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Editorial.

THE readers of the REVIEW will be interested in the situation at Aden, which is described so clearly by Col. Phipson in an article entitled "Aden and Its Leprosy Problem." The position there is unique and the difficulties raised are not easily solved. There seems to be a considerable amount of leprosy in the hinterland, and not until there is an enlightened Imam of Sana'a in power will there be much hope of effectively dealing with the situation. This article of Col. Phipson's is followed by a description of the Keith Falconer Hospital, in which is stated that many of the cases come from one district in the Yemen. This confirms the impression that leprosy is essentially focal in its distribution, and it is the more serious of these that need to be concentrated on in anti-leprosy campaigns rather than widespread efforts over a whole territory.

Dr. Ryrie's article on Fluorescein in Lepra Reaction opens out a new approach to the treatment of this distressing condition. Like the disease itself, the number of remedies used is legion, the best of which in our own experience is Pot. antimony tartrate, 0.02—0.04, given every other day for six doses. It is yet too soon to comment on the efficacy of this drug, but it is well worth a trial, remembering that the drug is a potent one, and a number of precautions should be taken such as keeping the patient in bed and on a light diet. In addition we think the avoidance of direct sunlight after the injection is important, for we have vivid memories of one patient reacting violently to 10 ccs. of fluorescein soon after having sat on a sunny verandah. It is said that rabbits can be killed by exposure to sunlight after an injection of fluorescein, which ordinarily would not affect them. We trust this remedy will be tested out further in suitable institutions.

We are glad to reprint an article from the *South African Medical Journal*, by Dr. P. D. Strachan. Readers of the REVIEW will be distressed to know of the untimely death of Dr. Eric Slack, Dr. Strachan's colleague. Dr. Slack was a regular contributor to the REVIEW, and his death is not only a personal loss to us, but the cause of leprosy has lost in the prime of life one of its most enthusiastic workers.

This article of Dr. Strachan's is most instructive, especially from the statistical point of view. We dealt

with the question of the results of treatment in a previous number of the REVIEW, and therefore, need not say anything further on this point except to emphasise the fact that proper statistics are essential before sweeping conclusions are drawn, and this article is a model for future articles on a similar subject. It is said that figures can be made to prove anything, but in the appraisal of results, the gathering of statistics is essential, and it is important that such figures should be amassed with great care, and with proper regard to controls.

In estimating the results of treatment there has been a tendency to give the credit of success to the treatment under consideration without due care being taken to realise the type of case under review, and the number of injections each patient in the series has had. In view of this and previous articles, we would emphasise that while the hydnocarpus (chaulmoogra) preparations are not a specific for the disease, they are the only ones that have stood the test of time, and should not be withheld in any active case of leprosy, for few physicians would be willing to treat the disease without their aid.

A series of articles dealing with impressions, experiences and the work which the Secretary did on his recent tour, will be published, and we trust they will be some help to readers of the REVIEW.

We reprint Dr. Lowe's excellent article from *Leprosy in India*, on the " Leprosy Clinic and the Control of Leprosy." It will be seen that he rightly stresses the fact that treatment alone cannot control leprosy. The more emphasis that is laid on the prevention of leprosy the better, and if the treatment centre can be part of a preventive unit, it will perform a useful function, and it is in this light that it should be developed. The statement Dr. Lowe makes that it has been argued that centres doing treatment alone may actually spread the disease, needs careful pondering, and be it said that we have seen certain types of clinics which add considerable weight to such an argument. We shall return to this matter from time to time, as it is one that is of utmost importance in the understanding of the whole leprosy problem and its control.

We have reprinted the Resolutions of the Calcutta Conference and the Report of the Madras Conference, which followed, and we trust readers will peruse these with care, for by a perusal of them the trend of modern leprosy thought in India will be best appreciated.

Aden and its Leprosy Problem.

E. S. PHIPSON.

THE leprosy problem in Aden, though not at the moment of serious dimensions, presents certain unusual aspects arising from its geographical position and from its political associations which threaten to give the problem a wider ambit than would at first appear.

The Fortess of Aden is situated on a peninsula about 12 deg. North of the Equator and 45 deg. East of Greenwich, on the south coast of the ancient province of the Yemen, Arabia. The inhabited peninsula is roughly oval, with a diameter of three to five miles, connected with the continent by a narrow neck of land some three miles long. Aden consists of a huge crater, walled round by precipices, the highest peak being 1775 feet above the sea. A great gap in the circumference of the crater has been rent on its sea face by some later volcanic disturbance, and on this aspect the bed of the crater, but little above the sea level, slopes gently to the sea.

The main town of Aden, with some thirty thousand inhabitants, lies in this crater, almost surrounded by precipitous volcanic hills. On the opposite side of the main peak, known to mariners as " Shum-Shum," is situated the modern shipping quarter, Steamer Point, which skirts part of the fine natural harbour of Aden.

The climate of Aden is trying for many months of the year, particularly in the lulls between monsoons in May and September. The mean shade temperature is roughly 90 deg. F. in the summer months and 75 deg. F. in the winter months, but in certain periods of the year the atmospheric humidity is high, and at these times the climate is very oppressive. The rainfall is scanty, and has an irregular annual average of about three inches. In spite of the many discomforts of life in Aden, it is by no means unhealthy, but prolonged residence causes inevitable deterioration in health. Malaria is now practically non-existent, though constant vigilance is required to keep it so. The local anophelines, now rarely encountered, are *culicifacies* and *subpictus*, while *Culex fatigans* and *Aedes egypti* will breed in great profusion if given an opportunity. The periods of local prevalence of the culicines are often observed to coincide with localised outbreaks of dengue fever which, with bacillary dysentery and, it may be added, chicken pox and mumps, are the only diseases which can be said to be endemic in the Settlement. Mosquito breeding

is kept down to so low a level by the natural aridity of the peninsula and by municipal and other measures that the use of mosquito nets by night is unnecessary, which adds greatly to personal comfort in the hot weather.

Historically, Aden is of great antiquity. Aden formed part of the Yemen under the ancient Humyarite kings. It has been identified with the Eden of Ezekiel xxvii, 23—the Eden whose merchants traded " in all sorts of things : in blue cloths and broidered work ; in chests of rich apparel bound with cords and made of cedar." In the first few centuries of the Christian era, Aden was an important *entrepot* of trade between the provinces of the Roman Empire and the East, and later for many centuries it flourished under Islamic rule ; from the sixteenth century onwards the rulers of Aden were at times the Turks, and at times local Arab chieftains, and its importance gradually diminished. In 1839 it was captured by the British under Captain Haines and has since remained under British rule, until recently as a detached part of the Presidency of Bombay, thirteen hundred miles away to the north-east. Since that time Aden has regained and no doubt surpassed its former glories, and is once again an important centre of transit trade, and still more important as a coaling port, and latterly as an oil-bunkering port, the oil being brought to Aden from Abadan in the Persian Gulf, by sea.

The Protectorate of Aden, as distinct from the fortress and the suburb of Shaikh Othman, embraces a large tract of territory some forty-two thousand square miles in area, forming a maritime belt extending for some hundreds of miles along the southern coast of Arabia ; it includes a number of states of local Arab sultans and chiefs in treaty-relations with the British Government, the rest of the territory being occupied by various semi-nomadic tribes, subservient to one or other of the Arab chiefs and under British protection. North of the Protectorate, lies the territory of the Yemen proper, ruled by an Arab chief, the Imam of Sana'a, who owes allegiance to no one, and his territory, is perhaps unique in being completely immune from "spheres of influence," mandates, or other forms of external political control, or even formal diplomatic contact, although abutting on one of the main lines of maritime commerce.

It is these circumstances which invest Aden with a special interest. It is the only centre of western civilisation within the southern half of the Arabian peninsula, which, therefore, becomes a reservoir of cases of leprosy which tend to gravitate into Aden as the only centre of scientific

and, it may be safely assumed, of humane treatment in this vast area. The population of this area is quite unknown and the degree of endemicity of leprosy is equally unknown, but it is probably highest in those montane and sub-montane districts which lie partly in the Aden Protectorate and partly in the independent territory which rises to the fertile plateau of the Yemen proper, a verdant country, the "*Arabia Felix*" of the Roman Empire, which produces the finest coffee in the world.

It is evident, therefore, that the leprosy policy in Aden cannot be directed merely to the care and treatment of the greatest number of cases consistent with financial means, but it must be fashioned on a compromise between humanity and expediency, political as well as financial; accommodation and maintenance on too lavish a scale must inevitably attract Arab sufferers in such numbers as would embarrass, or even paralyse, the limited arrangements which can be made for their reception.

The accommodation and standard of living require therefore, to be of the simplest possible character, and simple as they are, they are far better than the Arab is accustomed to in his own village.

The segregation and special treatment of cases of leprosy in Aden is of comparatively recent origin. Some twenty-two years ago, the Rev. J. C. Young, M.D., the head of the Keith Falconer (Church of Scotland) Mission, who devoted forty years of his life to its service at Shaikh Othman, and died in harness in 1926, called attention to the increasing numbers of cases from the interior who were presenting themselves for treatment at the Mission hospital, which had then, as it has still, a wide and beneficent connection with the interior of Arabia. The establishment of a leprosy hospital was considered advisable, and in due course it was established as a branch of the Mission hospital at Shaikh Othman, assisted by a small subsidy from the Aden Settlement. Sufferers from this disease from the Hinterland had, of course, presented themselves from time to time for treatment at the Government Civil Hospital, Aden, and the local Settlement Dispensary, but no special arrangements were made for their segregation.

In 1923, the Indian statute, known as the Lepers Act of 1898, was made applicable to Aden, and the Mission Leper Hospital, or more accurately "ward," was re-organised on a rather extended footing in accordance with the Act, assisted by grants from the Government of India as well as from the Aden Settlement. This Act made provision for

the organisation of Leprosy Hospitals, defined the procedure with regard to pauper cases and, in particular, prohibited them from following certain trades and doing certain acts which imply a risk of infection to the public.

In 1926, the lamented death of the Rev. Dr. Young led to an important change in the situation ; the number of cases was still increasing, and the Indian Government and Settlement grants were insufficient to cover the rising cost of maintenance.

During his lifetime, the Rev. Dr. Young, with characteristic generosity, had been in the habit of meeting all deficits out of his own pocket. After his death, the Mission felt, not unnaturally, unable to continue this private subsidy, and the management of the patients was handed over to the Aden Settlement Committee, and was established at Shaikh Othman as a branch of the Settlement Infectious Diseases Hospital, a primitive institution, of which the most imposing feature is its name.

In 1929, the accommodation and standard of equipment at the Infectious Diseases Hospital was considered to be inadequate and unsuitable, and the cases of leprosy were finally transferred to a building in the pleasantest part of Shaikh Othman, which is the property of Government and which was formerly used as a circuit-house, and the medical charge was once more placed in the hands of the Keith Falconer Mission, who are now adequately subsidised from Indian Government and Settlement sources. The general management of the leprosy hospital is in the hands of a Leper Board, constituted as contemplated in the Lepers Act, and consisting of Dr. Petrie, Hon. Medical Officer ; Mr. A. F. Ferram, I.S.O., Superintendent of Shaikh Othman ; Khan Bahadur, M.A.K., Mackawee, an influential Arab merchant, and the writer. The circuit-house has been converted at the expense of the Indian Government into a Leprosy Hospital capable of accommodating twenty-five inmates, including nine females. The hospital stands in pleasant surroundings, in a walled date-garden, and so pleasant is it as a haven from the rigours of the desert that, as indicated above, the difficulty which is likely to be encountered is the excessive number of those seeking admission. In the words of Dr. Petrie, the present Medical Superintendent of the Keith Falconer Mission, and Hon. Medical Officer of the Leprosy Hospital : " The steady rise in admission rate suggests that we are only starting to discover the extent of leprosy in the Protectorate and neighbourhood. In the first quarter (of the year under report) there were six cases ;

in the second, thirteen ; in the third, twenty. Since this, the hospital has been full and only three cases were admitted, but thirty were seen and turned away for lack of accommodation."

As regards the actual medical work of the hospital, Dr. Petrie has been good enough to furnish the following account :—

"THERAPEUTIC MEASURES EMPLOYED.

1. *General.*

There can be no doubt as to the efficacy of the general treatment of patients suffering from leprosy. Patients of poor physique and convinced as to their unfitness for physical exertion are put on the regular full diet of the hospital and encouraged to join one of the working parties with the result that they improve both mentally and physically.

2. *Specific.*

Alepol has been the drug of choice. We have administered it intramuscularly, subcutaneously and intradermally in 3% solution, and intravenously in a 1% solution. We have found that a dose of over 5 c.c. of the 3% solution into one spot is invariably followed by considerable pain and the method we now follow is the subcutaneous administration of 3 c.c. of the 3% solution into one or more areas. Thus :—

1st week, Tuesday and Friday : 3 c.c. into the right upper arm.

2nd week, Tuesday and Friday : 6 c.c. in two doses of 3 c.c. into separate areas of the left upper arm.

3rd week, Tuesday and Friday : 9 c.c. in three doses of 3 c.c. into separate areas of the right thigh.

So far, we have not gone on into higher doses but have continued at nine or ten c.c.'s for a month or six weeks, then allowing three weeks rest. *Chaulmoogra oil* is given in the rest-period and to patients who for any reason are deemed unsuitable for *Alepol* injections.

Potassium iodide is practically only used as a test of cure.

3. *Local.*

Trichloracetic acid has been most useful in reducing the size of the leprous nodules. We have also painted the edges of active macules with half-strength solution and the patients themselves declare that it was good, but the evidence is less conclusive.

Diseased bones associated with trophic ulcers have been removed by operation and successfully treated on ordinary surgical lines.

4. *Adjuvants.*

We have only started to use intravenous *mercurochrome* in two of our more septic cases and it is early yet to express an opinion of its efficacy. Other drugs occasionally used have been *fibrolysin* and *sodium morrhuate. Epinephrin* for nerve pains we have found most useful when combined with aspirin."

In February, 1931, the present writer had the pleasure of welcoming Dr. R. G. Cochrane, the Editor of this journal, on a brief visit to Aden, limited to the few hours that the P. & O. mail-steamer stays in port. On that occasion, Dr. Cochrane kindly gave, at my invitation, a lecture-demonstration on the diagnosis and treatment of leprosy at the Settlement Dispensary at Shaikh Othman, which was attended and greatly appreciated, by nearly every medical man in Aden.

The Arab sufferers, although in most cases indigent and accustomed in their own country to a life of penury and partial ostracism, retain the characteristically independent spirit of their race, and are difficult to handle. One is tempted to speculate whether this racial peculiarity may not be exalted by the lepra toxin—a sort of *spes leprotica* similar in nature to its tubercular congener.

To illustrate their peculiar mentality, the following anecdote may be related. It must be remembered that the treatment of these cases, as well as their maintenance and the provision of clothing, is entirely gratuitous. A year or two ago, while the patients were located in the Infectious Diseases Hospital at Shaikh Othman, the Resident received a police telephone message that the inmates were " in revolt " and that the more able-bodied of them had marched out of the Leprosy Hospital in a body, to the neighbouring village of Shaikh Othman and were demonstrating their grievances in a turbulent and threatening manner in public and before the house of the Kazi. The Resident ordered an enquiry, which elicited the fact that the cause of their " revolt " was partly that they did not receive a daily ration of meat (the poorer classes of Arabs rarely eat meat on account of its cost) and in particular that they strongly resented a recent change-over from the semi-opaque preparation of chaulmoogra-derivatives, used in their routine therapeutic injections, to a more refined, but limpid and colourless preparation, which they were convinced was

nothing but water, and that they were therefore being defrauded. The "revolt" was fortunately quelled by peaceful means and they were persuaded once more to accept the hospitality of the Leprosy Hospital !

With patients of this type continuous treatment of selected cases is rarely possible, as no compulsion can be used in segregation and the restriction of vagrant cases under the Act applies only to the Settlement of Aden and not to the hinterland. Only persuasion can be employed in the attempt to ensure continuous treatment, the patients being free to leave the Settlement for the interior whenever they wish. The statistical results of treatment can never therefore be very satisfactory, but the hospital's most important function is the segregation of cases under economical conditions, so that they will not be a danger to the community. But it remains to be seen whether the ultimate results of the provision of organised treatment and greatly improved accommodation may not prove to be embarrassing.

Herein, therefore, lies the leprosy problem of Aden ; Aden itself has no vagrant or indigent cases ; the Leprosy Hospital, maintained at the joint expense of the Government of India and the Aden Settlement, is filled to overflowing with Arabs, to whom neither of these bodies is under any moral obligation, other than the common obligation of humanity. The British Government, which exercises, through the Resident, a political control in the Protectorate, may be presumed, in theory, at any rate to watch over the interests of sufferers from leprosy from protected territory—a small minority, but nobody other than the Imam of Sana'a, who is not interested in leprosy either in his own domains or elsewhere, can be held responsible for the majority of the leprous inmates of the Hospital, whose home is in the independent territory of the Yemen.

It is not difficult to envisage the probable development of the present position ; the gradual drifting of the leprous population, numbering no doubt, many hundreds from the whole of Yemen and the Protectorate, towards Aden. Should this come to pass—and it is difficult to discern, from the present trend of events, any likely alternative—the leprosy problem of Aden may well develop into a political and administrative problem of considerable magnitude.

Leprosy Work in Aden Settlement.

P. W. R. PETRIE.

IN 1927, the Keith Falconer Mission at Sheikh Othman had to give up its leprosy department owing to lack of funds. From that date and until April of 1932, cases of leprosy coming into Aden were housed in sheds in Sheikh Othman, and were under the care of the Sub-Assistant Surgeon of the Civil Medical Service. In 1930-31, Government approached the mission, and asked them to reconsider the position. Government offered to provide a bungalow and garden which, without much alteration, could be transferred into a home for sixteen male and nine female patients. Government also undertook, with the aid of certain local bodies, to pay most of the running expenses and all the expenses necessary to care for cases actually belonging to Aden Settlement.

The mission undertook the work, and on 1st April, 1932, the new Leprosy Hospital was opened. During the year nearly fifty cases have been admitted, and have had varying lengths of treatment. Some have wearied of treatment early and left, but at the end of 1932 we had thirty patients, five more than our estimated accommodation, and ten more than our estimate for average expenditure. At first we had the assistance of an Indian graduate from Bombay, and his help in working out the routine of the hospital and planning the treatment for individual cases was invaluable, but at the end of 1932 we had to face the fact that we could not afford his salary. He has gone back to India, and now the mission doctors run the Leprosy Hospital as best they can in intervals free from their main work in the general hospital of the mission.

A very large proportion of the inmates come from beyond the British Protectorate, from a country in which there is no medical aid available, and, while Government is sympathetic, it cannot undertake further financial responsibility for people coming from beyond its own frontier. At one time recently there were, of the thirty patients in hospital, eleven from one district in the Yemen—the district known as Odain. One feels that a visit to this district would be well worth while but, besides the difficulty of getting permission for such a journey, none of the doctors is free to undertake it at present.

Recently we have had to turn patients away and apply to Government to deport them beyond the border. Such

a state of affairs seems wrong to us as missionaries. We have plenty of ground to build on. With a full-time superintendent we could probably get the patients to do their own building and much of their own producing, but at present we are held up for lack of money.

At first there was some suggestion that regular evangelical work at the Leprosy Hospital would be frowned upon by Government, but this has not proved to be the case, and our minister conducts regular work, which is not only tolerated but appreciated by the patients. This, in spite of the fact that all our patients, with the exception of one Jew, are Muslim Arabs.

In the last three days we have had the painful duty of turning away four cases of leprosy, two of them quite young boys, because we had not room to take them in nor finances to look after them. But deportation cannot continue to be a treatment for leprosy. We feel sure that, if only the facts were fully known at home, money would soon be forthcoming and this work put on a sounder basis.

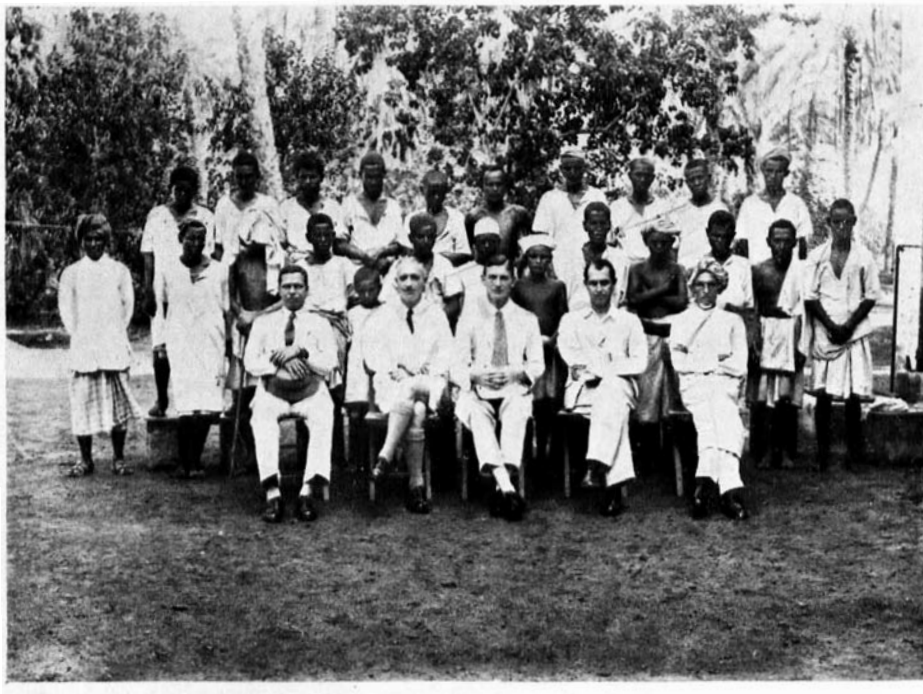
The Use of Fluorescein in Lepra Reaction.

GORDON A. RYRIE.

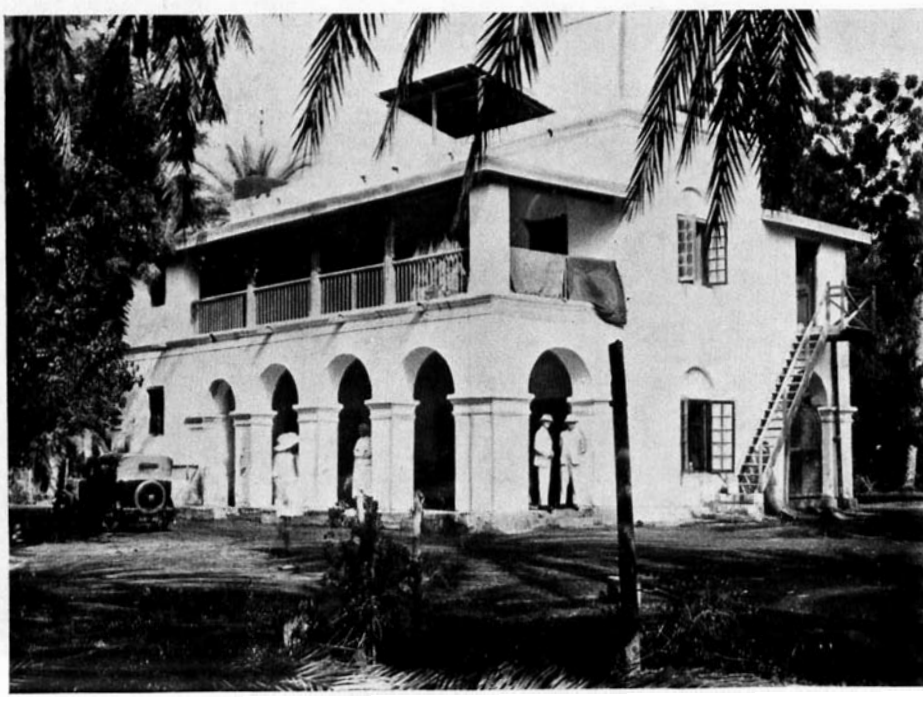
THE Federal Leper Settlement, Sungei Buloh, F.M.S., treats over one hundred and fifty cases of severe lepra reaction a year. These cases are of varied nationality and they are studied and treated under modern hospital conditions; they are institution patients whose previous condition is already known and recorded. For over a year the majority of such cases have been treated by the intravenous injection of fluroescein and we are now able to make a survey of the effects of this treatment.

A number of difficulties arise in assessing the effect of any drug in reaction. Lepra reaction is observed here to be very different in its racial severity. It is seen for instance in a much more virulent form among Chinese than among Indians who are living in the settlement under the same conditions. Further the syndrome known as reaction almost certainly includes a number of different entities which may require varied forms of treatment. The fever is remittent in many cases and remission may coincide with the exhibition of treatment. Reaction may go on for days or for months and may terminate by lysis or crisis.

THE LEPROSY HOSPITAL, SHAIKH OTHMAN, ADEN.



Group of Patients with the Members of the Leprosy Board.



General View of the Hospital Building.

Panoramic View of Leprosy Asylum, Sungei Buloh, Federated Malay States.

It is difficult again to estimate the effect of hospital regime. Has your concomitant drug cured the patient or the dose of salts the nurse gave him on admission ?

And, lastly, the multitude of preparations that appear to have been used successfully in reaction shows that the psychological effect of new treatment may be considerable.

Fluorescein, along with eosin and rhodamines, is a zanthene dye. Its trial arose from the recent work by Dr. Muir, on mercurochrome summarised in *Leprosy in India*, January, 1933. Administration of mercurochrome, as pointed out by Muir, often causes a dramatic abortion of the reaction process, and this is attributed to its effect in clearing up septic conditions. This explanation is open to a good deal of theoretical doubt, and I considered that the effect of mercurochrome on reaction was much more likely to be due to its fluorescein content. Such a dye, when injected into the blood stream, is taken up—among the other elements of the reticulo-endothelial system—by the macrophage cells of the leprotic lesion and may then interfere with the process deriving from the attachment of antibody to the cells.

After trial of fluorescein in a number of cases the results were found to be similar to those obtained by the administration of mercurochrome. Fluorescein, however, was found to possess a number of advantages. It can be given safely in much larger doses than mercurochrome, and if administered with proper precautions does not cause a rigor or febrile response.

Fluorescein is obtainable in two forms. Ordinary fluorescein is soluble in alkali, so that the dye should be dissolved in the same percentage strength of bicarbonate of soda. That is, a 2 per cent. solution of fluorescein should be made up by adding the dye to a 2 per cent. solution of bicarbonate of soda in distilled water. Fuorescein-soluble, however, readily dissolves in water and does not require alkali. In most cases we have given 10 c.c. of a 2 per cent. solution intravenously. To obtain the maximum effect the injections should be given twice weekly. The solution should be freshly made with distilled water or saline ; it should be boiled and filtered before use. The dye itself should be stored away from the light. The quantity that can be injected varies considerably with different samples of the dye, but I have given 50 c.c. of a 2 per cent. solution without any apparent ill-effects. I have elsewhere considered its effect on ordinary leprotic lesions.

Out of about eighty cases of severe leprotic reaction treated during the latter part of 1932, thirty-one were given fluorescein. Thirteen of these, or nearly 42 per cent. showed a rapid recovery after the administration of either one or two injections of 10 c.c. 2 per cent. fluorescein.

Four cases showed no improvement. Fifteen cases, or 45 per cent. showed a decline of fever by lysis after three to six injections.

These results must be subjected to a number of qualifications. With regard to the 42 per cent. who showed rapid defervescence of symptoms—mostly within 48 hours of injection, it must be stated that one or two striking recoveries when this treatment was started made a profound psychological effect on the Chinese patients. A certain amount of subsequent effects must be attributed to this. Some of this result, in any case, must be " written off " and ascribed to hospital regime and psychotherapy.

The 45 per cent. who showed decline of fever by lysis are even more difficult to assess. It is probable that a number of them would have got better within the same period without fluorescein.

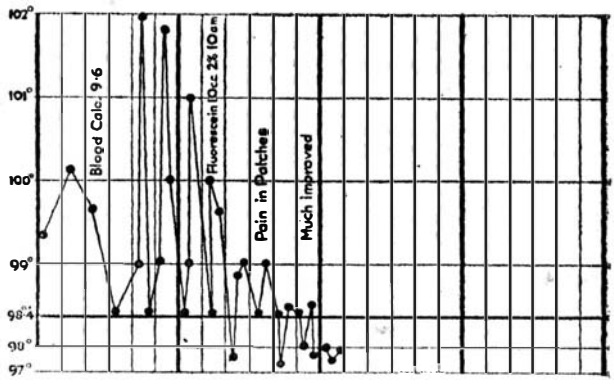
Even when every caution is observed, however, in interpreting results, one is left with considerable evidence that fluorescein exerts a definite and occasionally striking beneficial effect on lepra fever. It was found difficult to persuade control cases to continue with P.A.T. Control cases on mercurochrome appeared as a rule to be quite satisfied—their general attitude and the course of their illness being on the whole much the same as those treated with fluorescein. Illustrative cases :

Low Kee, male, Chinese, Aet. 24, C.2 N.1. Admitted 11/2/33 with history of reaction for the last four days, the first symptom being pain in the left ulnar nerve. On the third day of illness reaction spots appeared on the right elbow and spread to the face, arms and thighs. Joint pains appeared on the fourth day.

Laboratory report, Wassermann negative, Kahn negative. Blood negative X3 for malaria, stools negative X2. Urine normal, hæmoglobin 65 per cent. serum calcium 9.6.

Precipitating factor—said to be due to taking Tai Foong Chee. Examination of the circulating blood twice weekly, though the illness failed to reveal lepra bacilli, but they were found on the fresh patches in large numbers. Sedimentation rate examined in the ward twice weekly, began at 61 and gradually subsided as the patient improved.

Temperature.



Comment.— A case of decline of reaction after one injection of fluorescein.

2. Case of Pang Thye, Chinese, female, Aet. 16. Admitted 1/9/32, complaining of fever and reaction of a week's duration. Unable to state the cause and sequence of her symptoms.

Laboratory report: Wassermann + Kahn + Stools A.D.O. Blood negative x 3 for malaria. Urine specific gravity 1020, with no abnormal constituents. Hæmoglobin 50 per cent.

Examination: Tongue dirty, fauces inflamed, extensive pyorrhœa, right heart enlarged, one-finger spleen, descending colon, palpable mass of fæces.

Temperature swung daily from subnormal in the morning to a mid-day peak between 100 deg. and 101 deg. Multiple injections of fluorescein made little or no effect on the reaction and the patient only recovered very gradually.

I have quoted this girl's case as typical of a number of cases who are unable to stand the strain that the demands of ordinary outdoor activity make on their poisoned metabolism. The patient naturally had a history of frequent reactions and neither fluorescein nor any other drug used to control lepra fever can deal adequately with the multiple precipitating factors revealed on examination. The subsequent treatment of the precipitating factors in this case (with the exception of attention to bowel hygiene) each caused a fresh exacerbation of the reaction condition.

In a small number of instances a patient who failed to respond to fluorescein has been found to improve rapidly on mercurochrome. In the same way a number who appeared resistant to mercurochrome occasionally benefited by a later injection of fluorescein.

Summary:—

(1) In a fairly large proportion of cases of lepra fever the administration of fluorescein appears to give benefit.

(2) Its action, as observed by us, seems similar to that of mercurochrome, which is a fluorescein compound.

(3) It is much less toxic than mercurochrome, can be given in much larger or more frequent doses if desired, and if properly administered causes no febrile reaction.

(4) It may be given in cases of reaction in doses of 10 c.c. of a 2 per cent. solution twice weekly, but we have given larger and more frequent doses without ill effects. It should be freshly prepared.

(5) It is more likely to be effective after a few days of hospital regime, calcium therapy, and a milk and fruit diet. By waiting a few days before administration it is also possible to differentiate to some extent between purely nursing effects and those of the dye.

(6) Moderate disease of the kidneys does not appear to be a contra indication.

(7) Prolonged administration does not appear to harm the patient.

Chaulmoogra Oil in the Treatment of Leprosy.

P. D. STRACHAN.

(*Reprinted from the South Africa Medical Journal*).

I WAS prompted to undertake this investigation by the fact that out of a batch of 21 patients discharged from the Asylum in May, 1932, nine were classed as cases of spontaneous arrest, and some of the remaining did not appear to have accepted adequate treatment.

Of the nine spontaneously arrested cases, two were what is usually called " burnt out," and seven were early cases in fair condition for useful citizenship.

From time to time it has been stated, if not in scientific publications, at least in popular journals, that these treatments bring about arrest in every case of leprosy, provided that the treatment be begun at an early stage of the disease, and that the outlook of untreated patients is hopeless.

During the past ten years I have been puzzled by the fact that many cases after treatment, inadequate or nil, underwent arrest ; that in many cases large amounts of treatment failed ; and that in many others treatment appeared to be successful.

In some diseases, such as syphilis, malaria and diphtheria the evidences of benefit from the specific treatment are so

overwhelming that one would hardly think it necessary to bring forward statistical proofs. In pulmonary tuberculosis, on the other hand, although various special remedies, beginning with tuberculin more than forty years ago, have been vaunted by some, the general opinion seems to be that there is no reliable specific remedy, but a large proportion of early-stage cases recover when the patients are placed in a favourable environment, and the apparent results of special treatment have to be discounted by that fact.

The present investigation is concerned with all patients who were inmates of the Asylum at any time between the beginning of 1921 and the end of 1930. Those admitted since the end of 1930 are excluded, because they are still potential cases of treatment and arrest.

It must be stated at the outset that during the period under review special treatment on a large scale never had a fair chance, so that any case which these statistics can make out for the treatment could probably be greatly bettered in institutions where all the patients accept fully adequate treatment at an early stage of the disease. Up to the beginning of 1929 the sending of leprosy to the medical officers for certification, was left entirely in the hands of the chiefs and headmen, with the result that the majority of the patients were admitted to the Asylum in a deplorably advanced stage of leprosy.

In 1929 two native inspectors trained in the diagnosis of leprosy were appointed to search for patients throughout the territory on horseback. Two inspectors having been found to be quite inadequate for the area and population, four more were appointed in April, 1930.

When Dr. Cochrane, Secretary of the B.E. Leprosy Relief Association, visited the Asylum in June, 1930, Dr. Slack showed him the patients admitted during the preceding three months—a shocking exhibition, which led Dr. Cochrane to report that leprosy was not being controlled in Basutoland. Since the beginning of 1931 there has been a great change for the better. When Dr. Wade, editor of the *International Journal of Leprosy*, visited us in October, 1931, he was surprised at the favourable condition of patients admitted during the preceding three months, and said that the native inspectors must be well up to their work when they could diagnose such early cases.

Again, the treatment accepted by the majority of the patients has been very inadequate, more through irregularity of attendance than through deficiency in amount. From

year to year injection treatment has been becoming more and more unpopular, for the following reasons :—

1. In its earliest form it seems to have been irritating and painful.

2. In many hopelessly advanced cases much treatment was accepted without apparent benefit, and certainly without cure. Those of these patients that have survived are still here, and they poison the minds of the newcomers against the treatment. Those in whom the disease became arrested have left, and their good influence here is lost.

3. The patients observe that many cases became spontaneously arrested, and it is a fact that 61 per cent. of early nerve cases, after nil or trivial treatment, became arrested through the effects of good nourishment and good hygiene alone. As the number of patients submitting to special treatment becomes less, the existence of cases of spontaneous arrest becomes unmasked. On one occasion, when Dr. R. Germond, acting for Dr. E. Slack, was lecturing the whole male compound on the advisability of submitting to injections, a healthy visitor who had been discharged from the Asylum some years earlier, presented himself as an object-lesson and added his testimony in favour of "the medicines." After the *pitso* was over, Dr. Germond asked this man how many injections he had had. He replied : "None ; I just got medicine at the dispensary." If he imparted the same information to the patients, this object-lesson must have done more harm than good.

The total number of patients under consideration is 1,436. Fearing that a division into five or six groups would lead to numbers too small for statistical purposes, I first decided to place all C.'s (cutaneous) and C.-N.'s (mixed cutaneous and nerve) in one group, because it seemed certain that the results of treatment in these would be poor, and to put the N.1 and N.2 cases together in one group, as most of the successes seemed to occur among them.

The N.3's (advanced nerve cases) are of little interest for the evaluation of treatment, for those of them that survived usually became crippled, burnt-out cases, whether treated or not.

Basing the calculation on the percentages found in Dr. Slack's short-hand classification of 650 cases, I found the probable composition of the total to be, before commencement of treatment, as follows :—

All C.'s and mixed	826
N.1's + N.2's	520
N.3's	90
Total	1,436

Among all the C.'s and mixed :—

Treated.	*Arrests.*	*Percentage of Arrests.*
461	61	13.24
Treatment Nil or Trivial (under 10 injections).		
365	14	3.83

Although there is here shown a positive association between treatment and arrest, the result is poor.

Taking into consideration the fact that strong claims for the effects of treatment of advanced cutaneous cases have never been made, I separated the small group of treated C.1 cases, and found as follows :—

Treated more or less adequately.	*Arrests.*	*Percentage of Arrests.*
168	36	21.43

Of 64 so-called burnt-out cases discharged from the asylum, nearly all N.3's, there were treated, 36 ; no specific treatment, 28.

For treatment evaluation the burnt-out cases are of no interest. In most cases treatment had ceased years before discharge, and, indeed, quite as large a number of burnt-out cases remains in the asylum, because no means of support can be found for them elsewhere.

Before discussing the N. + N.2 group, I have to make the following remarks :—At the outset, in 1921, an attempt was made to give each patient an injection twice weekly, but after little more than a year nearly all the patients refused to submit to more than one injection per week, because, they said, they suffered too much pain at the sites of injections. At that time the ethyl esters were used with sodium morrhuate as an adjunct. Roughly, it may be said that this was the staple treatment until 1925. From 1925 until October, 1927, hydnocreol (hydnocarpus oil with creosote) was the staple form of treatment, and was better borne.

Since 1927 sodium hydnocarpate (alepol), best tolerated of all, has been used in increasing proportion, and at present it is the only form used, except the iodized esters intradermally, recently put on trial.

From the point of view of ready acceptance, the last-mentioned method has an advantage. The patients have little faith in general injection treatment which does not produce the magically rapid effects they have observed in tertiary syphilis. The most popular treatment consists in the attacking of local lesions, whether with trichloracetic acid, carbonic acid snow or high-frequency sparking (so-called surgical diathermy). Perhaps the treatment of local

lesions has a general effect, and may turn out the best of all in cutaneous leprosy.

For the purpose of grouping the N.1's + N.2's according to adequacy of treatment, I made a detailed scrutiny of all their injection record cards, and divided the patients into three groups, as follows :—

(1) Treatment nil or trivial (trivial means under 10 injections).

(2) Treatment inadequate, *i.e.*, under 20 injections, or, if over 20, less than 20 in a continuous period of six months

(3) Treatment adequate, 20 or more injections, of which at least 20 were given in one continuous period of six months.

The items were detailed in a table, of which the columns were headed as follows :—No. of Injections, No. of Patients, Adequate, Arrests, Inadequate, Arrests.

The number of those who received 52 or more injections was 93 ; of these, 55 were classed as inadequately and 38 as adequately treated. The highest number of injections accepted by a single individual was 183 ; although classed as adequately treated, he failed to recover—a matter of no statistical importance, however.

The following are the summed results :—

Treatment Nil or Trivial.	*Arrests*	*Percentage of Arrests.*
112 Patients	59	52.7
Inadequate, 307	128	41.7
Adequate, 101	49	48.5

Disappointed with the result, which shows a negative association between treatment and arrest, I separated the small number of N.1's only, and tabulated the treated cases in the same way. The total number of treated N.1's was 143.

	RESULT.	
Treatment Trivial.	*Arrests.*	*Percentage of Arrests.*
39 Patients	24	61.5
Inadequate, 75	59	78.7
Adequate, 29	23	79.25

The smallness of the difference between the two latter percentages is probably due to the fact that both the adequates and the inadequates are densely grouped in the neighbourhood of the dividing-line between the two.

The standard of adequacy adopted, admittedly low, is the best that could be adopted here for grouping purposes without calling the treatment inadequate in nearly all cases.

Nothing can be said against the administration of the treatment. Dr. E. Slack's ability, keenness and devotion

are well-known. He has studied leprosy profoundly, making two world tours to observe American and British methods.

TABLE OF COLLECTED RESULTS.

Number of Patients under consideration, 1,436.

All Cutaneous and Mixed.

Cases Treated.	*Arrests.*	*Percentage of Arrests.*
461	61	13.24
	Not Treated.	
365	14	3.84
Early Cutaneous Treated.	*Arrests.*	*Percentage of Arrests.*
168	36	21.43
Burnt-out (mostly N.3), discharged.	64	

(Many more remain in the Asylum.)

N.1 + N.2 Cases, *i.e.*, Early and Moderately Advanced Nerve Cases.

Treatment Nil or Trivial.	*Arrests.*	*Percentage of Arrests.*
112 Patients	59	52.7
Inadequate, 307	128	41.7
Adequate, 101	49	48.5
Total Arrests ...	375	

N.1 Cases Only.

Treatment Trivial.	*Arrests.*	*Percentage of Arrests.*
39 Patients	24	61.5
Inadequate, 75	59	78.7
Adequate, 29	23	79.25

The categories " Nil or Trivial " and " Trivial " are not identical, but from the two last tables we find for the N.2's only.

Treatment Inadequate.	*Arrests.*	*Percentage of Arrests.*
232 Patients	69	29.74
Adequate, 72	26	36.1

CONCLUSION.

It would be well if some institutions where large numbers of the earliest cutaneous and nerve cases accept really adequate treatment would publish statistics on these lines covering a long period of time. It is possible that nearly 100 per cent. of successes in early nerve cases might be recorded. On the other hand, quite another interpretation might be put upon the higher percentage of arrests among the treated N.1's (79.25), compared with 61.5 per cent. among the trivially treated. A patient who is spontaneously recovering under improved nutritional and hygienic conditions, if he accepts treatment, will attribute his increasing

sense of well-being to the treatment, and will continue to accept it. His continued acceptance of treatment may be an indication that he is recovering, but the treatment is not necessarily the cause of the improvement, except in so far as it may act as a faith cure. Having seen early arrest after adequate treatment in individual cases, one hesitates to advocate such extreme scepticism. Very few of the papers published in the periodical literature of leprosy are of statistical value.

Dr. John Lowe makes a short but important statement, based on several years' experience, showing that, after treatment, the nasal mucous membrance of 221 out of 309 patients, *i.e.*, in more than two-thirds of them, became negative. (*Leprosy Review*, vol. iii, No. 3, July, 1932; abstracted from *Indian Medical Gazette*, April, 1932.)

Many of the statistics of arrest are given on an annual basis, which is hardly fair to the treatment, for unarrested cases remaining in the institution are counted over and over again, while the arrested are counted only once.

Too often, where the actual arrests make a poor showing, a more favourable appearance is effected by lumping together under the general term "improved" such categories as "arrested," "greatly improved," "improved," etc. Certainly the treatment should be credited with any amelioration it makes in the patient's lot, but the estimation of degrees of improvement is too arbitrary for statistical purposes.

At treatment centres nothing is known of the fate of the untreated or of those patients (in India, the great majority) who cease to attend before they have received a full course of treatment. Most sweeping statements regarding the fate of the untreated have been made on very slight grounds, the number of untreated patients in each class cited being often less than ten.

My statistics, being based on the sequelæ of treatment largely inadequate, cannot be said to prove much for or against the injection treatment, but one thing they seem to prove is that more than 50 per cent. of N.1 patients undergo arrest spontaneously when placed under proper conditions.

A fact which should not be lost sight of when comparing the fate of untreated cases in the past with that of treated cases to-day is that at the present day the signs of arrest are far more liberally interpreted than they were 15 or 20 years ago.

On other grounds, the morbidity indices of various age-groups, Dr. P. H. J. Lampe has brought forward cogent

reasons for the belief that leprosy is frequently a self-healing disease. (*Het Geneeskundig Tijdschrift voor Nederlandsch Indie*, reprinted in vol. iv, No. 1, *Leprosy Review* of January, 1933).

That great care is here exercised in selecting patients for discharge is evidenced by the fact that out of 375 patients discharged, only 12 have been returned to the asylum as genuine cases of recurrence of activity. Besides having to report themselves to a medical officer twice yearly for seven years, the discharged patients are visited by the leprosy inspectors about once every eighteen months.

However good a treatment may be therapeutically, to be satisfactory it must be acceptable to the patients. The following are extracts from Dr. John Lowe's review of the present position of leprosy in India (*Indian Medical Gazette*, April, 1932): "The disease shows a marked natural tendency towards healing, and cases healed without treatment are now found to be quite common." "Our opinion is that special treatment is of very considerable value, but it is far from being completely satisfactory. It is painful," etc. "The finding that on the average 70 per cent. of cases cease attendance in the first six months, and that a still larger number fail to attend for one year, is a serious one."

"The reasons for this state of things are numerous, but one of the principal reasons is that, from the patient's point of view, our treatment is not good enough, and does not give the results they hope for. We should not shut our eyes to this fact."

I regret that I have not had direct access to much American statistical literature, which appears to be of great importance.

From the paper by Dr. H. W. Wade and Dr. C. B. Lara (*Proceedings of the Royal Society of Medicine*, 1927, vol. xx, Section of Tropical Diseases, etc., pp. 121-149), it appears that, of all cases treated from 1921 to 1927 (about 6,000), 10.5 per cent. became cases of arrest. At that time at Culion weekly intramuscular injection was the almost universal rule, and the patients coming under treatment were at least as unsuitable for treatment as ours.

The following passages I have translated from "La Lepre," by Dr. Etienne Burnet, pp. 132-133:—

"At Culion, from January, 1923, to June, 1929, 4,000 new cases were brought under treatment; from 1914 to June, 1929, a total of 8,520 were treated, of whom 6,800 received treatment lasting from 6 to 100 months. From 1st January, 1922, to 31st December, 1929, 1,400 of these 6,800

were set free, on parole or unconditionally. (Since 1914, 2,013.) "What becomes of the liberated? One would like to follow them and continue to treat them. Too large a number (about the half) disappear."

Those statistics are on a much larger scale than mine; they cover a similar period of time, and deal with similarly advanced cases, but the treatment accepted seems to have been much more adequate. Nevertheless the percentage of arrests is somewhat smaller, viz., 23.6 per cent. out of 8,520 treated.

Here we had 375 arrests among 1,436 patients, *i.e.*, 26.1 per cent., and of the patients only about 900 accepted treatment, mostly inadequate.

It would not be far from the truth to say that one-quarter of the patients here became cases of arrest; that three-sixteenths of them would have become arrested by means of general treatment and the treatment of concurrent diseases alone, and one-sixteenth of the total number of cases became arrested through general and special treatment combined.

I have to thank Professor J. P. Dalton, of Johannesburg for valuable hints on the methods of conducting this investigation.

SUMMARY.

1. So much of the treatment accepted has been inadequate that little can be said for or against it.

2. Of 168 early cutaneous cases treated, 21.43 per cent. became arrested.

3. Early Nerve Cases:—

	Arrests.	*Per cent.*
Treatment Trivial		61.5
,, Inadequate		78.7
,, Approaching Adequacy		79.25

4. Early and moderately Advanced Nerve Cases together:—

	Arrests.	*Per cent.*
Treatment Nil or Trivial		52.7
,, Inadequate		41.7
,, Approaching Adequacy		48.5

5. Over 50 per cent. of early nerve cases recover without special or *ad hoc* treatment of leprosy, provided that the patients be brought into a favourable environment, good nutrition, good hygiene, physical exercise, and the special treatment of predisposing and concurrent diseases, such as syphilis, being of prime importance.

After a time the patients ceased to have much faith in the injection treatment, because its effects were too slow and erratic in making their appearance.

Proceedings of Meeting of General Committee.

A MEETING of the General Committee was held at the India Office, London, on April 20th, 1933. Owing to the death of Lord Chelmsford, the chair was taken by Sir Edward Gait, the Chairman of the Executive Committee.

Sir Edward Gait expressed on behalf of the members of the Committee their sorrow at the death of Lord Chelmsford, and then proceeded to outline the work of the Association during the past ten years. He said that when the Association was founded in 1924 an appeal was made for a fund of a quarter of a million pounds. The response to that appeal in this country had been extremely disappointing, and in no year had the Association realised more than £8,800, the total amount received to date being only £51,000. In India, however, under the auspices of the then Viceroy (Lord Reading), an independent branch of the Association was formed in 1925, and a local appeal for funds realised roughly £150,000. Valuable research work had been carried out under Dr. Muir at the School of Tropical Medicine, surveys had been made and doctors had been trained. Work in other parts of the Empire had been hampered by lack of financial resources, but a great deal of useful work had been done. With the active encouragement of the Colonial Office the interest of local governments had been aroused, and whole-time leprosy officers had been appointed, surveys carried out and treatment centres established. Unfortunately, owing to the world-wide economic crisis, the services of the whole-time leprosy officers in Nigeria and the Gold Coast had had to be dispensed with. In the past year three-quarters of a million doses of drugs had been distributed, and grants had been made for the erection of dispensaries and huts for patients. The Association has recently arranged to pay the salary of a whole-time leprosy officer in Zanzibar for a minimum of five years, in the hope of thus providing an object lesson showing that leprosy can be exterminated if adequate measures are taken.

After the Hon. Treasurer had presented a statement of the accounts for the year 1932, Sir Leonard Rogers gave a brief address on the medical side of the Association's work. He said that he thought that the work which the British Empire Leprosy Relief Association had accomplished with its slender resources, within a single decade, could rarely have been equalled. In 1915-17, the value of the use of in-

jections of soluble forms of the active principles of chaulmoogra and hydnocarpus oils was established, and this form of treatment had now passed the realms of controversy, as *The Lancet* had recently pronounced in a leading article, based on the Association's last annual report, that " the results speak for it without contradiction." The best means, in his opinion, of reducing leprosy, lay in the examination of contacts of all leprosy cases repeatedly for 10 years, so as to detect early cases of the disease. The speaker referred to the rapid control of the epidemic of leprosy in Nauru Island, where 30 people were found to be infected. Three years later it was reported that the number of cases showing signs of leprosy had been reduced by 40 per cent., and no case had gone on to the advanced stage. A year later the epidemic was under control.

Sir Leonard next referred to the work that had been carried out in the Sudan. Here the problem was a difficult one, for a survey of the scattered population in the infected area revealed 6,500 cases, or over 5 per cent. of the population. Thirty square miles of land had been taken for a large leprosy colony for 4,800 cases, the majority of which were in the infective stage, and were mostly early cases. The patients grew their own crops and the colony was largely self-supporting. A recent report showed that within the last year no less than 2,230 cases have been discharged free from all signs of the disease. This shows the necessity for dealing with the cases in the early stage of the disease. In the Philippine Islands it had been found necessary to modify the existing system, because under the old rigid method of compulsory segregation it had been found impossible to reach the early cases, and the average period before patients were discovered or isolated was eight years. During this period they were capable of infecting others.

The Association, Sir Leonard stated, had just sent an experienced leprologist, Dr. T. B. Welch, to tackle the leprosy problem among the 200,000 people in Zanzibar, on the lines so successful in Nauru.

Sir Leonard reviewed the position in British Guiana, emphasising the fact that as a result of a suggestion from the Association the Government of British Guiana were permitting early non-infective cases to be treated as out-patients in dispensaries erected by the Association. He further stated that as a result of the policy in British Guiana more than half the cases in the leprosy hospital were now voluntary admissions. These were attracted by improved treatment, and the number of discharges had risen to 128,

with only 4.7 per cent. of relapses, while 73.5 per cent. of all cases show improvement. It is significant that Dutch Guiana has adopted the same system, and has instituted a regular examination of all school children. This has been proved the most efficient way of finding out slight or early cases of leprosy.

The Rev. P. B. Clayton, Founder Padre of Toc H, was present at the meeting by special invitation. Mr. Clayton had recently visited West Africa and had come into touch with leprosy work. As a result of what he saw he felt that non-medical men could be of assistance in leprosy colonies, and he detailed a scheme whereby such help might be of value in the leprosy campaign.

The Chairman thanked Mr. Clayton for his remarks, and said that these would receive the close attention of the Executive Committee.

The members of the General Committee present were :— Sir Edward Gait (in the Chair), Sir Frank Carter, Sir Leonard Rogers, Lord Lugard, Dr. A. E. Horn, Dr. T. Jays, Dr. Christopherson, Dr. Henry Fowler, Mr. B. F. Wright, representing the High Commissioner for Southern Rhodesia ; Mr. L. F. Honey, representing the High Commissioner for South Africa ; and Mr. F. W. Ross. Apologies for absence were received from Lord Reading, Sir John Rose Bradford, Lady Barnes, Sir A. C. Chatterjee, Dr. Thomas Cochrane, Dr. A. T. Stanton, Sir Francis Fremantle, Mr. F. H. Brown and Dr. Hugh Stannus.

Grants for Leprosy Work.

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

TANGANYIKA.

Benedictine Mission, Peramiho, to complete cost of new buildings	£60 15s.
Benedictine Mission, Ndanda—for buildings	£100

S. RHODESIA.

Medical Director, Salisbury—Grant towards enlarging Leprosy Hospital at Mtoko ...	£400

N. RHODESIA.

Dr. Knobel, Madzimoyo—For the erection of housing accommodation for the patients ...	£60

Applications for financial aid will be sympathetically considered by the Committee, and all applications should, in the first place, be sent to the Director of Medical Services of the Colony concerned, who will forward them to the Secretary of the Association.

Leprosy in India and Ceylon.

R. G. COCHRANE.

THE readers of the REVIEW might be interested in a brief account of the tour which was recently made, and in the conclusions which were come to, with regard to the present situation in the above countries.

It was most interesting to the writer personally to revisit India and to see something of the changed attitude towards leprosy. In the first place, the initial reaction to the policy of enlightenment which has been pursued satisfactorily by the Indian Council of the British Empire Leprosy Relief Association, has been apparently to make the problem more acute. The leprosy colonies, especially in Bengal, Bihar and the Central Provinces, are more than full, and one is astonished at the number of sufferers who have to be turned away. It is now being revealed that the number of those infected with leprosy is more numerous than ever. Both in this journal and elsewhere the question whether these are active and new infections, or whether many of them are inactive and old infections, which owing to better methods of diagnosis have been revealed, will be discussed.

Perhaps the best method of helping readers of the REVIEW to grasp the present situation would be first to deal with personal work attempted at the places visited in India, and then deal more particularly with the situation in Ceylon.

WORK AT PURULIA.

The first station which was visited was Purulia, where I had the privilege of working for three months. There is not space to enter into a description of the improvements in this excellent institution of the Mission to Lepers since I was last there; sufficient is it to state that it can now be considered in the first rank of leprosy institutions. As a result of the improvements, surgical and medical, conditions could be dealt with in a manner which hitherto was impossible. I think one may definitely say that we established the fact that it is possible to enucleate two or sometimes three metatarsal bones and still preserve an efficient foot. In order then to help readers, it might be well very briefly to describe the conditions which necessitate such an operation, and the operative technique, and after care.

In the first place, I think it may be taken as an axiom that whenever there is a long standing trophic ulcer on the foot, the trouble probably lies with the metatarsal bones.

It is unwise unless urgent to operate on a metatarsal bone where there is any suspicion of acute sepsis. The best type is the individual who has a long standing ulcer indurated and with a considerable amount of heaped up cornified tissue. Frequently there is an adherent scab, but when this is taken off, not infrequently a small sinus is detected leading down to necrotic bone. The general tendency is to be cautious, but in most cases bold surgery pays in the long run. Wherever there is a doubt about the soundness of a metatarsal bone it is wise to open up the ulcer and to explore, and if the metatarsal is found necrotic, to remove it.

There are one or two general principles which need to be laid down :—

(*a*) As far as possible clear up the operating area of any acute sepsis.
(*b*) Never approach the metatarsal from the sole of the foot, always make the incision in the dorsal aspect.
(*c*) Make a large enough incision in order to work properly, but define the proximal joint before endeavouring to separate the bone.
(*d*) Separate the bone from above and work downwards.
(*e*) Try to avoid any injury to the articular surface of the cuneiform and cuboid bones.

Some workers state that the first metatarsal should never be removed, but as a result of many operations on metatarsal bones, I feel that if there is definite evidence of necrosis there need be no hesitation in removing the first metatarsal. In fact, in one patient who had bandages on his foot for years, I removed the first and second metatarsal bones, and as a result a firm scar was produced with no evidence of breakdown, and the patient has had now no further trouble, and has a very useful foot.

Another controversial subject is whether the resulting wound should be sutured or not. The points in favour of suturing are :—

(1) It is a neater operation.
(2) The wound heals very much more quickly.
(3) Sloughs may not form so readily as there is a chance of healing by first intention.

Against these are the following points :—

(1) The operation area is almost impossible to sterilise completely and therefore sepsis is liable to take place, and stitches have to be removed.
(2) By allowing the wound to heal by granulation, the resultant scar is much stronger and, therefore, the wound is less liable to break down.
(3) There is a great deal of unavoidable trauma to the tissue and, therefore, it is doubtful whether it is good surgery to suture a wound, the base of which is liable to slough.

My own practice is not to suture, although if the foot is clean and the tissue healthy, I may alter this practice and close the wound by a few deep mattress sutures. If the incision has had to be made longer than usual to expose the articular surfaces of the cuneiforms or cuboid, then it is wise to put in a few sutures at the bottom of the wound in order accurately to appose the skin surfaces and lessen the danger of trauma to these articular surfaces, and so guard against necrosis.

A general rule is, that if an articular surface is damaged inadvertently, then the head of the bone immediately proximal should be removed, *e.g.*, if the articular surface of a metatarsal is damaged in removing a phalanx, then the head of the bone should be removed.

With regard to the type of dressing, we hope to publish an article by those working on this in a later number of the REVIEW, but generally speaking, the best dressing in uncomplicated cases we find to be 1 : 1,000 acriflavine. If there is much slough then four-hourly eusol gauze packs are inserted, taking care not to make them too " soppy." A few days with these usually produces healthy granulation tissue. Occasionally, if the wound does not respond to acriflavine, we find mercurochrome will stimulate granulation tissue formation.

Another operation which we hope to discuss at a later date, which we found relieved the distressing epiphora resulting from lagopthalmus due to the paralysis of the seventh nerve, is that of lateral tarsorraphy. The ***raison d'etre*** of this operation is a shortening of the lids and a partial closing of the lid margin so as to protect the cornea and prevent tears from running down the cheeks ; the operation is very simple and seems to be most worth while.

In view of the fact that the recticulo-endothelial system is the one which endeavours to cope with the invasion of bacilli, Dr. Ryles and Dr. Ryrie simultaneously bethought themselves of using the aniline dyes in the treatment of leprosy, because it is these dyes which are taken up by the endothelial cells. As a result of the work of Dr. Ryles we tried out intradermal injections of Brilliant Green over a period of four months at Purulia. The detailed results of these experiments will be published at a later date, but we found that intradermally the drug had little effect on the bacilli, though there was an apparent improvement in some cases in the clinical condition. Experiments are at present being made in connection with Bonny's Blue, but it is too soon to make any statement.

MODERN DEVELOPMENTS AS A RESULT OF ADVANCES IN TREATMENT.

One of the chief results of the new outlook in leprosy is the increasing number of early lesions coming to our notice. As a result of this, the clinical aspect of leprosy is becoming more complicated than was hitherto realised. There are still many aspects of the disease which are little understood, but the impression that leprosy is just pathogenic to man seems to be confirmed, and the organism seems to find considerable difficulty in gaining a footing. Probably a great deal of disturbance to normal health is necessary before this takes place.

While the disease is closely analogous to tuberculosis in many of its aspects, the organism seems to act as a parasite and form a sympiosis of an almost perfect nature. This is illustrated by the type of case not infrequently seen where there is little clinical evidence, yet on examination innumerable bacilli are found wherever a scraping is taken. In such cases a balance seems to be set up between the body and the organism in such a way that the bacillus can still live and multiply and yet cause little or no damage to the host. There seems little evidence of the production of toxins, and the reaction to the organism by the body seems to be a reaction to a foreign body rather than to a toxin producing organism.

The hypothesis that leprosy is usually acquired in childhood or early adolescence is being more generally accepted. I personally believe that a large proportion of cases become infected during these periods, and further I feel certain that, as in tuberculosis, so in leprosy, there are many abortive types. I am of the opinion that once adult life is reached the chances of acquiring the disease are greatly diminished, and if there have only been slight evidences of a leprotic infection which have remained inactive during the periods of stress and strain, the chances of these becoming lit up are slight.

While in India the writer had the privilege of attending the All India Leprosy Conference held in Calcutta in March. It is impossible to analyse the findings of this Conference in detail, but the impression gained by attending it was that a new era of leprosy work has opened out. The preventive aspect of the problem is coming into its rightful place, and the initial enthusiasm with regard to treatment is being replaced by an altogether more reasoned outlook.

It is inevitable when some fresh start is made on an age-long scourge, that there should be an initial somewhat excessive optimism, for if it were not for the ideals and optimism of pioneer workers, few far reaching discoveries would be made. Further, as a result of the new treatment we have attained a bird's eye view of the disease which it would have been impossible to obtain otherwise. We are, however, realising that there is a limit to treatment and that the abortive case does exist, hence the importance of an efficient organisation of preventive units. What I do feel, however, that the Conference did not stress sufficiently, was that the increase in leprosy was not necessarily a real increase, but only an apparent one, and that the actual incidence of the disease does not matter, but it is whether there is evidence for spread. The leprosy problem is too vast to cope with as a whole, and therefore, it is essential that further data should be accumulated, so that Public Health authorities should know where to concentrate on active anti-leprosy measures. While special treatment centres perform a useful service, they may not be helping towards the control of the disease, unless they are attached to a proper preventive unit and are in touch with an institution. The memorandum on a model clinic, which has been prepared by the School of Tropical Medicine, Calcutta, in pursuance of Resolution III, can be obtained on application.

It is very encouraging to note that the pendulum is swinging towards the preventive side and that the claim that leprosy can be prevented by treatment alone is being modified. Once the following points are grasped then the dawn of the day when this scourge will be controlled will be brought nearer :—

(*a*) Leprosy is a preventable disease ;
(*b*) That all cases do not necessarily need treatment—this applies to early as well as late cases ;
(*c*) That treatment cannot bring certain cases to a stage of non-infectivity ;
(*d*) That isolation for certain cases is essential ;
(*e*) That the seriousness of the problem is not uniform, but only certain areas may need special concentration ;
(*f*) That it is a disease which is only one of the endemic diseases and should be part of a general public health system.

I think it may be said that the Calcutta Conference made a most valuable contribution towards this end.

The resolutions of the Calcutta Conference are reprinted in this issue.

(To be continued).

The All-India Leprosy Conference.

RESOLUTIONS AND RECOMMENDATIONS.

RESOLUTIONS.

Resolution I.

CO-ORDINATION AND ORGANISATION.

In view of the wide prevalence, severity, and infectiousness of leprosy in India it is resolved :—

(*a*) That there is a great need for consolidation, co-ordination, and extension of anti-leprosy work.

(*b*) That as leprosy is essentially a public health problem, every effort should be made to make anti-leprosy work an integral part of the Public Health System, using the latter term in its widest sense, *i.e.*, in both its curative and preventive aspects.

Provincial Leprosy Officer and Board.

(*c*) That it is desirable that in every province or State there should be a specially trained Leprosy Officer.

(*d*) That for the more efficient working of anti-leprosy measures a Provincial or State Leprosy Board be formed in each province or State. This Board should be chosen from representatives of the Medical and Health Departments, Mission to Lepers, British Empire Leprosy Relief Association, and any other agency interested or engaged in leprosy work. The Provincial Leprosy Officer should work in close collaboration with this board, of which he may with advantage be a member. The functions of this board would be to co-ordinate all present and future anti-leprosy measures throughout the province.

District Leprosy Officer and Board.

(*e*) That similarly in each administrative district where leprosy is highly endemic there should be a special Leprosy Officer, who should work in close collaboration with the special Leprosy Officer of the province.

(*f*) That in such districts a District Leprosy Board should be constituted, consisting of the heads of the Medical and Health Departments, and of any local leprosy organization, together with the senior Government officials, representatives of the District Board and of the public. The functions of this board will be to co-ordinate all anti-leprosy measures in the district. The local Leprosy Officer should work in close collaboration with this board.

Suggestion.

It is suggested :

(*a*) That the Provincial or State Leprosy Board be convened by the Surgeon-General or the Inspector-General of Civil Hospitals in consultation with the Director of Public Health.

(*b*) That the District Leprosy Board be convened by the District Magistrate in consultation with responsible district officers, medical and administrative.

Resolution II.

TRAINING.

Because of great difficulties connected with anti-leprosy work (*e.g.*, detection of early cases, treatment, and prevention) it is resolved :—

(*a*) That instruction in leprosy by a specially trained doctor should be included in the curriculum of all medical schools and colleges.

(*b*) That special courses should be given at convenient centres where clinical material is available to all Government doctors. Private practitioners should be encouraged to attend these courses.

(*c*) That a more thorough training should be given in a suitable institution to District Health Officers and medical men engaged in special leprosy work. This course should be of at least a fortnight's duration.

(*d*) That all dispensers employed by Government or local bodies, should be given a short course of training in leprosy ; such a course should include practical instruction in the technique of injections.

(*e*) That Sanitary Inspectors should be trained so that they can recognise leprosy, and be able to aid in propaganda and survey work in the villages. This work should be done under the supervision of the District Health Officer in co-operation with the special Leprosy Officer where such exists.

(*f*) That other workers, such as sanitary or health visitors, public vaccinators, dais, etc., should be trained to recognise leprosy ; local leprosy institutions might be used for this training.

(*g*) That all medical officers and others connected with the requirement of industrial labour should be trained to recognise leprosy ; and that all labourers should be examined for leprosy before recruitment and periodically afterwards.

Resolution III.

SPECIAL LEPROSY CLINICS.

The need for forming and maintaining an adequate standard of anti-leprosy work in rural areas is recognised. It is therefore resolved :—

(*a*) That there should be in each administrative district where leprosy is highly endemic at least one model clinic under a whole-time Leprosy Officer. This clinic would act as a demonstration of the best methods of carrying out an anti-leprosy campaign ; it would also act as a centre for prevention, and for the training of doctors and lay-workers in the district and thus eventually lead to the establishment of other anti-leprosy centres.

(*b*) That a memorandum be prepared describing the functions and scope of the work of a model clinic and made available for distribution to all district officers, to medical, administrative, and local bodies, and to those interested in the leprosy problem.

Resolution IV.

LEPROSY CLINICS IN GENERAL HOSPITALS.

It is recognised that leprosy can be better treated in clinics especially devoted to that purpose, but in view of the large number of cases needing treatment, it is resolved that all Government medical officers and local practitioners should be encouraged to treat leprosy and initiate anti-leprosy schemes along similar lines to those in the model clinics.

Resolution V.

IN-PATIENT INSTITUTIONS.

Although emphasis is laid on the need for leprosy clinics to carry out treatment and prevention, the need for residential institutions has not diminished but rather increased. These institutions provide for the voluntary isolation of infectious patients and for the treatment of cases the nature of which demands hospital care. It is therefore resolved :—

(*a*) That the formation of voluntary isolation colonies be encouraged wherever possible.

(*b*) That the accommodation in the existing institutions be used to a greater extent for the isolation of infectious cases.

(*c*) That it is desirable that there should be, where possible, closer co-ordination between leprosy clinics and leprosy institutions.

Resolution VI.

RESEARCH.

It is recognised that highly specialised research is best done in efficiently-equipped laboratories; but in order that other branches of research may be facilitated, it is resolved :—

(*a*) That more use should be made of the facilities in existing institutions and that the staffs of these institutions should be encouraged to undertake such work.

(*b*) That there is a need for the establishment of a special leprosy investigation centre in a suitable rural area in order to make an intensive study, over a prolonged period, into the epidemiology and control of leprosy.

Suggestion.

It is suggested that the British Empire Leprosy Relief Association might make arrangements for leprosy workers in the provinces to obtain any necessary literature bearing upon any particular aspect of the problem which they are studying.

Resolution VII.

LEPROSY IN CHILDREN.

School Children.

Available statistics show that in endemic areas the incidence of leprosy in school children varies from 0.5 to 3 per cent. This Conference is of the opinion that in such areas all school children should be examined for leprosy. Treatment should be provided for all definite cases found, and isolation of all infectious cases strongly urged.

RECOMMENDATIONS.

Special Treatment.

(1) It is the opinion of the Conference that in leprosy ***general treatment*** is of paramount importance. While there are many forms of ***special treatment***, experience has shown that of the methods at present available the following are the most effective and practicable :—

Injections of hydnocarpus oil or esters with 4 per cent. creosote, which may be given intramuscularly, subcutaneously, or intradermally.

Since the intradermal method of injection requires more skill and time than the other two methods, its use should be chiefly confined to in-patients; it can however be used in out-patient clinics in suitable cases, provided sufficient time and skill are available; otherwise in out-patient clinics intramuscular and subcutaneous infiltration should be used.

(2) Whatever method of injection is used, the effects can be intensified by local application of trichloracetic acid solution.

(3) An opinion has frequently been asked regarding the relative value of hydnocarpus oil and esters in the treatment of leprosy. While the esters have been declared by many workers to be the more effective of the two, the opinion of this Conference is that the oil is almost if not quite as effective as the esters. It has the advantages of being cheaper and uniformly less irritant, while the disadvantage of its greater viscosity can

be overcome by heating it sufficiently before injection. Any possible advantages of esters may be counter-balanced by the possibility of treating larger numbers of patients by the cheaper drug.

Hospitalisation of Clinic Cases.

(4) While many patients can be treated effectively as out-patients, there are others who, because of complicating conditions, cannot improve without careful examination and treatment in hospital. It is therefort important that there should be beds where such patients may be kepe temporarily under observation and treatment.

Observation of Quiescent Cases.

(5) It is recommended that patients whose disease has become almost entirely quiescent should not be discharged, but that the intervals between attendances should gradually be lengthened. Patients may thus be kept under observation for a period of years, and relapses are less likely to occur.

After-care in Farm Colonies.

(6) In view of the liability of arrested and discharged cases to relapse when they are compelled to return to bad conditions of living, it is suggested that Provincial Governments encourage the development of farm colonies where such discharged patients may find accommodation and employment ; and where they would be re-established in communal life.

Employment and Non-infectious Cases.

(7)—(*a*) Within recent years it has become recognised by leprosy workers that the majority of early cases of the disease, as found in India, are not infectious and may be expected to heal if suitably treated under favourable conditions. Fear of dismissal from employment leads to concealment ; and the untreated disease may advance till the patient is a danger to his associates. Also dismissal and consequent unemployment endanger chances of recovery. We are therefore of the opinion that patients with early non-infectious leprosy should not be dismissed, provided they remain under expert medical observation and treatment.

(*b*) Early non-infectious cases are also found among school children. For similar reasons it is important that such children should not be expelled from school, provided they remain under expert medical observation and treatment, and periodical certificates of non-infectivity are produced.

The Leprosy Colony, Uzuakoli, South Nigeria.

JAMES A. K. BROWN.

First Annual Report. March 31st, 1933.

ALTHOUGH this is conveniently headed the first annual report, the period covered is a matter of eight months, the first cases being admitted during the early part of August, 1932. Much of the work done has therefore been preliminary, and to some extent, experi-

mental. It is to the credit of those who supervised the construction of the permanent buildings that it was possible to begin the actual work of the colony at so early a date.

At first, cases were allowed to enter without discrimination, to ascertain what response the opening of the colony would receive. There was little doubt about that, however, for in three weeks 200 patients had taken up residence in a temporary camp, making their own shelters with the materials at hand. Further admissions then ceased, to allow time for consolidation, and to consider the most satisfactory method of regulating future admissions. Meantime, those who were sufficiently able-bodied were utilised to clear the bush and to begin the building of separate townships for men and women.

Of those already in residence, by far the greater number came from the immediate vicinity and belonged to the Bende division. With but very few exceptions they were advanced cases, who could hope for little more improvement than the amelioration of their immediate condition. Ultimately it was arranged that new admissions should be mainly by the recommendation of the various divisional officers, the number of cases from each division to bear some proportion to the financial contribution, early cases, as far as possible, being recommended.

The numbers of patients admitted to March 31st, 1933, was as follows :—

		Deaths.	*Left or Dismissed.*	*Total in Residence.*
Bende Division	140	5	4	131
Okigwe Division	156	4	4	148
Owerri Division	57	–	–	57
Aba Division	12	–	–	12
Ahoada Division	34	–	8	26
Others	16	–	1	15
Totals	415	9	17	389

These have been classified as follows :—

	Men.	*Women.*	*Children.*	*Total.*
Early cases	28	15	19	62
Advanced but able-bodied	131	39	29	199
Advanced and disabled	90	21	17	128
Totals ...	249	75	65	389

The totals include all the cases sent by the divisional officers and, in addition, those admitted in the first few weeks without any recommendation, and 40 were sent from the unofficial camp in Port Harcourt. In further explanation of the proportionately high figure for the Bende cases in residence, it should be noted that the majority of the children are from the Bende division, whilst a large number of the adults maintain themselves.

There are an additional 98 out-patients who attend from the towns adjacent to the colony once each week for treatment. Of these 56 are men and 42 women.

The principle of the treatment administered has been to eradicate all co-existent disease in each patient, as for example, yaws, malaria, scabies, ankylostomiasis, to build up the patients' natural resistances to overcome the leprosy infection, and to give weekly injections of hydnocarpus oil and its derivatives, carefully controlling the strengths of such injections by observing the temperature reaction. The temperatures of all the patients are taken morning and evening, by a number of patients trained to do so. All the children are given cod liver oil twice each day. Those unable to take injections are given whatever medicines are thought will improve or alleviate their symptoms. Certain of the patients are being trained as nurses, to do the dressings and to assist in the giving of the injections.

Those able to work are given one shilling each week towards their sustenance. Those too weak to work are provided with food. A number of the patients are independent of the colony for such assistance and work on two days only every week, this being their contribution to the upkeep of the colony. The greater the proportion of such cases the greater the number of admissions possible. The work done by the inmates has been the building of two townships, one for men, one for women, road-making, and farming. With reference to the latter, 35,000 seed yams have been planted, about five acres of cassava, a quantity of native beans and other vegetables, and 2,000 palm fruit supplied by the farm at Umudike. At present a piece of ground is being cleared preparatory to planting a number of citrous fruit trees.

The organisation of the colony is carried on, as far as possible, through the medium of a " chief " assisted by four " headmen," elected by the patients. These settle the majority of such disputes as there are, all who are dissatisfied having the right of appeal. So far this system has

worked satisfactorily. A number of patients trained as " police " assist in maintaining discipline.

To assist the sufferers to forget their sickness and to counter the morbid introspection that is so naturally an accompaniment of the disease, a number of social activities have been introduced, the expense of these being borne by the missionary society through the medium of specially contributed gifts. At Christmas each inmate received a present of clothing, and certain extra food. Sports were held amid considerable enthusiasm and prizes distributed. School is held each morning for the children, the most educated inmates serving as teachers. Two nights each week all adults attend school too, in order to learn to read. A band is being trained and assists in various ways in the life of the colony.

In presenting this report I wish to express appreciation of the interest accorded the development of the colony. Thanks are due to the Executive Committee of the Nigerian Branch of the British Empire Leprosy Relief Association, for a grant of £300 towards the building of a home for the uninfected children of leprous parents, and certain essential laboratory equipment.

It is too early yet to speak of anyone ready for discharge, with perhaps the exception of one particularly early case. The majority of the early cases and the advanced but able-bodied are showing some improvement. It is convenient, therefore, here to emphasise the importance of securing early cases for treatment. There is, of course, an administrative problem associated with leprosy, involving the plight of those who are disowned by their relatives and an offence to their neighbours. The settlement could be filled many times over with such as these. Such cases come to stay. On the other hand, the early cases are those who will go out again with their disease arrested. Early cases will not, however, apply for admission into a settlement that they know contains a large number of those who are disabled and deformed. In actual practice, with only little accommodation available in proportion to the extent of the disease, some kind of compromise is inevitable ; but it is well to remember that the cases that are discharged are the colony's best advertisement to inducing others to present themselves while their condition is still hopeful.

The Leprosy Clinic and the Control of Leprosy

JOHN LOWE.

(*Reprinted from "Leprosy in India," April,* 1933.)

THE great value of special clinics to deal with special diseases is now well established. They have proved their worth in dealing with such diseases as tuberculosis, venereal disease, and other common endemic diseases; it is natural that this method of work should be tried in leprosy, and during the last eight years the generally accepted method of trying to deal with leprosy in India has been that of the out-patient clinic.

In discussing out-patient clinic work it is advisable to try to get a clear idea of what should be its aims and objects. The object of any special clinic should be to try to control the particular disease in the community which the clinic serves. The principal means of control in any disease are (*a*) prevention, and (*b*) treatment, and any clinic which is really trying to do its job should exploit to the full both these means.

The relative importance of treatment and prevention in the control of any disease varies somewhat according to the efficacy of the means of treatment and of prevention available, but it is now generally recognized that even diseases for which we have treatments of a more or less specific nature, are best controlled not by treatment but by prevention. For example, it used to be thought that malaria might be stamped out by making adequate quinine treatment available for all. This idea has long been modified. Similarly, the discovery of the marked effect of arsenical preparations in syphilis, led to the hope that this disease also might be stamped out by treatment. This idea also has been much modified.

For diseases such as tuberculosis and leprosy, we have no treatment comparable in efficiency to the treatment of malaria and syphilis. The impossibility of controlling leprosy by treatment alone should be as fully realized as it already is in tuberculosis. This being so, it is surprising to find that in 1925 the following statement was published in India: "It is now certain that leprosy can be eradicated from the country if only adequate arrangements are made for the proper treatment of all persons contracting the disease." We are quite sure that this statement would not now receive the support of a single leprosy worker of

experience. We would quote some recent statements of Muir: "Leprosy can never be stamped out by treatment alone, at least in a country like India; prevention must be the chief means of bringing about its diminution and in the long run its suppression"; "The most important factor in stamping out leprosy is the isolation of infectious cases"; "It is easier to prevent a dozen cases of leprosy than to cure one." We need say no more regarding the tremendously greater importance of prevention than treatment in the control of leprosy.

In India there are hundreds of leprosy clinics, but we know of few in which any serious attempt is made to organize prevention work. Clinics are treatment centres and little more. It is so much easier to give injections in a clinic than to organise propaganda with a view to prevention in the villages and homes of the patients. We have heard it argued that clinics doing treatment only, may actually tend to cause leprosy to spread, for in some cases, especially under the limitations of out-patient work, treatment does not arrest the disease nor even render the patient non-infectious, but merely enables him to go on infecting others for a longer period than he otherwise would. This may or may not be so, but it is being increasingly recognized that the prime aim of the leprosy clinic is prevention.

How is preventive work to be done? Unfortunately there is no one outstanding direct way of preventing leprosy. There is, as far as we know, no insect transmitter, the control of which will control the spread of leprosy. There is no one outstanding source of infection comparable to the sputum of phthisis cases, the proper handling of which will markedly reduce the risk of infection.

Leprosy can only be controlled by limiting the opportunity of spreading infection. We do not know the exact mode of spread of leprosy, but certain important facts are now generally accepted. Leprosy is spread by contact of infective cases with healthy people. The more intimate the contact and the greater the period of contact, the greater is the danger. Children and young people are much more susceptible to leprosy than adults. Prevention must aim at preventing this contact, specially with young children. Isolation of all infective lepers in institutions is impracticable in India, but much might be done to carry out isolation in villages and in homes. The type of contact which is most dangerous is the type which is commonly seen in family homes at night, infective lepers sleeping together with healthy members of the family in a small crowded room.

This should, if possible, be prevented. In some villages it may be possible to have huts put up outside the village, where infective lepers should live and sleep. They can go about and work if possible during the day, but they must sleep in separate quarters at night. The same applies to the homes of lepers. A separate room or hut outside the family house, for the infectious case to live and sleep in, is very essential. Even now this is commonly provided by the families of lepers, but only when the patient has become deformed, unsightly, and ulcerated. This is too late. Many patients have been infective for years before they reach this state, and in fact the deformities and ulcerations are often signs that the infective stage is drawing to a close. The village or home isolation must be carried out much earlier and much more efficiently. Too often one sees infective lepers living in a separate hut, but attended by the children of the family. Thus the home isolation is rendered worse than useless, for children are much more susceptible to leprosy than adults. In home and village isolation, arrangements must be made for separate eating and drinking utensils as well as for separate sleeping accommodation, and the importance of protecting children from infection must be realized.

The great predisposing causes of leprosy in India are the bad social and hygienic conditions of the people. Bad housing, bad diet, and debilitating diseases render people susceptible to leprosy and provide the conditions under which leprosy spreads. Therefore all measures which tend to improve social and hygienic conditions and to help people to live a healthy life, will also tend to bring about a diminution in leprosy. Leprosy propaganda should therefore merge into the wider sphere of general public health work.

Propaganda work with a view to prevention should aim at influencing firstly the patient himself, secondly the patient's family and relatives, and thirdly the general public. The teaching of the patients can be done largely at the clinic, where special arrangements should be made to make the propaganda work effective by means of posters, pamphlets, and oral teaching in the vernacular given by an assistant with special knowledge and training. The doctor in charge of the clinic should train a good assistant to do this work.

Propaganda work among the families and relatives of the patients can only be done to a limited extent at the clinic. Only a few of the patients will bring their families for

examination for signs of leprosy and for instruction in prevention. The propaganda work among the families and relatives of lepers will need to be done by visitation of the homes of the patients. This will be difficult work and will need to be done by workers with special knowledge and training and, above all, tact.

If this work is to be attempted seriously, it will mean that to each clinic of any size there would be appointed a man to act as propaganda worker and home visitor. (Similar methods are used in tuberculosis clinics.) These workers need not necessarily have much general education, but they should be able to read and write. In rural areas an intelligent village man with special training, will probably be able to work more effectively than a more highly educated man from a town. His work will be facilitated by posters, pictures, and vernacular pamphlets.

The propaganda work among the general public can be done in many different ways, the best methods varying with local conditions. Articles in vernacular newspapers, public lectures in market places with lantern slides, lectures in schools and colleges, etc., are very useful in towns. In rural areas, propaganda work must be done in the villages, and must be carefully prepared to suit the limited understanding of village people. Lantern lectures are often useful, but to primitive village people they may convey little. Simple dramas sometimes teach much more than lantern slides. Valuable help in leprosy propaganda can sometimes be obtained from organisations such as schools, co-operative societies, boy scouts, or any organization interested in health and social service.

Leprosy prevention is difficult to teach in India, where leprosy is so prevalent in the rural population, who are usually ignorant and superstitious and who do not understand infection, or believe that leprosy is infectious, but attribute it to a visitation of the gods. The practical difficulties in preventive work are very great, and are increased by the very bad social and hygienic conditions of the people, but these difficulties have to be faced and overcome before leprosy can be controlled.

When this work is done effectively the patient himself will have been instructed what to do, and this instruction should be supported by pressure from his family and from the village community. It is possible that in time there may be built up a public opinion that will make the control of leprosy possible.

Another important activity of leprosy clinics is the examination of contacts. Here again it is rarely possible to do this in the clinic, although patients can occasionally be persuaded to bring the members of their families for examination. The bulk of this work must be done in the homes of the patients, and hence it is necessary for the home visitor to be trained in diagnosis of early cases, and he should refer suspected cases to the doctor in charge of the clinic.

Another important part of the work of the ideal clinic is the keeping of records, particularly leprosy registers of the surrounding villages, so that after some years' work it may be possible to estimate the effect of the work on the prevalence of leprosy in the surrounding area.

It is most important that leprosy propaganda work should be built up in co-operation with health organizations, Government and otherwise. In most places the work can best be undertaken by the Health Department of the Government, who would doubtless welcome voluntary helpers. In other places it may best be done by some voluntary organization, but it should work in co-operation with the Health Department.

We consider that there is a great need for making the leprosy clinic not merely a centre of treatment, but a real centre of leprosy prevention. The efficiency of a clinic should not be judged by the number of patients attending, or by the number of injections given, but by the extent and the effectiveness of the preventive work done.

The work of a clinic as here outlined would mean extra staff and extra expense. It needs really keen efficient men animated by the spirit of preventive medicine and social service. There must be a good doctor in charge, adequate assistance, and, above all, a good full-time leprosy propaganda worker and visitor.

Few clinics are being run on the lines we have outlined. Most clinics are engaged mostly on treatment and may do a little propaganda work now and then. They are not staffed adequately to undertake the activities we have suggested. We think that possibly the best policy to adopt at present is what might be summarized as that of fewer and better clinics. A poor clinic may do more harm than good. It raises people's hopes only to disappoint them, and renders good work difficult later. A good clinic working seriously at prevention might do incalculable good, and we hope that work such as we have suggested may be started in a few centres in highly endemic areas under favourable conditions.

Reports.

MADRAS LEPROSY CONFERENCE.

(*Reprinted from "Leprosy in India," October*, 1933).

A conference of medical and social workers in the Madras Leprosy Campaign was held at the Surgeon-General's Office on the 3rd and 4th of July, 1933, under the Chairmanship of Major-General Sprawson, C.I.E., I.M.S. The Conference was attended by forty-nine workers of the Presidency representing Government, Mission, and private agencies, medical and lay, and also by Drs. E. Muir and I. Santra. The report of the Conference has recently reached this office. One object of the Conference was to discuss the resolutions of the Calcutta Conference (published in the July number of *Leprosy in India*) and their applicability to the Madras Presidency. These resolutions were read, discussed, and accepted with certain minor modifications. We shall quote certain sections of the report.

The Conference considered 'that the Madras Provincial Leprosy Board should be replaced by a Madras Presidency Leprosy Relief Council of which His Excellency the Governor should be invited to be the President, as His Excellency the Viceroy is President of the Indian Branch of the British Empire Leprosy Relief Association. The Surgeon-General should be the Chairman of the Council and should summon its meetings, which should be held more frequently and more regularly than those of the present provincial Board. The Madras Presidency Leprosy Relief Council should be a branch of the British Empire Leprosy Relief Association and should be in close touch with the various Leprosy Relief Councils. It would be a purely advisory body.'

'On the Presidency Leprosy Relief Council should be the Director of Public Health, the Chief Leprosy Officer, a representative of missionary leprosy relief, at least one social leprosy worker, the Finance Member to Government, Secretary to Government in the Local Self-Government Department, the Director of Public Instruction and several (about five) medical men engaged in leprosy work.'

'The formation of two different kinds of leper colonies was considered:

(*a*) Large collections, several hundreds of cases living together under supervision of a medical man and forming a separate and almost self-supporting community. It was thought that if grants of land were given by Government that such colonies might with advantage be formed.

(*b*) Voluntary colonies of cases of leprosy living just outside their own village.'

'The importance of voluntary segregation is fully recognised as the best means of preventing the spread of infection; but it is also realised that great caution must be exercised in conveying this to the minds of villagers at the present stage or there is danger of alarming simple folk and of further concealment of the disease. The dissemination of propaganda is the best present means of combating the disease, combined with the collection of statistics as to the true number of leprosy cases. It is hoped that eventually the pressure of opinion amongst the villagers themselves will be strong enough to induce cases of leprosy to segregate themselves outside their villages.'

'It was agreed that a co-operation closer than at present exists is very advisable between leprosy clinics and leprosy settlements and that the settlements should admit infective cases from those attending the clinics.'

'To regulate the admissions, clinics should be arranged on a territorial basis with reference to settlements. The Chief Leprosy Officer is requested to draw up a list of clinics that should be in liason with each settlement, and the officers in charge of those clinics should be requested to correspond with the Superintendent of that particular settlement whenever cases have to be admitted. The officers in charge of clinics should apply to the Superintendents of the settlements with which they are in liason and send patients for admission only when called for.'

'Discharged cases from the settlement should be kept under observation and treatment by the medical officer in charge of the clinic nearest to the patient's village and the condition reported to the Superintendent of the settlement once every quarter.'

'The Conference is decidedly of the opinion that school children (both boys and girls) should be inspected periodically with a view to the recognition of early leprosy cases. School medical inspection should be re-introduced as early as possible. School medical Inspectors should undergo a special course of instruction to enable them to diagnose early cases of leprosy.'

'The co-ordination of work between Government and Missionary leprosy workers should be carried out by the District Leprosy Relief Council where such exists. Where there is no such Council the co-ordination will be made by the District Medical Officer in consultation with the group leprosy officer.'

Regarding the provision of accommodation for out-patients needing temporary hospitalisation the following suggestions were made :—

'Small infectious sheds attached to small mofussil hospitals, if unused for long, may be converted into emergency leprosy wards to accommodate and treat emergency cases (perforating ulcers and cases with severe reaction).'

'City Hospitals. Six beds each in the Government General Hospital and in Royapuram Hospital may be reserved for admitting and treating urgent leprosy cases. The Superintendents of these hospitals are to be addressed for this accommodation.'

'Mofussil. Wherever possible a shed to accommodate six patients, with an impervious flooring should be provided. Private generosity should be stimulated to provide such sheds where possible. Local considerations, such as the size of the hospital compound, will determine whether these sheds should be built within or just outside the existing hospital compound.'

'After much discussion it was generally agreed that, although many cases of leprosy recover and do not recur, it is advisable not to employ the phrase " leprosy can be cured " as a general statement. If the phrase is used it should be qualified, and care should be taken not to raise too exuberant hopes early in the treatment. The necessity for prolonged treatment should be brought home to patients who should at the same time be imbued with hope and encouraged to persevere and be regular in the treatment.'

'The rôle of social workers in the Leprosy Campaign was considered to be :—

1. The connecting link between doctors and patients. To bring the patients to the clinics.
2. Propaganda. House to house visiting and conversation.
3. The promotion of a general spirit of co-operation and friendliness between patient and doctor.
4. Compiling of statistics concerning leprosy infection of villages.

5. Classification of infected houses in villages keeping up village cards.
6. Work in charge of Leper Relief Councils and Committees both District and Local.
7. Inculcation of a feeling of hope amongst the clinic patients.
8. Raising funds for the Leprosy Campaign.

Health officers to do propaganda work and give advice to social workers whenever necessary.

Medical officers to treat cases and make the clinics attractive by their kind words and prompt attention. Social workers to visit the clinics, understand the requirements, and help the medical officer in every way.

Honorary workers, particularly young women doctors who are unemployed, should be encouraged to work in the clinics.'

'The Conference wishes it widely known and wishes the Director of Public Instruction and the Education Officer of the Corporation of Madras to communicate to all schools, and the Commissioner of Labour to all factories, that leprosy is found in two forms, infective and non-infective, and that patients in the latter condition may, while under treatment, be allowed to attend their school or work since they are not dangerous to their comrades.'

Reviews of Books and Articles of Current Medical Interest

International Journal of Leprosy, Vol. 1, No. 1.

We are glad to bring to the attention of our readers the International Journal of Leprosy. This number contains many very valuable articles, and the standard set up augurs well for the future. Space forbids our attention being given to all the contributions, and therefore, one or two only can be cited.

Dr. Lampe contributes an article on the "Fate of Children Born of Leprous Parents." In the discussion at the close of this article, Dr. Lampe points out the necessity not only for the separation of children at birth, but strict attention should be paid to their subsequent surroundings. It is this and other work of Dr. Lampe's that has brought evidence of the fact that leprosy frequently develops in childhood or early adolescence, hence the necessity for the strict supervision stressed in this article.

Dr. John Lowe contributes an article on leprosy in Hyderabad, and this is of extreme interest, as he emphasises the following important facts :—

(1) That children are susceptible to leprosy infection.
(2) That adults are usually immune to leprosy.
(3) That the infection is usually contracted in childhood.
(4) That the infection usually shows itself clinically by the age of 20.
(5) That in some cases in which the disease does not show itself till later in life, the infection was probably contracted in childhood and there has been an unusually long latent period.

Dr. Hayashi has an article which was reprinted in LEPROSY REVIEW, Vol. IV, No. 4.

The interesting work of Soule and McKinley, on the "Cultivation of B. Lepræ with Experimental Lesions in Monkeys," is reprinted from the

American Journal of Tropical Medicine. Temporary lesions were produced in monkeys by the innoculation of suspensions of ground-up leprosy nodules, but as in the case of other workers, there was no evidence of general spread. The cultural work is based on the maintenance of certain concentrations of oxygen and carbon di-oxide. A growth of acid-fast bacilli was obtained, which resulted in the experimental production of granulomalocis lesions suggestive of early leprosy.

The work has been extended recently by an attempt to produce subcultures on chick embryo tissue (*Proc. Soc. Exp. Biol. Med.*, Vol 30, No. 5, pp. 659-661). The whole position must be considered at present to be non-proven, and we shall await the results of the work, which is being done in Calcutta along these lines, with great interest.

We would emphasise the importance of this Journal to leprosy workers and urge such to join the International Leprosy Association. Applications should be sent to 29 Dorset Square.

Preliminary Report on Certain Dyes in Leprosy. GORDON A. RYRIE.

This article has caused considerable interest among leprosy workers, as it holds out considerable hope of a new and more effective remedy for leprosy. The treatment is by the intravenous injection of certain aniline dyes. The most hopeful of these were found to be Brilliant Green in a 1 per cent. solution, and Trypan Blue in a 2 per cent. solution, in doses as big as 20 cc.s. The result appears to be striking, but on analysis we find very few cases have so far been treated by these methods, and when one reads that nine cases have become bacteriologically negative, one is encouraged, but one learns that among these " five have shown very definite retrogression of lesions." This seems to indicate that a bacteriological examination was the main criterion, and herein lies a fallacy, for it is sometimes very easy to produce an apparent improvement in this direction which, unfortunately, is seldom permanent. In view of a recent personal communication, in which Dr. Ryrie says the aniline dyes have " decided limitations," it would be well to withhold conclusions with regard to this apparent new and effective treatment.

It remains to be said that Dr. Ryrie warns workers of the care needed in administration of these dyes, and intravenous medication cannot be lightly undertaken. He himself had everything meticulously prepared, and all the apparatus for the combating of collapse, ready.

Manson's Tropical Diseases. PHILIP MANSON-BAHR. Ninth edition. Cassell & Co., Ltd. 31/6.

We are glad to bring to the notice of workers in the leprosy field this very valuable and classic book on tropical medicine. Leprosy is a disease which cannot be treated effectively without a knowledge of other tropical conditions, and we know no work which presents Tropical Medicine so clearly and concisely as Manson's.

We are naturally particularly interested in the leprosy section. We regret that this section is not written altogether from the modern standpoint. The description of the disease is the description of the more advanced case, and the treatment has not been brought thoroughly up-to-date. We trust that these points will be noted in the preparation of future editions, so that they may give the student and practitioner a wider grasp of the protean nature of the disease.

We unhesitatingly state that this book should be on the shelf of all those who directly or indirectly are connected with the treatment of tropical complaints in the course of their leprosy work. R.G.G.

Correspondence

CHURCH MISSIONARY SOCIETY HOSPITAL,

YUNNANFU, CHINA, 15th September, 1933

To the Editor, "Leprosy Review," London.

DEAR SIR,—I have read with interest the criticism of text-book descriptions of Leprosy by Dr. A. McKenzie in your April number, and Dr. Lowe in the July one. The former of these deals with the explanation of nerve involvement—the so-called ascending nerve type.

Dr. McKenzie says "I have seen cases—many of them of over 10 years duration who show no signs of ever having suffered from involvement of a main nerve," and suggests that the involvement of main nerve trunks, when it does occur, is due to embolic (Haematigenous) spread rather than by infection of the nerve endings in the skin and ascending peri-neural spread.

I have given a certain amount of thought to this question and in particular to the question of the origin of the "pure nerve type." I have come to the conclusion that in some areas this type is never seen, and therefore that those discussing the general classification of leprosy may be at cross purposes. In contrast to the heavily infected skin type mentioned by Dr. McKenzie, there may only be involvement of one main nerve. There may be no macules to be seen and no signs at all of skin involvement. For years few except the expert would think that such a case was a leper at all. Then there are grades with involvement of more than one main nerve, especially one ulnar and one facial, and a few macules to that of the most familiar of all in South China, to which the experience of the disease by the writer is limited, the so-called mixed type.

If we grant that the pure nerve types are embolic originating from some minute skin infection, we still are in a dilemma and have to explain how it is that heavily infected skin types may have no main nerves infected. It is hardly a question only of resistance—though it would seem highly probable that where the resistance of the community is high, a greater proportion of pure neural cases are to be found, and that these are an index of the time that leprosy has been endemic in any region.

One would endorse the suggestion of Dr. McKenzie in regarding the infection of the great nerves as embolic in origin (either blood or lymph spread) and to be a matter of chance. The question as to why, when the number of lepra bacilli is exceedingly small, is it possible to have, say the ulnar nerve involved and apparently no other tissue of the body; and on the other hand, how is it that cases with myriads of bacilli (and I have known a case with 25 severe lepra reactions where there is a lepra septicaemia in a man with heavy cutaneous infection who had no signs at all of peripheral nerve involvement) in various areas of the skin, with no main nerve affected, can be dealt with in a statistical manner.

One assumption is necessary, *i.e.*, that a large number of people after infection with leprosy, recover without ever having shown signs of it. We may regard it as a matter of chance whether leprosy bacilli in the blood stream reach the larger nerve trunks in sufficient numbers to cause clinical symptoms. Of those heavily infected this occurs in the majority of cases. In other words, the old so-called mixed types of leprosy predominate in most districts where leprosy occurs.

Among those where the resistance is high, clinical leprosy does not occur, but in a small number of cases, and unfortunately for the patient, the bacilli happen to become deposited in the large nerve sheaths, and a minute lesion by pressure on the nerve causes symptoms out of all proportion to its size. If this be so, we may assume that in those areas where there are a fair proportion of more or less pure neural types there have been many more among that particular population who have been infected but recovered without clinical symptoms of leprosy.

Dr. Lowe is sceptical about the somewhat confident and detailed descriptions to be found in textbooks of the onset of leprosy, and he is probably not far wrong in thinking that the phenomenon of lepra reaction is the pitfall for the man who only sees a few cases of leprosy. As Rogers has pointed out, it is also to be borne in mind when assessing the value of any alleged specific treatment.

I am, yours faithfully, A. J. WATSON.

WETE, PEMBA, October 17th, 1933.

To the Editor, "The Leprosy Review."

SIR,—Reference is made in a recent abstract (1) of an article by Rao (2) to his finding that the Formaldehyde Test in uncomplicated leprosy is never positive. If this observation holds good in the light of further experience, then the significance of a positive Wassermann Reaction, or of other serological equivalent, in a case of leprosy can readily be ascertained. Thus a positive Wassermann Reaction associated with a definitely positive Formaldehyde Test will indicate a very strong probability of the presence of active Syphilis or of Yaws; but if the latter test is negative then these diseases will probably not be present.

Dye (3) wrote that he found the Formaldehyde Test strongly positive in an unstated number of cases of leprosy of all types. Dunscombe (4) carried out the test in connection with thirty-eight patients, all stages of leprosy being represented, but his findings differed widely from those of Dye. McKenzie (5) found, as a result of the study of one hundred and thirty various cases of leprosy, that the result of this test varies with the severity of the disease. None of these three authors states that he was dealing with uncomplicated leprosy, and sources of error may have been overlooked.

It would be interesting to know if any attempts have been made to associate Wassermann and Formaldehyde Test findings on the lines suggested above, and, if so, with what results.

I am, Sir, yours obediently, T. B. WELCH.

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(4) Dunscombe (W. H.).—The Serum-Formalin Reaction in some cases of Leprosy. Trans. Roy. Soc. Trop. Med. and Hyg., 1927, April, Vol. XX, No. 8, pp. 512—513.

(5) McKenzie (A.).—Some Non-Specific Serological Tests in Leprosy. Lep. Rev. 1933, July, Vol. IV, No. 3, pp. 99—112.