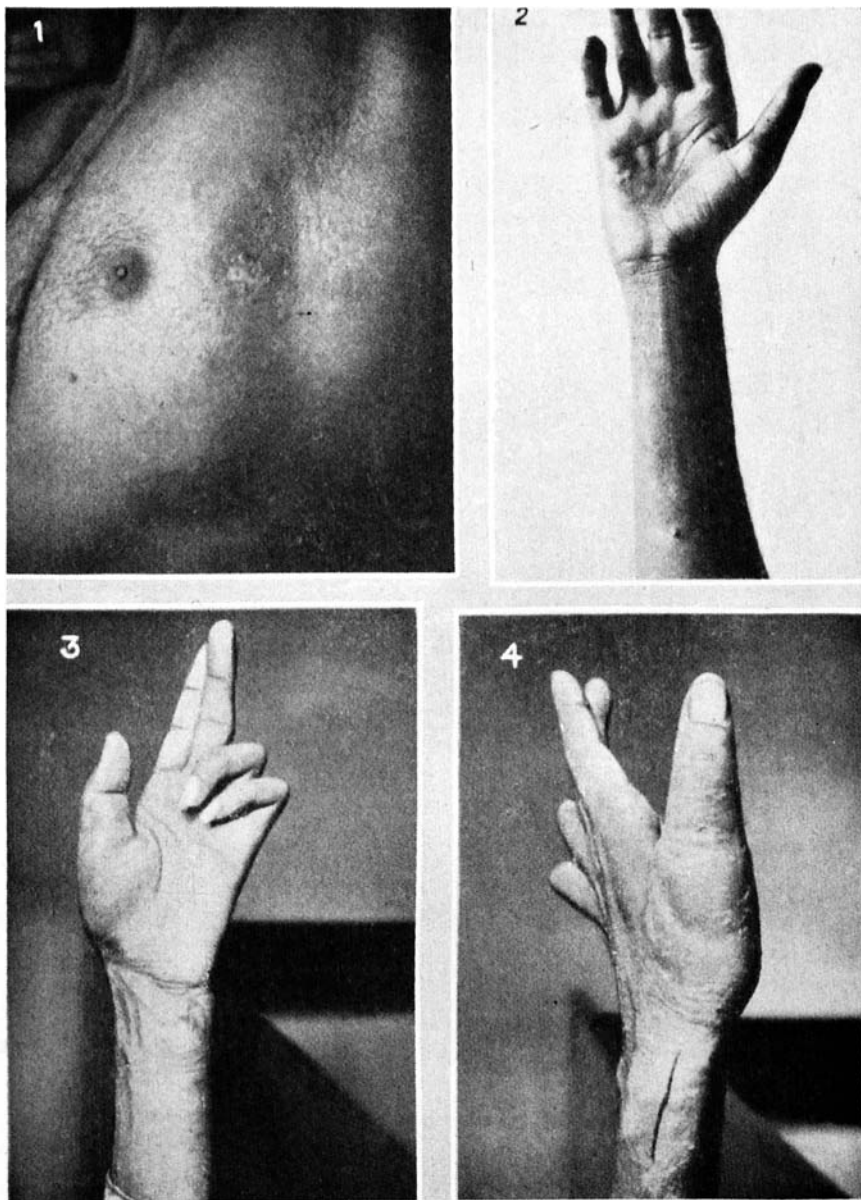


Fig. 1. Scarring and anaesthesia of the skin following an attack of herpes zoster years previously.

Fig. 2. Deformity and anaesthesia of the ulnar side of the hand due to trauma and injury to ulnar nerve. The scar of the injury can be seen in the arm.

Figs. 3 and 4. Deformity due to injury and leprosy lesions occurring in the same hand. The scar of the injury can be seen on the ulnar side of the wrist in Fig. 3, and the leprosy lesions on the radial side of the same hand can be seen in Figs. 3 and 4. The black mark on the wrist in Fig. 4 indicates the markedly thickened nerve.

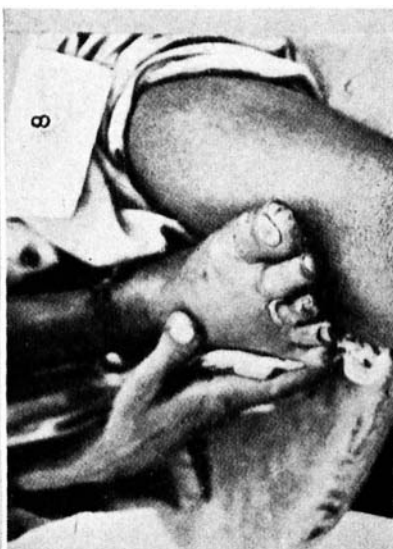


Fig. 5. Deformity and anæsthesia of the fingers due to incision of the hand for cellulitis.

Fig. 6. Deformity of the hands due to bilateral cervical rib.

Fig. 7. Deformity and loss of heat and cold sensation of the hands due to syringo-myelia.

Fig. 8. Dry gangrene of a toe due to Raynauds' disease.

hand caused by the patient falling on some glass, and a leprosy macule on the radial side of the same hand.

In cases of *fracture*, the broken ends of the bone may severely damage nerves, with the development of anæsthesia, paralysis, and trophic lesions. This is most commonly seen in the arm in the musculo-spiral nerve but the ulnar and median nerves may also occasionally be affected. Nerves in close proximity to bone may not be injured at the time of fracture but may be affected as the result of *callus formation* around them. This condition may be seen in the musculo-spiral nerve in fractures of the humerus, and in the ulnar nerve in fractures round the elbow joint. Usually in such cases paralyses are much more marked than the sensory changes, whereas in leprosy the reverse is usually found.

The cutaneous nerves may be injured as the result of *subcutaneous injections*. One such case came to a leprosy clinic some time ago showing an extensive area of anæsthesia on the ulnar side of the arm. The history was that about a year previously the patient had had an attack of malaria which had been treated by subcutaneous injections of quinine. One such injection had been given on the antero-medial aspect of the forearm, and there had been a marked local reaction and later anæsthesia had developed. At the time of examination there was still a hard swelling at the site of injection, which was exactly in the course of the medial antebrachial cutaneous nerve, and the damage to this nerve was the cause of the anæsthesia.

In this connection we may relate the personal experience of one of us (J.L.) some years ago. He was a volunteer for certain experiments involving the estimation of blood-sugar before and after severe exercise (a rugby football match) and on two occasions blood was taken with a syringe and needle from an antecubital vein. On the next day anæsthesia of an area on the front of the forearm was noticed, and it was decided that a cutaneous nerve had been severed. During the next few months he verified in himself the results of Head's classical experiments on skin sensation. Sensation did not completely return for about one year.

Anæsthesia and deformity may be the result of *surgical operations*. Fig. 5 shows the hand of a patient who had had incisions made for cellulitis of the hand. Later anæsthesia and deformity of the fingers were found and for some time a suspicion of leprosy was entertained.

(b) *Pressure on nerves*. Occasionally anæsthesia, paralysis, and deformities are produced by pressure on nerves, the least uncommon example of this being *cervical*

rib. We have seen only one example of cervical rib giving rise to the diagnosis of leprosy, see Fig. 6, but we have seen two or three cases of leprosy in which cervical rib was suspected or diagnosed wrongly.

One curious case recently came to our clinic. A young man had anæsthesia, muscular wasting and deformity in the left forearm and hand. Cervical rib was suspected by his doctor, an X-ray photograph was taken, and the definitely elongated transverse process of the cervical vertebra, which is called cervical rib, was clearly seen, and a definite diagnosis of cervical rib was made. Later, however, someone noticed a thick cord in the upper arm and the suspicion of leprosy was aroused which was later confirmed in our clinic, the ulnar and radial nerves being very markedly thickened. Thus both cervical rib and leprosy were found in the same arm but leprosy was causing the symptoms.

Another condition which occasionally produces symptoms of pressure on nerves is *neoplasm*. One probable case of this was recently seen in our clinic. A man was examined about nine months ago and he showed a little loss of sensation on the ulnar side of the left hand. There was no nerve thickening and no deformity. Nothing else was noted and leprosy was suspected but not definitely diagnosed. The patient was requested to come again if anything further developed. Six months later he came showing anæsthesia from the shoulder downwards and weakness and some wasting of all muscles of the arm and forearm. There was no nerve thickening. In the axilla was found a large hard swelling almost certainly of neoplastic origin and the nervous manifestations were attributed to involvement in the neoplasm of the nerves in the axilla. We did not have the opportunity of verifying this at operation.

We have seen one case and heard of another in which a tight wrist watch strap has caused numbness of the radial side of the hand due to pressure on the superficial branch of the radial nerve where it lies on the radius. One of these two cases attended our clinic because leprosy was suspected.

3. *Lesions of the spinal cord.* Various diseases of the spinal cord may produce sensory changes in the skin of the body. Syringo-myelia, sub-acute combined degeneration of the spinal cord, and other rare diseases may occasionally be mistaken for leprosy. One such case recently attended our clinic suspected to be suffering from leprosy. He developed loss of sensation in the feet, extending gradually up the legs which became completely insensitive from the hips down-

wards. There was no nerve thickening but there were exaggerated knee jerks and other signs indicating a lesion of the spinal cord but not of the peripheral nerves.

Syringo-myelia produces sensory changes, particularly in the arms, but we have never seen a case of syringo-myelia diagnosed as leprosy*. The reverse is however seen, cases of leprosy being wrongly diagnosed as syringo-myelia. Two such cases have recently attended our clinic after being treated for months in Calcutta hospitals for syringo-myelia.

4. *Lesions of arteries.* If the blood supply of a limb is reduced owing to narrowing of the lumen of the arteries or to an embolism, a sensation of coldness and numbness is produced in the affected part, although tests for skin sensation often reveal little loss of tactile sensibility. Nevertheless such cases not infrequently are sent to a leprosy clinic because leprosy is suspected. Also in such cases ulceration and gangrene of fingers and toes may be seen and this also may suggest leprosy as a possible diagnosis.

The narrowing of the arteries is usually due either to contraction of the muscular coat of the arteries as in *Raynaud's disease*, or to *obliterative endarteritis*. These two conditions are seen particularly in the feet and hands, the arteries in the neighbourhood of the wrist and ankle being affected, but larger arteries may be affected. In our clinic we recently saw a patient with coldness and partial loss of sensation of the feet and legs, and the lower part of the thigh, which was caused by endarteritis of the femoral arteries which could be felt in the groin as thick hard cords; there was no pulsation felt in the arteries of the lower part of the legs.

Cases of Raynaud's disease with coldness and deadness of fingers or toes often going on later to dry gangrene are not infrequently seen in our clinic. Fig. 8.

We have seen one case of obstruction of the arteries of the arm due to embolism in which a suspicion of leprosy was aroused by occurrence of numbness of the arm and gangrene of the fingers.

5. *Lesions of the skin.* Conditions which cause marked thickening of the epidermis of the skin (e.g. scleroderma, keratosis) cause also an impairment of cutaneous sensibility

* Since this was written we have seen one such case, a girl showing loss of heat and cold and pain sensation on the ulnar side of both hands and forearms, and some deformity of the hands. There was no loss of tactile sensibility and no thickening of nerves. See Fig. 7.

in the affected area, and this gives rise to the suspicion of leprosy. Scarring of the skin due to burns, trauma or ulceration, also cause a similar impairment of tactile sensation. Such patients not infrequently come to our clinic.

The mere existence of scarring in an anæsthetic area of skin does not exclude the diagnosis of leprosy because leprosy macules are often treated by the patient himself or by his advisers, by the application of strong caustics and by cauterisation which produce ulceration and dense scar formation partly or completely obscuring the original leprous lesion.

Differential diagnosis between these conditions and Leprosy. Leprosy is a very common disease in India. These other conditions are rare, often very rare. When loss of skin sensation occurs with or without paralyses and deformity, it is extremely probable that the cause is leprosy. In diagnosis of such cases, therefore, the first step is to examine the patient thoroughly to see if definite evidence of leprosy is present. Five questions have to be considered : (a) Are the character and the distribution of the anæsthesia like that of the anæsthesia of leprosy? (b) Is the anæsthesia accompanied by other skin changes, depigmentation, erythema, anhydrosis, depilation, etc. which are commonly found in leprosy? (c) Is there any definite thickening of the nerves of the affected part? (d) Can lepra bacilli be found anywhere in the body? (e) Does the clinical picture correspond with that of leprosy? In practice we find the third question often of vital importance. In cases of leprosy with anæsthesia or deformities at all marked, we nearly always find thickening of nerves. A nerve, however, must not be stated to be thick merely because it can be palpated. Many normal nerves can be palpated in some persons. The fifth question is also of importance. After dealing with thousands of cases of leprosy of all kinds, one gets a very clear mental picture of the many various forms that leprosy can take, and then one day one sees a patient with anæsthesia, with or without paralysis and deformity, which looks in some ways like leprosy, but in other ways does not quite fit in with one's mental picture of leprosy. In other words one's clinical sense and judgment tells one that the case is not quite as simple as it looks. One must always be prepared, in dealing with leprosy, to meet with cases showing unusual features, but in these cases one must ask the question, 'Is there some disease other than leprosy which is causing these symptoms?'

However, all these five questions are important and only when the answer to these five questions is doubtful or negative, should other causes of anæsthesia with or without paralysis and deformities be considered. Such cases will be found only occasionally in general practice but owing to the widespread knowledge that anæsthesia and deformity are commonly due to leprosy, such cases tend to be seen more frequently in leprosy practice. Doctors doing leprosy practice should realise this and should be able by very careful examination to differentiate between these other conditions and leprosy.

Shooting of Lepers in China

The special correspondent of the *Morning Post* reports that two hundred and fifteen lepers and nine narcotic peddlers, including a young woman, were executed to-day in widely-separated parts of China.

The military authorities shot lepers at Paiyunshan, in Kwangtung Province, despite the protests of the local populace, according to the "China Daily Times." This is the third such butchery in Kwangtung this year. Lu Tselan, an attractive woman peddler, aged 28, was shot by a firing squad at Hsuchow, in Kiangsu Province, before a large crowd. She attempted to smuggle a large quantity of heroin from Hsuchow to Chengchow. Eight narcotic dealers in Peking were paraded through the streets and executed, bringing the total executions in Peking this year to 30.

The *Japan Chronicle* somewhat caustically remarks: "Lepers in South China are to have their miseries ended with a rifle bullet. A Canton telegram states that the continued prevalence of leprosy has led the Kwantung authorities to take this drastic measure for the purpose of combatting the spread of the disease. It is a decision which, if persisted in, will finally stamp out leprosy altogether, but like the new "cure" for drug addiction, there is an air of ruthlessness about it that will win China no sympathy. And yet Canton is only putting into practice the suggestions of leading European and American scientists and thinkers. Doomed to certain death, it is better for the patient—and in the case of leprosy certainly better for society—that his

life be painlessly ended. China's critics, however, will not look on it in that light, and perhaps it is a little difficult to associate the scientist's euthanasia with a military firing party. Only in normal displays of patriotism does the taking of human life cease to shock."

The *China Press* states that after hearing a report on details of the massacre of from 50 to 60 lepers in Southern Kwangtung on Easter Sunday, the Chinese Medical Association decided yesterday to enter strong protests to the proper authorities in Nanking and Canton.

The officers of the conference were instructed to take immediate steps to urge that suitable penalties be imposed on "the murderers," that steps be taken to protect lepers, and that precautions be taken to prevent the molestations of those undergoing medical treatment.

Dr. J. L. Maxwell, Secretary of the Council on Medical Missions, who is an authority on leprosy, reported on the massacre at the conference session.

"As the sun was rising on Easter Sunday morning from 50 to 60 Christian leper men and women were murdered by soldiers at the leper settlement of the Yeung-kong mission hospital in southern Kwangtung," he said.

"The institution, which is called King's Mothers Village, is located at Yeung-kong (Yang Kiang is Mandarin), in Southern Kwangtung and was founded 20 years ago. The hospital is supported by funds from the Presbyterian Church in the United States and the Chinese Mission to Lepers. Last year the institution had 56 patients.

"The full story may never be known," he continued, "but sufficient details of unquestionable accuracy are to hand allowing us to picture the course of events.

"For over 20 years this settlement has ministered to the needs of some of the lepers in this region under the able supervision of the doctors of the Yeung-kong mission hospital and other friends. During this period the inmates have received regular medical treatment many of them had greatly improved and a number had become quiescent and non-infectious cases.

"Some financial help has been given by the local Chinese community whose attitude has always been friendly and assistance has from time to time been forthcoming from the Chinese Mission to Lepers. Such funds as it has been possible to secure have not, however, been sufficient to meet completely their needs and has been supplemented by begging.

"Some three weeks ago a senior officer of the soldiers in the neighborhood took up a very hostile attitude towards these poor people and threatened to shoot any lepers that were seen about. He sent a message to this effect to the local authorities. A meeting was immediately called to see what could be done and the civil and military authorities were invited to attend. The former did so but none of the latter put in an appearance, so nothing could be done.

"On the Wednesday before the massacre, however, the military

notified the lepers that all lepers in the settlement would receive 10 cents a day. It is evident now that this was done to try and get as many as possible into the settlement with a view to killing them off. Each inmate had to sign his name when receiving his 10 cents. This continued on Thursday, Friday and Saturday.

"On Sunday morning early the inmates were called together to receive their money but, as soon as they had assembled, soldiers rushed in, bound them individually, dragged them out of the settlement and shot every one. Two trenches were dug and the bodies of the men thrown into one and those of the women into another, lime thrown over them and the trenches filled up. Of those murdered between 15 and 20 were women and the rest men.

"The soldiers then re-entered the settlement, breaking open everything and stealing what money could be found. They then burned much of the place except the chapel.

"Here it should be made clear, however, that the soldiers, and the soldiers alone, were responsible for this outrage. The local civil authorities took no part in it and have always shown a helpful attitude towards the settlement as far as they were able. Further, it should be emphasized that this outrage was in direct defiance of the Canton civil authorities, who, at the representations made to them more than a year ago, issued instructions which were posted in every town, including Yeung-kong, that molestation of the lepers was to cease. Indeed the attitude of the central authorities in Canton has, of recent years, always been helpful.

"Finally it should be pointed out that no other action could be so certainly followed by an increase of leprosy in the area affected. From now, and it may be for years, every leper will be driven into hiding and no patient with leprosy will dare to come out for treatment or acknowledge his disease. As the most infectious stage of leprosy is an early one, when concealment is easy, it is quite evident that the results of this appalling exhibition of cruelty may be far-reaching and lead to a greatly increased spread of the disease."

In view of all this the Chinese Medical Association Conference adopted the following resolutions:

"That the Chinese Medical Association, in session at the Medical Center, Shanghai, has heard with dismay of the premeditated murder of lepers in the Yeung-kong hospital leper settlement and the subsequent looting of the settlement by soldiers. That, apart from the natural abhorrence of such cruelties, this and similar acts, in direct contravention of the orders of the Canton authorities, as expressed in their published injunctions strictly forbidding the molestation of lepers, do more than anything else to spread the disease by driving every leper into hiding.

"And that immediate steps be taken by the officers of this Conference to approach the proper authorities in Nanking and Canton urging that suitable penalties be imposed on the murderers, that steps be taken to protect the lepers, and especially to prevent the molestation of those undergoing medical treatment."

Further action will probably be taken at the Third National Conference on Leprosy which will be held on April 7th and 8th at the National Medical College, Fenling-chiao.

*Administering Justice in a Leper Hospital

G. A. R.

A Leper Hospital differs from other hospitals in a number of ways. First of all a large number of the patients are able-bodied and they could if they found the idea attractive chase the Medical Superintendent and his tiny staff abruptly and humiliatingly off the premises. There are nearly two thousand of them. So that a situation might (in theory) arise where one would find exactly two thousand reasons for the belief that one minute more spent in the Settlement would be about five minutes too long.

A second difference is that the inhabitants of Sungei Buloh are segregated lepers. Now that makes quite a difference on their outlook. Most of us keep good—or as good as we are—through fear of the law and through pressure of our respectable environment. In other words we keep out of trouble for fear of the consequences, and also because we have got into the rut of being good, like everybody else, and are scared of what people would say. You picture the O.C.P.D.s with their enormous khaki topis on, coming down on you like a horde of evil brown-shirts, and all the dreadful machinery of Court.

But for a patient in a leper hospital these deterrents do not exist. He has been cut off from all his associates and has ceased to care what they think. He has lost his respect for the law—the law can't do anything worse to him than nature has already done.

It will readily be seen then that justice has to be modified a little in a Leper Hospital and that the Medical Superintendent besides being a doctor has to be Lord of the High Justice, the Middle and the Low. That is, if the patients are not to be run haywire all over the place.

We have a prison of course. But prison with us is not a reformatory nor is it a punishment; it is a disgrace and the patients are constantly taught so. This means that putting a patient in prison for one hour is just as good as putting him in for a whole day—saves one a lot of trouble.

Justice is different in other ways too. Some sentences are much milder than they would be outside. For instance what I might call “natural wickedness” gets off very lightly.

*This article originally appeared in the *Maylayan Police Magazine*. We reproduce it from the *Straits Times*, Penang.

By natural wickedness I mean the things we all would like to do but are scared to and therefore pretend that we wouldn't "lower ourselves" to do. That includes violent language, hitting our neighbours, being in a filthy condition, staying in bed all day, gambling all night, stripping our neighbours' fruit trees and libellous defamation of character. Anything from an hour to "satu hari lock-up" suffices for these.

On the other hand disrespect to any of the staff would be judged an extremely serious offence. Back chat to the Medical Superintendent for instance would probably get eighty to ninety years imprisonment according to the gravity of the offence.

The sentence passed on a prisoner is not, as in outside courts, the end of the case. It is merely the beginning, like the opening price suggested by the barang man when he sold you that brass tray. It goes very much like this:—

Magistrate: "Ada salah, tiga hari lock-up."

Patient: "Tuan banyak bagus, satu halli chukop."

Magistrate: "Well, I'll make it dua hari."

Patient: "Tuan numba satu punya—Kasi satu halli."

Magistrate: "Certainly not. Jangan chakop bohong. Misti kena dua hari."

Patient: (*loud wailing*)—Too-aaan!"

Magistrate: (*hastily*)—All right. Satu hari be it."

It is not a bad system really. After all the prisoner is the interested party and should have some say in his sentence.

To take an example of justice in Sungei Buloh. I come down in the morning to be greeted by the clerk.

Clerk: Good morning, Sir. Sir, there was some frackass in the Settlement last night.

Self: Some what?

Clerk: Some frackass, Sir.

Self: What the——Oh! I see. Well who's been fighting now.

Clerk: Ramasamy Two and Lazarus the Scavenger, Sir.

Ramasamy Two has a moving story to tell. He was cycling along peacefully and inoffensively when the scavenger suddenly rushed out at him, knocked him off the bike, struck him till he was unconscious and he was only saved

by the timely intervention of his friends who pulled off the scavenger so that Ramasamy Two could run away. Throughout the whole attack he never attempted to hit back using only kind words begging Lazarus please to desist. Yes, just like that. He is backed up by three witnesses. Lazarus the Scavenger has an equally sad tale. He saw Ramasamy Two cycling along and saw him tumble from his cycle. Bursting like a mattress with brotherly love he rushed over to pick him up, dust him and send him happily on his way. Imagine his consternation when Ramasamy Two turned on his good Samaritan and hit him repeatedly with the clenched fist. He made no attempt to retaliate only begging Ramasamy Two to be merciful. It was just too bad. He also has three witnesses.

Having listened to these two schools of thought it comes to me that both must have a singularly low opinion of intelligence to hand out this kind of thing. I turn and reflect a moment on the witnesses.

As a rule I prefer to do justice without the bother of listening to witnesses, whom I find just tend to obscure the issue. Witnesses remind me frequently of the paragraph in front of novels stating that all events narrated herein are wholly imaginary and have no relation to any living person. In fact it would save a lot of trouble if this statement were elicited by the court interpreter instead of the usual oath.

Meanwhile Ramasamy Two has thought up something new, having noticed that the Tuan is evidently insufficiently impressed. The assailant—Lazarus the Scavenger—not only attacked him but used a very Wicked Word. He peers anxiously, wondering how that goes down.

“What word?” I ask.

After a flood of interpretations I am informed that the word is such that it could not be repeated in the Tuan’s ears. This seems to leave me a trifle out of the party. I become faintly annoyed.

“All the witnesses go to prison for an hour.”

The policemen assume that look of alert self-righteousness that all police appear to affect when dealing with a prisoner, and trundle off the loudly protesting witnesses. That gets rid of six Tamils and two policemen. One feels that the general atmosphere of tutored untruthfulness has cleared considerably.

The two principals Ramasamy Two and Lazarus the Scavenger remain. I look at them, sullen, torpid and disgruntled like everybody except the end man in “Who’s been

at my Eno's." This reflection plus a closer look arouses certain ideas that are more medical than judicial. "Enquire," I say to the clerk, "enquire as to whether these two men are in need of Eno's." (These are not perhaps my exact words at the time). The enquiry is made, ruthlessly, publicly and with a refreshing lack of delicacy. Alas, it is only too true. Both Ramasamy Two and Lazarus the Scavenger stand in painful and self-admitted need of Eno's. Now emerges the reason for the bad temper, the sullenness and the quarelling. Decision is easy.

"Both are to have four ounces of white mixture and have it right now."

The sentence is carried out amid the loud approval of the audience who appear to think the decision a happy one. The Sergeant unbends so far as to felicitate me in my judgment. I am unaware of having asked his opinion but I cannot but concede my concurrence.

"As a matter of fact looking round the spectators there are quite a few who could do with the same . . ." the court clears with remarkable celerity proving that my words are clearly audible.

In a couple of minutes I am left alone with the clerk. "Well, that's justice done for today." "Yes, Sir" says the clerk. "Er, just a minute before you go, clerk."

"Yes, Sir."

"It really doesn't matter particularly—just as a matter of interest—er—ah—Just what was that word that was so bad it couldn't be repeated in my ear?"

I suppose it comes to most of us, this wretched duty of being nasty to some particular person for his own and everybody else's good. When the prisoner is your own patient it is worse than ever. In the case of a leper—one who has suffered more than you and I will ever be called on to suffer—it is doubly and trebly difficult. I once heard it said that before passing a sentence one should ask oneself three questions—"Is it just?"—"Is it kind?"—"Is it necessary?"

I would like to add one more of my own and to suggest to those of you who from time to time have to "tangkap" a leper to send him to Sungei Buloh. "Can you understand what he has been through?"

REVIEWS.

International Journal of Leprosy, Vol IV, No. 4. Oct.-Dec., 1936

The first article introduces the first of a series of reports on the *Skin Lesions of Neural Leprosy*, by H. W. Wade. The material used was collected during a tour in India and Ceylon. The term "lepride" is applied to these lesions and they are primarily divided into "simple", "minor tuberculoid" and "major tuberculoid" according to the amount of infiltration and the degree of visible and palpable infiltration. Further considerations in classification are based on the depth of the lesion, the involvement of related cutaneous nerves and the increase or abatement of activity at the time of examination. The surgical, pathological and bacteriological technique used are described.

E. Burnet describes the *International Centre for the Study of Leprosy at Rio de Janeiro*. This centre is of benefit not only to Brazil but forms the chief centre for the whole of the South American continent. The main objectives are : experimental research, keeping leprology in contact with dermatology; and, secondly, epidemiological research with a view to prophylaxis. The public health departments, both federal and state, have placed their staff and dispensaries, etc. at the disposal of the Centre. Also, in the State of Sao Paulo about 9,000 lepers are segregated in institutions, and there is a group of workers engaged in the study of leprosy. The League of Nations, which sponsors the international centre at Rio, invites governments, hygiene administrations and important leprosy associations in other countries to take cognisance of the centre and of the services which it is able to render towards international control of leprosy.

T. M. Clouston writes on *Children of Lepers at Nauru*. The children born of leper mothers are separated at birth.

"When an infant is born in the leper station the usual procedure is for it to be bathed by the orderly in charge, who is an arrested case, after which it is handed over the fence to the 'caretaker' who dries and clothes it and thenceforth acts as a foster mother. As far as possible, it is seen to that the caretaker is not even attending the clinic for non-infectious leprosy cases, though in practice it is not always possible to follow this rule, because all the available relatives may be attending the clinic. The welfare of the child is carefully guarded by regular attention at the baby-health clinics, which are held weekly. It is probable that the foster mother, having to feed the child artificially, cannot do all that the real mother could; however,

this is problematical, as almost half the native mothers feed their children artificially.

The infant mortality rate for these children, in the very small series available, is rather above that for the island as a whole over the past fifteen years. Nine have died (21 per cent.) at less than 5 years of age, five of them under 12 months. The causes of death were ordinary infantile conditions, no death being due to leprosy.

Of the thirty-four children still alive, ten may be excluded as less than 3 years of age and consequently below the age at which signs of leprosy can reasonably be expected to appear—though I realise that children less than 3 years old have been reported to have had leprosy. Out of the remaining twenty-four children born to infectious mothers and removed at birth, five have developed the disease, three in an infectious form. This is an incidence of 20 per cent. Three of these five have been admitted to segregation as infectious cases, at the ages of 9, 7 and 4 years respectively, but one of them has been released after three years' treatment. Two other children attending the clinic for closer observation and treatment exhibit small hypopigmented areas with slight sensory disturbances, but no signs of cutaneous activity and no acid-fast bacilli in skin sections. They correspond somewhat to the type described by Muir as 'juvenile leprosy'."

In India and in other places removal from parents at birth and careful guarding under European supervision from contact afterwards has practically never been followed by the development of leprosy. In view of this one would like to have more details of the precautions taken to prevent contact and the degree of European supervision.

R. M. Wilson gives a second report on *Marriage among Lepers*.

"One group of eleven carefully selected, strong and able-bodied couples in whom the disease was arrested were allowed to marry after vasectomy of the male, and to adopt a child and support themselves upon land within our colony. There have been no relapses of the disease after three years, and the experiment has proved a happy one.

"A second group with whose selection and marriage we had nothing to do came under our care. Among seventeen couples nine have had babies, and in four of the women concerned the disease has relapsed due to the strain of pregnancy and lactation.

"Lepers will marry, as do other people. Relapses follow and children are born who create new problems. For a limited number of selected suitable cases it seems to be highly desirable to permit marriage after sterilization and to aid these families in becoming self-supporting."

Purification and Esterification of Chaulmoogra Oils is the subject of a paper by H. I. Cole and H. Cardoso. The methods and apparatus are fully described and should be read in the original by those who wish to prepare esters.

L. Rogers writes on *The Epidemiology of Leprosy*. The various factors influencing the incidence of leprosy are fully

described. The plan for the control of leprosy is based on the facts: (a) that most infections (probably about 80 per cent.) are contracted by living in the same house with an infective leper; (b) that the earliest symptoms appear in most cases (probably some 80 per cent.), especially in the case of children, within five years of exposure to infection; and (c) that by prolonged modern treatment in the early stages the great majority can be prevented from going on to an infective stage.

"As the key to the problem is the early discovery and treatment of as many cases as possible, it is essential to examine from head to foot the household and other close contacts of every discovered case of leprosy every few months for at least five years, and if possible for ten years."

A very instructive article by K. Mitsuda on *The Significance of the Vacuole in the Virchow Lepra Cells and the Distribution of Lepra Cells in Certain Organs* is translated from Japanese and reprinted. The author noticed that the vacuolar substance in lepra cells was remarkably well stained with Sudan III, the bacilli being only slightly stained.

"In the preparation of gross visceral specimens of leprosy, if a formalin or Kaiserling specimen is placed in a saturated alcoholic solution of Sudan III for an hour or more, and, after washing in half-strength alcohol, is stored in Kaiserling III solution, a splendid specimen will be obtained that keeps its colour for a long time. The general process of leprosy, when the infiltrations are generalized, is such as to permit naked-eye determination of whether a lesion is old or recent. For example, when a skin leproma is new, its surface will present a pale, pearly colour, while old lepromata or infiltrations are dark grey or yellow, or yellowish brown."

Regarding the chemical composition of the vacuolar substance he sums up:—

"Since the lipid substance in the lepra cells stains by either the Smith, Ciaccio or Fischler method, it cannot be a neutral fat. Because it is not doubly refractile it is not the cholesterol ester. Consequently, it must be one of the so-called lipid substances. Its chemical formula has not been established, but it may very well be of very complex structure. Since the fresh leprosy bacillus can also be stained with Sudan III or by the Smith and Fischler methods, it also contains a lipid substance. On the whole the lipid content of the bacillus is similar to that of the lepra cell, the only difference being that the bacillus resists the fat solvent, and that its acid-fastness is much greater than that of the vacuolar substance; moreover, it is stained more rapidly by osmic acid."

With the aid of Sudan III the author describes the nature and position of leprous lesions in the various internal organs:—

"In cases of nodular leprosy, examination of the heart by means of Sudan III often shows that histiocytes in the intermuscular connective tissue give rise to the lipid reaction, and they grow to form

tubercles similar to the rheumatic nodule. Lepra cells giving rise to this reaction, whether they occur singly or in groups of several, usually contain one or more bacilli. It is to be noted that, although these cells sometimes contain at the same time some needle-like fatty crystals, no error can be made on that account if specimens defatted by ether, alcohol or acetone are studied.

"Rarely are macroscopically visible nodules found in the lung, but the bacillus is to be seen in the histiocytes in the interstitial tissue, in the endothelial and perithelial cells of the blood vessels, and in the dust cells.

"In the case of nodular leprosy the bacillus is unmistakably present in the glomerulus of the kidney, where it causes hyalin degeneration of the glomerulus and interstitial nephritis. In addition, there are a few microscopic groups of lepra cells in the interstitial tissue around Bowman's capsule and the interlobular arteries and veins.

"The fact of the matter is that whenever there are leprosy nodules in the liver or spleen, some of them are usually to be found in the suprarenal. Indeed, even in cases where such lesions are difficult to see in the liver and spleen, either because of their small size or other changes that obscure them, the suprarenal may show conspicuous nodules."

The author considers that the lipid material may result from the degeneration of lepra bacilli. He also suggests that this substance may be responsible for positive Wassermann and other tests which are often found, especially in advanced cutaneous cases in which the lipid material is present in largest amount.

Revista de Higiene, Vol. XVI, April, 1935.

Communication from Dr. E. Burnet from Rio de Janeiro, June 11th, 1935.

The Brazilian Government founded in 1934 an "International Centre for the Study of Leprosy" under the auspices of the League of Nations. This Centre has as its Administrative Council the Committee of Hygiene of the League of Nations, and has a directorate of seven members, including four Brazilians, one delegate of the League of Nations, one Argentine (Prof. Balina) and one Colombian. The Director of the Centre nominated to succeed Prof. C. Chagas, who died in November, 1934, is Prof. Rabello, specialist and professor of dermatology, syphilis and leprosy in the Faculty of Medicine of Rio de Janeiro. (Revista de Higiene 137-163).

Leprosy and Children.—R. F. Parra.

In an article by Dr. Ricardo F. Parra of Colombia on "Leprosy and Children", the writer quotes from the chief authorities on the subject in other parts of the world, but also goes into the details of his experience in his own

country. In his series of 726 children of both sexes 81.68 per cent. had leprous relatives—father, brothers, etc.—who lived or were in frequent contact with them for varying periods; such period of exposure to contagion varying from one month to fifteen years, the average period being often years judging from the appearance of the first visible symptoms of the disease, which was mostly between the ages of eleven and twelve. In the year (1st May, 1926 to 30th April, 1927) there were examined in the colony "Agua de Dios" 120 children of both sexes, admitted as infected or suspected cases, some having resided in the lazareto; of this group 24 per cent. became lepers. In 1928 of 135 children examined, 23 per cent. were found leprous within one year. and in 1929, 24.38 per cent. of 324 examined were leprous.

Comparisons are made with the percentages as found in the Philippines, Hawaii, Japan, British Guiana, French Guiana and the Punjab.

In Colombia in the "Agua de Dios" Colony, the children under 15 years of age who were diagnosed as lepers in the period between 1920 and January, 1934, reached the number of 726, both sexes being in equal proportion.

The high percentage, 81.68 per cent., of those who had leper relatives, shows clearly the danger of the cohabitation of children with lepers, and the enormous propagation of the disease in such circumstances. There were the remaining 18.32 per cent. cases who had no leper relatives, but may all possibly have had contact at an early age with lepers, contact that may not have been noticed, as often happens, because the lepers in such cases may not have shown any visible signs of their disease in their uncovered parts.

There is mentioned the high proportion, 32%, of children born in the lazareto or living in it from an early age and remaining in long intimate contact with the lepers. The percentage does not cover all the children born in the lazareto during the period mentioned, but only those diagnosed as leprous during that time. It is impossible to get the exact total of all the children born in the Agua de Dios Colony, because the greater number of the children are smuggled out to be baptised and registered in other villages, so as not to have the stigma of having been born in the lazareto, while many people outside the lazareto bring or send their children into it to get them baptised, because the ceremony performed inside costs less than when performed by a priest outside, the parents never worrying at all as to what the consequences may be!

Attention is drawn to the contrast between the proportion

of leprous children, one only of whose progenitors was leprous (20.93% and 28.23% respectively) which is a very high percentage—more than half of the cases that could be verified—and the proportion 11 per cent. of those born of two leper parents. This may be accounted for by the relative infecundity of those patients and also perhaps because the children are born with a certain degree of acquired immunity. It is often observed that children born of two leper parents are weaker than the others, and of cachectic appearance, and yet they live on for many years, and may even reach an advanced age without having presented any active signs of leprosy.

In a series of 514 children in whose case it had been possible to fix the age more or less accurately when the first visible signs of the disease appeared in them, the biggest proportion of them were 11 to 12 years old, as already stated. This may depend on the physiological changes and the alteration of the metabolic equilibrium at puberty, and also on the fact that children who have reached that age have had the optimum period of contact with the sources of infection, and the average length of incubation period has now been passed. It was found that the next highest percentage after that of the 11 to 12 years children, was that of 13 to 14, namely 8.75%, and then 8 to 9 years, 8.56%, ages included in the periods of the change of puberty and of second dentition.

The writer draws attention to the high proportion of "cutaneous" cases of leprosy (63.22%) in children at the time when they were admitted as "infected". Such advanced cases were those that had remained hidden away in the very worst hygienic conditions for a long period, in many cases (13.19%) as long as 10 years, if one may judge from the date at which the first visible signs of disease were said to have appeared.

The Colombian Medical authorities are now well aware of the necessity for making proper provision for leprous children, as also for the children of lepers, and are establishing "Nursery Annexes" and "Children Annexes" in connection with the various adult leper institutions, as well as "School Dispensaries" in connection with the Municipal Leprosy Dispensaries.

The author gives a resumé of his conclusions:

1. The frequency of leprosy among children is due to their great susceptibility to the infection and to contact with leprous parents.

2. To avoid their contracting leprosy, children ought to

be separated from all contact with their leper parents immediately after birth.

3. The "Nursery Annexes" under special conditions of isolation, are the best method for carrying out this idea.

4. When they leave the "Nursery Annexes" children, who cannot be handed over to healthy relatives, must be brought up and educated in separate institutions, such as agricultural colonies.

5. All children of school age ought to be examined periodically by leprosy specialists, and this service must be organised in all the schools throughout the country.

6. Infected children not interned in lazaretos, will be attended at "School Dispensaries".

7. All the isolated cases must be classified according to the form and gravity of the disease, and must be educated in the same way as healthy children, but must be kept separated from adult patients.

J. W. LINDSAY.

Public Health in Iceland. *The Lancet*, December 5th, 1936.

The total population of Iceland is 114,000, nearly a third of the total being concentrated in Reykjavik. The report for 1934 has 152 closely printed pages and a 5 page summary in English for readers unfamiliar with Icelandic.

Leprosy continues to decline; in 1925 there were 50 lepers alive, and in 1934 only 31. But it should be noted that in this year the diagnosis was made for the first time in three cases.

Leprosy in France. *The Lancet* of May 8th, 1937 reports as follows:—At the end of 1934 the leprosy service of the Saint-Louis Hospital in Paris was confided to Dr. C. Flandin who, in association with Dr. J. Ragu, presented a disquieting report on the subject at a meeting of the Academy of Medicine on March 16th. When Dr. Flandin took charge of this service there were only 4 lepers in it; now it houses 26, and 69 others are under his observation either at the hospital or elsewhere. There are several reasons for this remarkable rise in so short a period from 4 to 95 cases of leprosy. In the first place the greatest tact has been shown in dealing with the lepers, who are most sensitive to being treated as exhibits for medical students. In the second place, these patients have been assured that professional secrecy will be preserved with regard to them and that no step will be taken to intern them against their wills. A third inducement to lepers to come

forward and submit to diagnosis is the success here believed to result from intravenous injections of a new preparation of chaulmoogra oil and cholesterol. Among the 95 patients were 41 whites who had passed some time in the colonies, 17 whites who had been born in the colonies, and 6 whites who had never left France. The remaining 31 patients were coloured or half-breeds. Four of the Europeans who had contracted the disease in the colonies had stayed there only 4 to 10 months; their incubation period ranged from 8 months to 25 years. The enormous differences in the length of the incubation period may in part be explained by a reference to the mode of infection; the comparatively short incubation period of 6 to 8 months is to be observed in patients contracting the disease by sexual intercourse with a leper, whereas comparatively long incubation periods are the result of mere residence in a leprous milieu. This was the case with 2 of the 6 cases of leprosy in persons who had never left France. In the remaining 4 cases the infection was conjugal. Now that it is definitely proven that leprosy can be contracted in France there may be a renewed clamour for compulsory notification and isolation; but Dr. Flandin is definitely opposed to such a course, being convinced that it will defeat its own object by driving leprosy underground. The measures he favours include facilities for diagnosis and treatment at a hospital, such as the Saint-Louis, which should be in touch with all the bodies working on behalf of lepers in France. In the course of the discussion following this communication to the Academy, Dr. Marchoux agreed with Dr. Flandin as to the undesirability of compulsory notification, and he considered the best solution of the problem to be the leprosy dispensary and supervision of the lepers by visiting nurses. His suggestion that a commission should be appointed by the Academy to deal with this problem was accepted and Dr. Flandin and Dr. Ragu's report was referred to a commission on which five leading members of the Academy will sit.

“La Sensibilité au Virus Lépreux n'est pas plus grande chez les Jeunes que chez les Adultes.” *“Annales de l'Institut Pasteur,”* December, 1936. E. MARCHOUX et V. CHORINE.

The main contention of this paper is that children are not more susceptible to leprosy than adults but that, due to their inexperience and other circumstances connected with childhood, they are more likely to be subjected to infection. The chief argument is based upon the analogy of rat leprosy.

The statements of some workers that there is an ultra-virus form of Stafinsky's bacillus is denied by the writers, as Peltier and Mlle. Choucroun, working in the same laboratory, found that the bacillary rods themselves will pass through a filter candle. They consider that the presence of Hansen's bacilli in the umbilical cord and the internal organs of newborn offspring of leprous parents found by Pineda and others is accounted for by contamination of instruments used at previous autopsies, as boiling and other forms of sterilisation do not always remove adhering acid-fast bacilli.

The writers therefore consider that leprosy is never hereditary and that there is no ultra-virus which can pass through the placental membranes. It was found that adult rats are as easily infected as new born rats by contact with leprous animals which show bacillus-bearing ulcers, the infection taking place apparently through the conjunctiva and infecting first Harber's gland and subsequently the adjacent sublingual and submaxillary lymph nodes. Rat leprosy was induced in new born rats kept in contact with a mother having an ulcerating leprous lesion of the nipple. The larger the dose of bacilli inoculated in the skin of rats the greater and more rapid the infection, also the more widely a given dose of the infection is distributed over the skin surface, the more rapid and severe will be the infection.

Marchoux and Chorine therefore conclude that the apparently increased susceptibility of children to Hansen's infection is due to their greater exposure to infection, and the greater likelihood of infection taking place over their whole skin surface by their close contact in a naked condition with their infected parents.

It is doubtful to what extent it is justified to argue concerning human leprosy from the rat leprosy analogy. It is true that the two diseases resemble each other in certain respects. The organisms are similar in morphology and staining reactions; both show difficulty or impossibility in culture *in vitro*; and progressive disease has been produced by each organism in only one genus. But one of the most characteristic phenomena in human leprosy is the affinity of *M. leprae* for the peripheral nerves, and this characteristic appears to be entirely lacking in rat leprosy. The contention that children are not more susceptible to leprosy than adults is not borne out by the *Leprolin Test*, which there is good reason to believe is a delicate indication of the degree of response of the human skin to the invasion of Hansen's bacilli. The skin of children reacts very much less than that of adults to intradermal injection of a sterilised suspension of

leproma, and it is not unreasonable to suppose that this variation of reaction has an important bearing on the comparative resistance of adults and children.

Journal of Tropical Medicine and Hygiene, April 1st, 1934
and April 1st, 1936.

In two articles Dr. Socrates Lagondaky describes methods and results of inoculating himself three times with material from lepers.

There seems to be no doubt that Dr. Socrates Lagondaky infected himself with leprosy. Whether the infection was the result of the first two inoculations which were intramuscular, or of the third, which was intravenous, it is impossible to say. For the inoculations he took blood from three different patients, but does not state the types of these cases, nor does he say whether the skin covering the veins from which the inoculation was taken was free from lepra bacilli, or if any precautions were taken in puncturing the skin over the donor's veins to prevent bacilli from the skin entering the needle. As shown by Lowe (*Ind. Med. Gaz.* Vol. 68, No. 9, Sept. 1933, pp. 503) bacilli enter the needle from the skin if blood is taken from a vein covered by leprous skin. The appearance of the skin cannot be trusted, as films taken from healthy-looking skin in the neighbourhood of the vein puncture will often show marked infection.

There is no record given of bacteriological examination of the lesions previous to the beginning of treatment, although it is recorded that bacteriological examination was negative after the period of treatment. This is unfortunate, as the best proof of improvement would have been positive findings followed by negative.

Also there does not appear, from the recorded facts, to have been any increase in the size of the skin lesions. It is only stated that spots the size of sixpence to half-a-crown appeared and later cleared up, and that the colour of the outer side of the thigh was pinker than the inner.

From the point of view of the results of this interesting experiment it is unfortunate that treatment was begun, against the will and judgment of the patient it is noted, without waiting for further developments. It is not unlikely that progress towards recovery would have been equally, or even more rapid, if treatment had not been given, and the power of the tissues to deal unaided with the infection would have been demonstrated.

We may hypothesize the course of events as follows.

Leaving aside the two first inoculations, which were intramuscular, and any organisms contained in which may have been dealt with locally, we may suppose that the intravenous injection contained a considerable number of bacilli which had entered the needle as it passed through the skin to puncture the vein. These bacilli found their way through the blood stream to various parts of the body where they were arrested in the skin and subcutaneous plexuses, and possibly the nerves. These leprous foci began, after a few weeks, to produce signs of their presence in the form of larger or smaller macules, areas of anæsthesia, etc. These signs were caused by local reaction of the tissues to the bacilli in their neighbourhood. None of the lesions appear to have increased in size or shown any signs of spreading. According to the records in the second paper they appear to have cleared up steadily. This is attributed to the effect of treatment, but there is at least a reasonable chance that in a healthy subject, such as he appears to have been, the lesions would have cleared up equally rapidly without treatment.

International Journal of Leprosy, Vol. V, No. 1. January-March, 1937.

A second article appears in the series of *Skin Lesions in Neural Leprosy* by H. W. Wade and J. N. Rodriguez. Material is taken from two groups of cases, 18 being gathered in the course of an intensive survey, and 34 at the Cebu dispensary. All the cases were found to be bacteriologically negative except two, which however were both " frank tuberculoid ". The lesions are grouped as follows:—

- (A) Anesthetic patches, non-macular.
- (B) Residual macular leprides. (Healed lesions, usually non-tuberculoid).
 - (1) Non-atrophic.
 - (2) Atrophic.
- (c) Simple macular leprides. (Not elevated or only slightly so, surface smooth or only coarsened in texture.)
 - (1) Quiescent. (Non-erythematous, flat or practically so. Frequently slight tuberculoid histologically.)
 - (2) Active. (Almost always tuberculoid histologically. Divisible into two main groups according to elevation, each further divisible.)
 - (a) Flat. (Not elevated; erythematous: (1) marginally, and (2) diffusely throughout.)
 - (b) Raised. (Slightly elevated; divisible into (1) erythematous, usually only marginally, and (2) non-erythematous.)
- (D) Minor tuberculoid leprides. (Frank tuberculoid, recognizable clinically, elevation more than slight, surface characteristically irregular.)

- (1) Papulate. (Discrete populations, usually marginal in a flat, often quiescent or residual base.)
 - (a) Paucipapulate. (Populations typically marginal, except in case of "lichenoid" subgroup. Active retrogressive.)
 - (b) Multipapulate. (Divisible into (1) diffuse, populations scattered throughout, (2) marginal, populations scattered over a broad marginal zone, and (3) circinate, populations peripheral, often in hazy spots, isolated or agglomerated.)
- (2) Diffuse. (Tuberculoid thickening diffuse in affected parts, whether lesions soiled, annular or otherwise. Surface typically irregular or pebbled not actually papulate, but sometimes quite smooth.)
- (E) Major tuberculoid leprides. (Maximum degree of the leprides, often resembling lepromatous lesions.)
- (F) Cases with non-leprotic lesions ("controls").

Apart from giving this tabulated grouping it is impossible to do justice in a review to this very thorough and painstaking paper, which must be read in the original in the light of the excellent photographic illustrations. The summary and conclusions end as follows:—

"The findings as a whole indicate strongly the constancy of tuberculoid changes in all typical active leprides of whatever clinical variety. They emphasize the great variations in the degree, and to some extent in the histological details, of that condition, but also the lack of any clear pathological distinction of any one variety of these lesions from others. The common belief that the simpler leprides are not tuberculoid may be due to failure in the past to recognise the lesser degrees of the tuberculoid picture."

B. E. Eddy describes extensive efforts at *Attempted Cultivation of M. leprae*. Sixty-eight different media were used under: (a) aerobic conditions, (b) partial tension conditions as used by Wherry, (c) increased carbon dioxide and oxygen as used by Soule and McKinley, and (d) anaerobic conditions. The results are summarised as follows:—

"The mycobacteria of the inoculum persisted on many media for long periods of time, depending on their number in the inoculum, the reaction of the media, and the conditions of moisture. Mycobacteria were found in smears from cultures on several different media kept moist at 37 C for twenty to thirty weeks, in five cultures kept for over one year, and in five others kept for over two years. On slightly acid media the organisms became coccoid and fragmented after a few weeks, and finally disappeared. Fewer were seen in smears from partially dried cultures than from moist cultures.

"Mycobacteria were found on transplants made from the primary cultures, but there was a diminution instead of an increase in their numbers. As many as six transplants made on several media continued to show organisms.

"An organism resembling *M. tuberculosis avium* was isolated from the asicitic fluid of one leprosy patient. Cultures made from the skin of the same patient were negative.

"Of the non-acid microorganisms that appeared in some of the cultures, there were some (molds, spore-bearing bacilli, and staphylococci) that were considered as ordinary contaminants and were discarded.

"Two other groups of microorganisms were also obtained, actinomycetes and small non-acid-fast bacilli. It was not determined whether any of them had any relation to leprosy. One similar actinomyces was obtained on medium exposed to the air in the laboratory. The small non-acid-fast bacillus grew on several media inoculated with material from a number of cases of leprosy."

R. Cliento writes on *Leprosy in Australia and its Dependencies*. Writing of conditions as in 1931 :—

"The incidence of leprosy in Australia and its dependencies was considered at that time to be marked amongst both white and coloured persons in Queensland; marked amongst coloured persons in the Northern Territory; slight and of focal distribution in Western Australia; minimal in New South Wales; and non-existent in Victoria, South Australia and Tasmania. With regard to the Territory of Papua, information is meagre. The disease is known to exist, but there has been no adequate determination as to its extent. In the Mandated Territory of New Guinea a small leper asylum was established off Madang, north-eastern New Guinea, about the year 1925, for some forty lepers from a few neighbouring foci around the mouth of the Sepik River. Leprosy was also recorded from several other localities, of which the most definitely suspected was the island of New Hanover, north of Kavieng. At Linding, on that island, many lepers were subsequently observed, and the numbers recorded and bacteriologically confirmed in the Mandated Territory are now considerable (approximately 500). It appears likely that, when the problem is adequately surveyed, it will be found to represent as serious a condition as that found in Fiji. First at Limellon, and now at Anelaua, there has grown up an establishment that will become the central leper establishment of North Melanesia, as Makogai in Fiji is for South Melanesia. Leprosy is also recorded in the British Solomon Islands Protectorate, where it is regarded as 'increasing', this being probably an expression of the fact that the more intensive the search the greater the number of cases detected. In New Caledonia and the Loyalty Islands the problem is recognised to be the greatest one of public health among both white and coloured persons."

Difficulty was found in providing for re-examination of contacts with cases found in making a survey, because of the migratory habits of the population.

"Where a case of leprosy has been recorded, relatives and contacts often leave the neighbourhood and become untraceable. Furthermore, when the relatives do not migrate they often refuse subsequent examination, even when approached with the greatest tact. No provision is made in existing regulation for their examination, except on a magistrate's order or when there is a suspicion of leprosy, which would need to be substantiated; and so far as it has been tested by me,

ministerial and legislative opinion is against the provision of any such facilities. It is, therefore, difficult to the point of impossibility for a member of a commonwealth department, unprovided with definite authority, to examine such contacts every six months for five years. When the question of the aboriginal was investigated, the problem was seen to be infinitely complicated. The native habit of changing his name repeatedly further disguises relationships already masked by the haphazard use of the terms 'brother', 'father', 'cousin' 'uncle', etc. His complete dread of the white man's medicines, surgery and hospitals renders it utterly impossible to contemplate any system other than segregation for him. It is frequently suggested that if the benefits of cure are presented adequately to him, the native will appreciate them and will respond to requests for his attendance for treatment. This, in so far as the Australian aboriginal is concerned, is utterly untrue. His whole outlook and conduct are determined by a blind and unreasoning fear of anything in the way of medicine outside his experience, and as a consequence he will never appear for treatment, or be surrendered by his relatives, unless he is unaware that he is sick or is *in extremis*. On the other hand, in every large aboriginal settlement where lepers have been looked for intensively, at least one case has been found at the outset; since then other cases have been found with what appears to be undue frequency, considering previous figures, and there are presumably other lepers now at liberty for whom treatment is impossible. This is the fact in North Queensland, at any rate, and the same is known to be the case in the Northern Territory and in the north-west part of Western Australia."

The methods of control recommended at the session of the Federal Health Council of Australia are embodied in Resolution No. 5, Leprosy:—

"Each State Health Department will undertake to furnish as complete records as possible of each case which comes under official notice. The Commonwealth Department of Health will assemble and analyse all the information as received. That the Commonwealth Department of Health arrange for the publication of a series of articles in the daily press and the Medical Journal of Australia, in order to inform the public on the question of leprosy. This Council recommends strongly that in each State in which there is any considerable number of aborigines, a medical officer should be appointed by the State Government, whose duty shall be the medical supervision of the welfare of all aborigines with special reference to leprosy.

"In addition to these officers, this Council considers that the immediate urgency and increasing gravity of the leprosy situation demands the appointment by the Commonwealth of a medical officer specially devoted to the study of leprosy and other diseases specially affecting aborigines. This officer should be available to travel through the northern portion of the Commonwealth to consult with the State Medical Officers for Aborigines, to collect information and study the epidemiology of leprosy, to conduct research and to distribute information concerning the most recent knowledge concerning, and all recent progress in, the treatment and diagnosis of leprosy.

"It is important that each State which has not the necessary powers should provide full legal powers for the periodical examination and any necessary detention of persons: (a) suspected of being

infected with leprosy; (b) who have been in contact with known cases of leprosy. It is imperative that any leper discovered in Australia should be placed under conditions permitting of full modern medical treatment and continuous and immediate laboratory facilities, and under the continuous supervision of a medical man with special knowledge of leprosy. There is not sufficient reason for requiring leprosy stations to be on an island; the disadvantages of such a location are greater than the advantages.

"Modern knowledge in respect of leprosy indicates that it is very necessary that, as well as the specific medical treatment of leprosy, lepers should be placed under the best conditions of social life including a healthy environment, sufficient food of good quality and controlled exercise, and such purposive employment in their own interest as is possible."

In a *Study of One Hundred and Fifty Autopsies on Cases of Leprosy* by K. Mitsuda and M. Ogawa, the conclusions are as follows:—

"In this group of cases the most common cause of death was tuberculosis, which is in agreement with experiences in the Philippines and other foreign countries. Leprotic lesions of the viscera, aside from those of the testis, are found only in cases of the cutaneous type, and not in neural cases. They are found in 'secondary neural' cases, but these cases are to be classified as primarily cutaneous. Lepromatous involvement of the lymph glands is also limited to the cutaneous type, and it is found in such cases even when they are of slight degree of advancement. Tuberculosis-like changes in the viscera have no relation to the tuberculoid changes found in the tuberculoid macules of the skin; such visceral changes are only a manifestation of generalised tuberculosis."

A paper by R. G. Cochrane and others on *Preliminary Observations on Childhood Leprosy in Ceylon* describes work which has already been reviewed on page 17 of the January issue of the Leprosy Review.

R. C. Germond writes on *The Classification of Leprosy* and suggests a modification of the chart originally suggested by Wade and le Roux.

An editorial describes shortly the first three International Leprosy Conferences and the Leonard Wood Memorial Conference, and discusses the nature of the International Conference which it is proposed to hold in Cairo, Egypt, from the 21st of March, 1938. Members of the International Leprosy Association and others are invited to send suggestions as to the manner in which this conference should be conducted, and the topics that should be discussed.