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EDITORIAL

The relationship of leprosy to diet and especially to the vitamins is one of importance. Dr. Blueth's paper in this issue shows relief of leprosy neuritis by treatment with synthetic vitamin B_1. Chowhan and Chopra, writing on *Cobra Venom in Nerve Leprosy* in the last December number of the Indian Medical Gazette, state that they have used mixed injections of Vitamin B_1 and cobra venom with marked success in a few cases of leprosy neuritis which had not yielded to cobra venom alone, believing that most of these resistant cases were due to vitamin B_1 deficiency. How these drugs act is still a matter of conjecture, but anything which relieves this most painful of all the conditions in leprosy should be welcomed. It is the general opinion that it is impossible permanently to relieve the pains of leprosy without first improving the general health of the patient. In the strong healthy leprous patient severe nerve pain seldom, if ever, occurs. The use of vitamin B_1 seems to be on the right lines, as vitamin B_1 deficiency so frequently stands in the way of improved general health. Curiously, however, this product seems to require to be given by injection. Badger and Patrick, in the article referred to in Blueth's paper (p.109), first tried dried brewer's yeast and synthetic B_1 concentrate by mouth without results, though their intramuscular injections were most effective.

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We would also call our readers' attention to three more forms of treatment recommended in articles appearing in or reviewed in this issue. Sir C. Sprawson (p.106) reports on the treatment of nerve conditions with novocaine used in Russia. Dr. de Carvalho (p.133) describes the use of intravenous injections of hypertonic glucose in 74 cases, with complete recession in 51 per cent. Dr. Boenjamin (p.140) obtained favourable results in ten out of twelve cases of lepra reaction with intramuscular injections of omnadin.

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Dr. Rotberg's article, an abstract of which we print (p.130), opens up interesting speculations. If his hypothesis is confirmed, that the majority of people are born with a definite " N factor " which renders them immune to leprosy, or at least to its lepromatous and infectious form, then methods of prophylaxis will call for revision. The most effective control of leprosy would then be through finding out and concentrating on the minority in endemic areas who are proved by the lepromin test to be susceptible to

leprosy. To prove or disprove Rotberg's hypothesis considerable further investigation would have to be carried out, both in endemic and non-endemic countries, the lepromin test forming the basis of the investigation.

In this connection Dr. Burnet's success in inoculating Syrian hamsters with human leprosy (see p.132) seems to uphold the hypothesis of the susceptibility of a minority of individuals in a community. Only one of his six hamsters developed the disease, and this one developed it in a very definite form. This suggests that hamsters, with the exception of a minority, are resistant to leprosy. If this is proved to be so then this rodent, and possibly other species of the same order, may yet be of immense value in the investigation of the unknown factor which underlies susceptibility and resistance to leprosy.

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The abstract from the Burma Report appearing below (p.142) is certainly of a startling nature. If among the thirteen million inhabitants of Burma there are 200,000 lepers, a percentage of more than one and a half, then the situation is a serious one. In an article appearing in *Leprosy in India* (Oct. 1938) Dr. Lowe discussing the question concludes : " Thus it appears that the lack of resistance to leprosy of Burmans is racial and hereditary." Seventy-five per cent. of Burmans in the Rangoon Leper Asylum were found to be of the lepromatous type, while only thirty-nine per cent. of the Indians were of this severe type.

Dr. Oberdorffer's paper (p.112) puts forward the suggestion that this difference in racial susceptibility is dietary and that sapotoxins from aroideal food (plants like colocasia) damage the adrenals, thus proving the deciding factor in racial susceptibility. This suggestion is certainly one that deserves consideration and further investigation by leprologists and others throughout the world. In connection with racial immunity Dr. Flandin's speech quoted from the *Lancet* (p.135), and the short paragraph about leprosy among white peoples in Australia, show that leprosy is not yet an obsolete problem even in Europe and among Europeans.

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The treatment of trophic ulcers is always a difficult problem. Various methods have been suggested at times, and we publish two in this issue. Dr. Maynard (p.118), after cleaning up with antiseptic dressings, pours on a mixture of beef suet, ghee and beeswax. Dr. Mehta injects locally a solution of rivanol (p.140). There is no doubt that subcutaneous injection in the region of the ulcers of irritant fluids such as hydnocarpus oil and esters, dettol

and many other drugs, has a marked effect in causing healing of sluggish sores. The thick skin of the sole will peel off within a few days and the surface of the ulcer become vascular and healthy. Whether rivanol has any properties which make it preferable to these other stimulating injections awaits confirmation. It is possible that a triple method of treatment may prove best: first, the removal of dead bone and gross sepsis; second, stimulation by local injections; third, some such method as that of Dr. Maynard. The depth, area and chronicity of the ulcer, the condition of the leg and of the patient obviously call for variations in the method used; but the triple principle is a useful one to bear in mind—cleanse, stimulate, protect.

LEPROSY IN SOVIET RUSSIA

C. A. SPRAWSON.

I spent the month of September, 1938, on a medical tour in European Russia. Before going I had notified the Soviet authorities that my chief interests were Leprosy and Tuberculosis and I asked to see a leprosarium. I am also interested in medical education, but I knew I should be shown that without special request. The Commissar of Public Health replied that they did not think it worth my while to make a long journey (most of their lepers are in Asia or in the Caucasus) to see cases, but that they would show me a leprosarium near Moscow. However I knew there was a leper settlement, the Krutye Ruchi, in the Leningrad district, so when I was in Leningrad I several times repeated my request to see that institution, and was eventually told they did not wish to show it me. I found later it was 120 kilometres from Leningrad, so the distance may have been a difficulty.

In Leningrad, however, at the Institute of Medical Research and Experimental Medicine, a very fine institution, I met Professor Speransky who told me, through an interpreter, that he had been interested in leprosy and with his colleagues had for 2½ years done research work at the Krutye Ruchi Lazar Hospital on blocking nerves. Professor Speransky is known for life-long research on diseases of the peripheral nerves. He claimed that by the injection of novocaine in the course of the nerve in leprous cases he gave relief to trophic ulcers and to cramps of the hand and obtained general relief as well. He gave me two books by himself, one in English with only brief reference to leprosy, the other in Russian with a detailed account of his experiments. He said that he could

not obtain acute or early cases of leprosy to work on, as there was not much of the disease in that area, and he asked me if I could get the treatment tried in some part of the British Empire where many cases occurred. I said I would bring his request to the notice of B.E.L.R.A. Here is the extract from his English book which mentions his work on Leprosy.

" In cases that had not been neglected, novocaine had a good and lasting therapeutic effect. We had a number of patients who almost regained their working capacity, chiefly owing to the restoration of sensitivity. Levelling, and in some cases, disappearance of skin nodes was also noted, as well as healing of chronic ulcers and removal of contractures. The fingers of the patient after being contracted for a number of years, regained sensitivity and mobility, even becoming capable of performing certain forms of fine work (embroidery). Similar improvement occurred in regard to the general state (subjective state, weight, appetite, sleep, etc.). It must be mentioned that in some cases it was possible by means of the novocaine blockade to do away with the sudden intense attacks experienced by leper patients, a process which is frequently the cause of death. A detailed report on this work will be given in a separate article."

Unfortunately the detailed account is in Russian, which I cannot read. I should be pleased to send this book to anyone who wishes to try the treatment suggested.

When I reached Moscow I saw the leprosarium there and was very kindly shown round by the Director, Dr. Belnov. There was really very little to see except a laboratory adequately equipped. They had thirty beds, but some time previously had decided that the neighbourhood of a large city was not a good place to keep lepers and so had sent them all to a remote settlement in the south. The Moscow place was now used only as an out-patient clinic and Dr. Belnov had only one patient, whom he showed me and whom he claimed to have cured by injections of serum from a horse that had been inoculated with some diptheroid organism. His usual treatment seemed to be by potassium iodide, but he was aware that this had been considered dangerous. He also used Alepol; but apparently did not use chaulmoogra oil or esters.

No leprolin test is applied; nor is either variety of leprolin prepared. Dr. Belnov spoke with great respect of Dr. Muir and asked me about his methods: I gave him a copy of Dr. Muir's recent book.

Dr. Belnov also gave me some interesting details of the Soviet's organisation against leprosy. He said that all lepers have to be registered and that there were only 3,000 registered

lepers in the Soviet Union. He gave their main distribution as follows: Caucasus 700, Turkestan 1,000, Astrakan 600 to 700, Far East (Vladivostock) 100, Yakutsh 30.

On my expressing doubt that all lepers were registered, he demurred: but I still think there must be many more than these numbers indicate.

There is no medical inspection of school children in infected areas to detect new cases.

It is not compulsory for a leper to go to a leprosarium, but Dr. Belnov said one would prefer to do so and would be unlikely to evade treatment. He said that an infective case would be compelled to reside in a leprosarium. They have special homes, outside the leprosarium, for the healthy children of patients. Children born in the settlement are separated from their parents at nine months.

In some places they have clinics for non-infective cases, like this one at Moscow. Crippled cases in whom the disease has died out are retained in a leprosarium, there being a special house for them.

Although not much has been done hitherto, it is interesting to note that recently generous financial provision has been made for the care of lepers. Dr. Belnov said that the budget for 1937 contained an allotment of 12 million roubles for leprosaria. It is impossible to give a sterling equivalent for this amount. one might put it perhaps about £300,000. Most of this seems to be going in building. Out of this a leprosarium of 600 beds is under construction at Krasnodar in the south. Three more new leprosaria are also under construction, one near Moscow, and two in Asia.

My chief impressions about leprosy from this visit were :—

1. Leprosy is not a major problem in the Soviet Union.

2. The Soviet have hitherto not done much for it, but have been devoting their energies to more important problems, such as tuberculosis, which they are attacking with the utmost energy and with considerable success.

3. The Soviet are now tackling the problem and building more leprosaria. There remains much more to be done, however, such as inspection of school children.

One further point is of interest. The Soviet evidently regard leprosy work as a dangerous occupation, because on that account they pay their leprosy physicians much more highly, usually double, than they pay their general medical officers.

BETAXIN IN THE TREATMENT OF LEPROSY

ALFRED BLUETH.

A study of recent publications will confirm that very promising results are being obtained with " Betaxin " in many aetiologically diverse forms of polyneuritic and polyneuralgic disorder. The neurotoxic and infective types appear to respond equally well, and the striking successes obtained with this synthetic crystalline Vitamin-B_1 preparation suggest the presence of a B_1 deficiency in these conditions.

In view of these experiences Vitamin-B_1 was tried in the treatment of a very refractory infective type of peripheral neuritis, *viz.*, leprous neuritis. The conditions underlying the use of Vitamin-B_1 in nervous forms of leprosy have been comprehensively laid down by Keil (1), and the service rendered by it in 15 cases are highly commended by Villela and Rocha (2). Their cases responded particularly well to intramuscular injections of " Betaxin," improvement being shown by a marked increase of appetite and weight and general betterment of health. The usual dosage was 1 mg, and the total amount administered over some 9 weeks was 45 mg. Of late, in the light of further experience, these authors have been increasing the single dose up to 10 mg.

Badger and Patrick (3) also report favourable effects from intramuscular injections of a synthetic Vitamin-B_1 in 9 cases of nerve leprosy, particularly of the acute neuritic type. They also give about 1 mg. daily, and they state that the rapid cessation of pain and regression of the nerve swellings was most striking. Even advanced bilateral peroneus paralysis improved in a relatively short time so much that practically complete function could be restored.

Owing to the significance, both practical and theoretical, of these findings, some personal experiences of the writer may here be recorded :—

Case 1 Lepra mixta. Type L3N1.

In April 1938, a severe general reaction with intolerable pain, especially violent at night, along the nerve trunks of the extremities. Neurotic vaso-dilatory reaction in hands and feet with well-marked areas of paraesthesia.

27.4.: Treatment begun with intramuscular " Betaxin " injections, the patient being given 1 mg. daily.

30.4.: The pains are less; patient sleeps better at night; hands and feet less swollen.

5.5.: No pain; swelling of hands and feet almost gone.

11.5.: Still free from pain; swelling of hands and feet quite gone. Lepromata and other cutaneous manifestations of leprosy unaffected. " Betaxin " injections discontinued.

At the beginning of August, 1938, another very violent general reaction with unendurable pain—this time, however, not of a neuralgic but of an arthritic character; all joints of the extremities very swollen. Since the usual treatment was without effect, " Betaxin " treatment was begun on 26.8. with daily injections of 10 mg. No effect on the arthritic pains having been observed after 10 injections, these were discontinued.

Case 2 Lepra mixta. Type L2N1.

Well-marked neurotic vaso-dilatory reaction of hands and feet accompanied by pain and paraesthesia formication and sensation of cold.

25.4.: Treatment begun with daily injections of " Betaxin " (dose: 1 mg. of synthetic Vitamin B_1).

27.4.: Swelling of hands and feet begin to go down. Paraesthesia improving.

30.4.: Continued improvement.

6.5.: Only the two forefingers remain somewhat livid and swollen.

11.5.: The swelling of the hands disappeared; the skin of the hands again displaying normal colour; pain and paraesthesia completely relieved. " Betaxin " treatment discontinued.

6.6.: Almost immediately after cessation of treatment the condition of the patient deteriorated and the former symptoms gradually returned.

14.6.: Resumption of daily " Betaxin" injections (1 mg. synthetic Vitamin-B_1).

23.6.: After 10 injections, complete recovery. No further " Betaxin " treatment.

Up to the date of the last examination (20.10.38) the patient's condition was entirely satisfactory and she has been able to resume her occupation as a sempstress.

Case 3 Lepra cutanea. Type L2.

In April, 1938, simultaneously with a mild reaction of the skin symptoms, onset of violent pain in the nerves of the left arm.

Patient unable to sleep and much run down.

25.4.: Treatment begun with daily injections of " Betaxin " (1 mg. of synthetic Vitamin-B_1).

27.4.: Pain becoming less and patient sleeping better.

30.4.: Pain somewhat increased, especially at night.

6.5.: Neuralgic pain now quite disappeared. No further injections.

At the time of the last examination (20.10.38) the patient was found to have remained free from symptoms.

Case 4 Lepra mixta. Type L1N2.

On 27th April, in the course of a severe general reaction, onset of extremely violent nerve pains in the extremities, especially in the legs. "Betaxin" (10 mg. of synthetic Vitamin-B_1) was injected.

28.4.: Pains considerably less. Injection repeated.
29.4.: Almost free from pain. Injection repeated.
30.4.: Injections discontinued; patient quite free from pain.

The general reaction remained unaffected but regressed slowly under the usual medication. The neuralgia had not reappeared up to the time of the last routine examination (20.10.38).

Case 5 Lepra mixta. Type L3N1.

In June, 1938, during a severe reaction, patches of erythematous infiltration appeared over the whole body; livid swellings of the hands and feet; neuralgia and arthritic pains.

8.6.: Treatment begun with daily "Betaxin" injections (1 mg. of synthetic Vitamin-B_1).
22.6.: Treatment discontinued. The neuralgia had completely ceased but the arthritic pains still persisted, although to a less extent. The regression of the neurotic vaso-dilatory symptoms in feet and hands was particularly rapid in this case. Other pathological changes in the skin, however, remained unaffected.

"Betaxin" injections were subsequently employed in all leprosy cases complicated by neuralgic symptoms and always with great success.

In conclusion it should be stated that treatment with "Betaxin" injections has proved of great service in leprous neuralgia occurring as an isolated symptom and in the course of a general reaction to the disease; the response is equally good in the usually intractable neurotic vaso-dilatory symptoms in the hands and feet, which as a rule are associated with severe pain and paraesthesia. The action appears to be highly selective, since the treatment leaves both the general and the arthritic symptoms of leprosy wholly unaffected.

Literature.

(1) Keil: "Is nerve leprosy aetiologically uniform? The Vitamin-B_1 treatment of nerve leprosy." Arch.f.Schiffs-und Tropenhyg, 1938, Vol. 42, No. 1, pp.1-12.

(2) Villela and Rocha: " Influence of aneurine (Vitamin-B_1) and ascorbic acid (Vitamin-C) on leprosy." Internat. Journ. of Leprosy, 1938, Vol. 3, No. 3, p.458.
(3) Badger and Patrick: " Effect of intramuscular injections of Vitamin-B_1 on acute leprous neuritis and of oral administration on the general disease." Publ. Health Rep., Vol. 53, No. 24, 17.6.38, p.969.

INTRODUCTION TO AN INVESTIGATION OF RACIAL DIFFERENCES IN THE CLINICAL PICTURE OF LEPROSY

M. OBERDÖRFFER.

It has been described fairly often that in one race or in one country leprosy tends to take a different clinical course compared with others. I have been studying this question in West Africa, Sudan, Egypt, Ceylon, India and recently, Malaya. The following facts seem to be established from these observations which will be extended further in the near future.

(i) In Nigeria the majority of all cases (90%) belong to the macular type of lesions and have been found to contain more or less marked tuberculoid structure according to the findings of Wade and his co-operators in other countries. The prognosis of these Nigerian types of leprosy appear to be bad as compared with India and Ceylon. The results of treatment in Nigeria are bad, the relapse rate is high while the definite advance to generalised lepromatous lesions appears to be rare. With regard to type distribution as found in surveys see (M. I. Oberdorffer, Arch. f. Schiffs u Tropenhyg. June, 1938).

(ii) In Ceylon leprosy tends to take a very mild course and the prognosis in the many mono-macular cases appears to be good. The incidence is not very high. It may be noted here that in all countries some individuals seem to be unresistant against leprous infection from the start.

(iii) In Calcutta the incidence of leprosy is probably high, though not as high as I found in Nigeria. A good many of these cases are frank tuberculoids and give a very good prognosis with regard to treatment.

(iv) In Malaya as Ryrie will point out later, Indians shew these mild forms of leprosy in striking contrast to the very serious

course which leprosy tends to take in Chinese. Even early tuberculoid cases tend to become lepromatous. In Malays, more or less, an intermediate type is found.

The very interesting observation in all these countries which I think is new is the following one.

I found in Nigeria that in certain seasons of the year most of the macular lesions are bacteriologically negative while in the other seasons a great number of these more or less tuberculoid lesions become positive (M. I. Oberdorffer, Arch. f. Schiff, u Tropenhyg, July, 1938). This observation could be affirmed in Calcutta and Lowe will report on the findings. The percentage of positive cases in Calcutta in this seasonal variation is not as high as in Nigeria. In Malaya the tuberculoid lesions in Chinese appear to be positive all through the year. Ryrie will detail these observations later. I have been looking for a possible explanation of these facts. In my paper on predisposing causes of leprosy in Nigeria I have detailed my findings and I want to give here only a short account of the results. I could not convince myself that the seasonal variations of bacteriological findings is a consequence of any climatical factor. The geographical distribution of high incidence of leprosy in the tropics brought me on the track of one factor which has never been investigated with regard to leprosy as yet. In all countries with a high incidence of leprosy in the tropics there is a very common food plant called Colocasia antiquorum—the vernacular names of which are given in an appendix. Colocasia antiquorum has been found by Clark to contain a highly toxic sapotoxin—the toxicity of which shews a definite seasonal variation. Details should be looked up in Clark's original papers. The tentative hypothesis which I derive from my observations and findings in Nigeria and elsewhere is the following :—

(i) Colocasia antiquorum forms an important predisposing factor in leprosy.

(ii) In countries with high incidence of leprosy in the tropics, tuberculoid lesions which become seasonally bacteriologically positive and lepromatous prevail if Colocasia is eaten only in certain seasons (Nigeria). The prognosis in these countries as to cure is bad, as to complete change to lepromatous leprosy, the prognosis is good.

(iii) In Ceylon where little or no Colocasia is eaten and the general health of the population is good, the incidence of leprosy is low and the prognosis as to cure and as to lepromatous change is good.

(iv) In India where comparatively little Colocasia is eaten

and the general health of the population is bad, the incidence of leprosy is high but mild forms prevail generally with good prognosis. It is not certain if the seasonal variations of bacteriological findings in India can be attributed to Colocasia eating. Further investigations seem desirable.

(v) In Malaya, Chinese who eat Colocasia all through the year tend to develop constant lepromatous change in tuberculoid lesions far more frequently. Ryrie will go into the details.

Summarising my observations and my hypothesis, I say that in some countries tuberculoid leprosy shews seasonal variations in bacteriological findings which may possibly be caused by a sapotoxin containing food plants, the Colocasia antiquorum. It is certainly not the only predisposing factor in leprosy but the observations in this matter may be worth while discussing.

[In a later paper Dr. Oberdorffer writes:—

"The author ascribes the seasonal variation and the frequency of lepromatous lesions in some countries to the temporary or habitual intoxication with sapotoxins from aroideal food plants like colocasia (taro, etc.). The mode of action of this sapotoxin is its damage to the adrenals, and the author thinks that toxin or constitutional adrenal damage may be a decisive factor in the determination of the manner in which the infected body deals with its infection. Adrenal damage of any kind is likely to cause the temporary or final transition of tuberculoid to lepromatous tissue reaction—which means from non-infective to infective stages."]

Synonyms and Colloquial Names for Colocasia Antiquorum.

West Africa—Coco-Yam; Central Africa—Taro; Egypt and Sudan—Ul'ass or Culcass; India—Kach-chi, Kachu, Aroi; Ceylon—Kiri-ala, Habar-ala, Daesi-ala, Kand-ala; Malaya—Talla, Ubi Keladek; Java—Bote, Loombo, Tales; Madura—Kaladi; Pacific Islands—Taro; West Indies—Tannia, Dasheen, Edoh, Melanga. Colocasia is also eaten in: Brazil, Columbia, South China, Japan, Phillipines, Mediterranean Area.

SOME MENTAL ASPECTS OF LEPROSY

E. MUIR.

In the treatment of leprosy it is perhaps as important to study the patient's mental condition as his physical. Leprous infection does not directly cause organic disease of the central nervous system, though widespread affection of the peripheral nerves is said sometimes to give rise to secondary degeneration of certain tracts in the spinal cord.

Leprosy is a disease apart. When a word is required to express the utmost limit of horror and loathing, the word "leper" is commonly used. In many countries the innocent victim is loaded with reproach for having acquired it; if he had not been a very wicked person the gods would not have punished him in this way. The community reacts to the leper with a feeling of abhorrence, and it is the counter-reaction of the leper to this attitude of the community which is largely responsible for his mental condition.

Except in a few places here and there where the leper is tolerated, and, because of ignorance or indolence, is allowed to mix with the public, it is the almost universal custom that he is shunned and ostracised. It may be useful, therefore, to study first of all the reason for this mental reaction of the community. It is not on account of great infectiousness. Leprosy is not a notifiable disease in England, where open cases of tuberculosis are notifiable; the latter is undoubtedly a much more infectious disease. Yet tuberculosis is not dreaded like leprosy. Nor is it high mortality that makes leprosy dreaded; influenza and a host of other infectious diseases are much more fatal, yet they are not feared as leprosy is.

It is the disfigurement of leprosy that makes it so repulsive. The hands and face, the chief organs of self-expression, are deformed and repulsive in many advanced cases. "Skin for skin, yea all that a man hath will he give for his life" said Satan regarding that perfect and upright man, Job. And he added, "put forth thine hand now and touch his bone and his flesh, and he will curse thee to thine face." Whether the author of *Job* meant to describe leprosy or not, he understood the psychology of a chronic, non-fatal, disfiguring disease. The leper is seldom ill enough to be confined to bed, and so he moves about in the community. Also, as it is not in itself a fatal disease, the duration of leprosy is prolonged. The unfortunate victim is not considered as having an "attack of leprosy," but as "being a leper." He belongs to a class apart like the blind, the deaf-mute and the insane, only his infirmity is much more detested than theirs. While the majority of those suffering from leprosy may never reach a stage at which they are actually repulsive, yet the ignorant public seldom take degrees and types into consideration: he is a leper, and therefore to be shunned.

In face of this attitude of the community, there is bound to be a profound mental effect on the leper himself. His first reaction is concealment, and the constant dread lest his condition become known tends to cause repression and a general unhealthy mental state. Then, in proportion as he becomes known as a

leper, and the ostracism of the community becomes operative, he suffers from a feeling of inferiority. If he loses his employment and becomes dependent on the charity of others, his instinct of self-respect becomes undermined.

The consequent mental depression is apt to produce a parallel condition of physical depression and thus still further to lower the patient's resistance to leprosy. The disease accordingly increases and becomes the more difficult to conceal; or, if its presence has become known, it induces still more severe ostracism; a vicious spiral is thus formed.

In treating leprosy it is essential to recognise, and if possible to remedy, this deplorable mental condition. For this purpose the agricultural settlement is an ideal solution. Here all need of concealment is removed. The doctor and his staff know the worst and still are sympathetic. He is surrounded by fellow patients, so that ostracism is at once removed. The sympathy of fellow-sufferers and the inspiration of mutual endeavour towards recovery, help to bind all together in a common bond of friendship.

The settlement, besides giving mental relief and opportunities for self-expression, provides modern treatment of leprosy and complicating diseases. The patient's self-respect is restored by obtaining suitable employment. He feels that he has a useful part to play in the community; healthy physical exercise hardens his body and enables him to fight the disease.

Those who have visited a modern agricultural and industrial leper settlement with its whole-time expert workers and its voluntarily admitted patients, and have compared it with the original compulsory leprosarium, must have noticed a very marked contrast. In the former all is cheerfulness, hopefulness, alertness and willingness to co-operate. In the latter, though as a rule far more is done for and spent on the patients, there is an atmosphere of churlishness and a constant feeling of grievance. In the former most misdemeanours can be sufficiently punished by stopping the treatment, while in the latter the patient must be bribed or forced to take treatment. Needless to say, the voluntary institution gives considerably better results and far more patients recover. In the compulsory leprosarium the patient may be satiated with physical comforts but the years of care-free ease, the smouldering feeling of grievance that his liberty has been taken away, the absence of hope for the future and the enforced detachment from the world of reality outside the walls of the institution, lead inevitably to mental degeneration; the unemployed becomes unemployable and a discontented useless parasite on the community.

Prof. Cazanavette found 82 (19.5 per cent.) of the 427 patients at the U.S. National Leprosarium, Louisiana, to be diseased mentally, the largest group being 18 suffering from mental depression. Besides the 19.5 per cent. with mental abnormalities, 3 per cent. were affected with definite psychoses, while a larger percentage presented abnormal mental conditions, including mental inferiority and border-line states. The leprosarium is among the best equipped and staffed and lavishly provided institutions in the world.

Leprosy differs from most other diseases in the importance of the patient's role in the chance of recovery. In appendicitis recovery depends chiefly on the surgeon, in typhoid on the nurse, in leprosy on the patient. The doctor can advise the patient what to do and encourage him to do it; but day in and day out it is the patient himself who must carry out the constant struggle against the disease. To enable him to do this he needs the cheerful, busy time-planned atmosphere of the leper settlement, with its encouragement of fellow-strugglers towards the common ideal of restored health and the inspiration of those who have already advanced further up the steep slope towards freedom from disease.

There are certain mental qualities which increase the patient's chances of recovery. Intelligence is necessary if he is to understand the nature of the disease and the measures necessary for successfully combating it. Without determination and perseverance he cannot carry on the struggle for years on end. Without hopefulness and cheerfulness he cannot withstand the feeling of depression and often of disappointment attendant on his condition. Important as good physical health and strength are, the requisite mental equipment is no less important. Looking back over some of the most remarkable cases of recovery one has known, patients who were originally bad lepromatous cases, but who, after years of treatment, finally got rid of the disease and have now remained free from active signs for many years, one remarks that they have all been patients of character, intelligence, common sense and perseverance, who were determined to get better and obeyed all instructions, however irksome, with implicit obedience.

In the treatment of any patient it is therefore necessary to study his mental equipment. If he lacks intelligence the physician must explain things the more frequently and carefully, knowing that without understanding it is impossible to gain satisfactory co-operation from the patient, and the treatment is likely to fail. Or the relatives must be instructed, especially any of them who appear intelligent and likely to help the patient to carry out directions.

If the patient is depressed or gives way to fear, he must be encouraged, not with false hopes but by pointing to other cases who have made satisfactory improvement.

The kind-hearted sentimentalist who pities the leper as a hopeless incurable, who panders to his besetting sins of depression and dejection, who gives charity in such a way as to clog up the wheels of self-respecting action, is the greatest stumbling block in the way of recovery.

Lastly, we should remember that although leprosy is sometimes a painful disease, the mental distress is far greater than the physical. Also the mental distress is often in direct proportion to the education and culture of the victim. He tends to be abnormally sensitive and has periods of exaltation alternating with periods of depression. He is on the look out for new " cures " for leprosy, hails them with the greatest enthusiasm, is first sure that they are doing him good and is proportionately disappointed when he finds them of little avail.

The victim of leprosy deserves and requires our sympathy, but much more he requires understanding; and the object of this short paper is to interpret some of the least understood aspects of this obscure and difficult disease.

TREATMENT OF TROPHIC ULCERS

N. H. MAYNARD.

In common with others working among leprosy patients we have been perplexed over the trophic ulcers. We tried one treatment after another—everything we read of and others of our own efforts.

Finally on thinking of the meaning of the ulcer, we decided to attempt bringing nourishment to the parts. We began, accordingly, a series of experiments with ointments made up of animal fats. We summarise below what we finally settled on, beginning January 1937—

First remove carious bone and trim dead skin back to the level of the base of the ulcer; give a week of daily antiseptic dressings—perchloride, 1-1000, for a general cleaning up; then begin with an ointment of beef suet 2 parts; ghee 1 part; beeswax ¼ part.

Beef suet alone is not readily absorbable; ghee alone soaks into the dressings; the two combined melt too quickly when the foot was in contact with the warm earth. Beeswax was

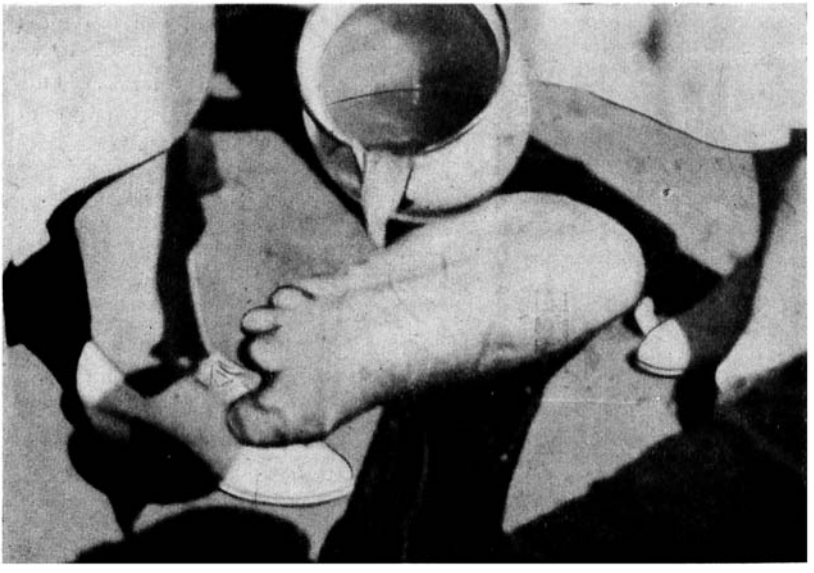

Fig. 1. Pouring on warm mixture.

selected for combining with the above named fats because of its high melting point.

A jug is partially filled with this ointment, which is heated in a water bath, and into the clean ulcer this warm mixture is poured. As the ointment congeals, a piece of thick, white material (drill or americana), large enough to cover it, is placed over the ulcer and a pad of cotton wool over this; it is well bandaged and the

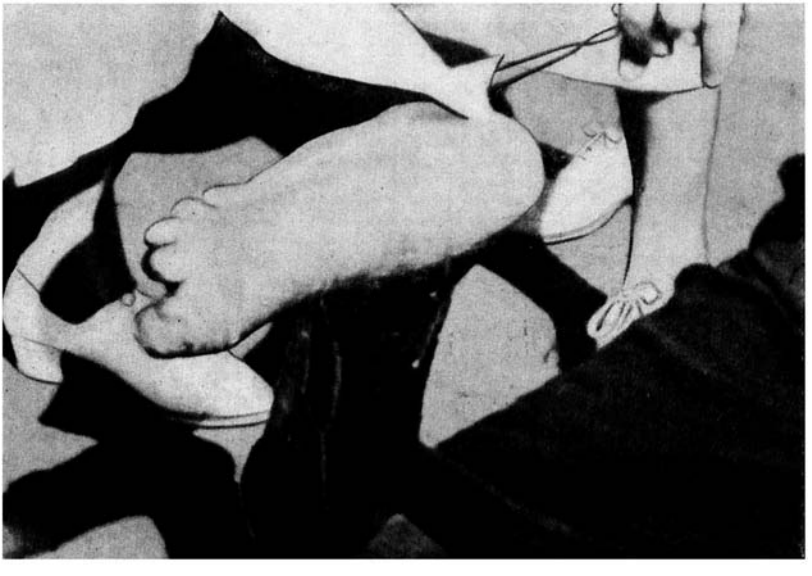

Fig. 2. Covering with cloth.

bandage sewed on. In the beginning of any case the bandage and ointment are left for three days then renewed as at first. After two weeks the dressing is changed but once a week. The bandage is protected from contamination by a stocking made of americana.

We began with sixty cases. In six months time fifty per cent. of these cases were entirely healed. Some small, shallow ulcers healed in six weeks time. As cases healed others joined the group, keeping the number to about fifty. In the oldest case we have at present the ulcer involved almost the entire sole of the foot. Treatment was begun eight months ago and the ulcer to-day is four inches long and one inch wide.

Others may have found a better treatment; we are finding this to be quite successful.

HYDNOCARPUS SOAP

GORDON A. RYRIE.

About a year ago in Batavia, Dr. Lampe very kindly provided me with a prescription for hydnocarpus soap. The soap is made as follows:

Sodium Hydroxide	143 grams
Water	143 grams x 3
Hydnocarpus Oil	1,000 grams

Dissolve sodium hydroxide in water (3 times as much) and allow to cool. Then add hydnocarpus oil and mix well. Place into moulds and allow to harden.

During the past year cakes of this soap have been given to selected patients and it has been useful in quite a number of ways. Most patients like it and it makes an acceptable reward for regular attendance. Patients claim that it allays the tingling feeling of the skin that sometimes persists for a day or two after large doses of hydnocarpus oil or esters. It makes cleanliness more interesting. On its specific value in leprosy or its prophylactic value when used by leprosy workers, I have no view. Manufacture of this soap forms a practical method of using up old or contaminating oil. The soap retains the disagreeable clinging smell of hydnocarpus oil. Addition of a little eucalyptus oil remedies this for the time being but if the soap is left for some time the smell of the more volatile eucalyptus oil disappears leaving the hydnocarpus odour again predominant, " elegant " preparations can easily be made by the further addition of glycerine, dettol, zinc, oatmeal, and so on. Ordinary skin medicaments and colouring matter can of course be added as desired.

THE PILOCARPINE TEST

E. MUIR.

This test, as described by Jurgensen and Milner, has been modified by A. Dubois and J. Degotte (1938).* They test for local sweating by the intradermal injection of a pilocarpine solution in small doubtful leprous patches, a second intradermal injection

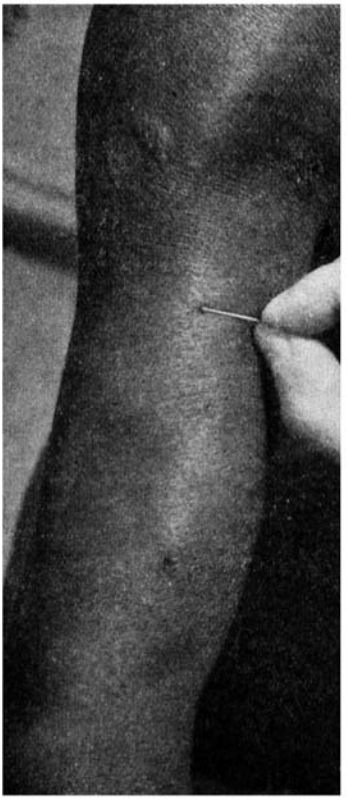

Fig. 3.

Fig. 4.

being given into normal skin as a control. Tincture of iodine is then painted over an area covering the site of both injections; and when this has dried powdered starch is dusted on. The positive inoculation remains dry, but there is sweating for a few millimetres round the control, thus bringing the iodine and starch in contact and forming a blue stain. The amount injected is 0.2 c.c. of a 1 in 1,000 solution.

In the figs. 3 and 5 the wheals of the injections are seen in the

Le test a la pilocarpine dans le diagnostic des macules lépreuses, par A. Dubois et J. Degotte. (Annales de la Société Belge de Médecine Tropicale. Tome XVIII, No. 3, Sept. 1938.)

Fig. 5.

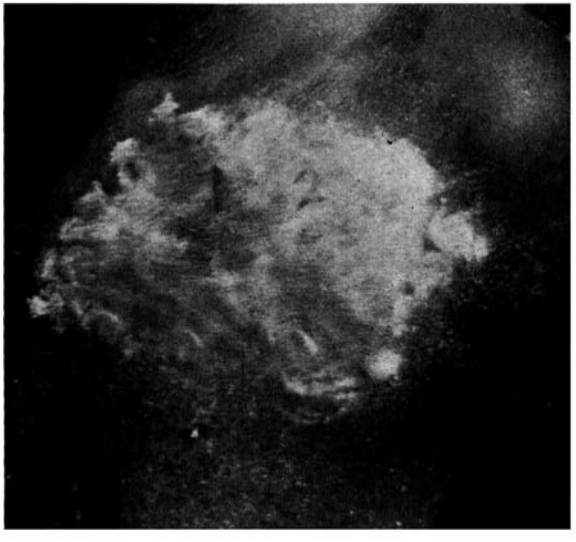

Fig. 6.

unpowdered skin. In figs. 4 and 6 showing powdered skin the controls are marked " 1 " and the wheals on suspected areas are marked " 2 ", and " 2 " and " 3 ".

While visiting the Belgian *Croix Rouge* station at Pawa, Congo Belge, I had an opportunity of studying this test in several of the slight cases of leprosy which are combed out by the very thorough survey which is carried out there. Prof. Dubois, while estimating progressive leprosy at 4 per cent., considers that the number would rise to 6 or 7 per cent. if the slight, frequently abortive, cases were included. The pilocarpine test is a valuable auxiliary means of diagnosis especially in early and slight cases.

*POPULAR MISCONCEPTIONS OF LEPROSY

G. A. RYRIE.

I was sitting in my office one afternoon about a year ago when two Chinese youths appeared at the entrance. The effect was a little startling at first, for the pair were as far as I could see duplicates of each other. They were in fact what is called identical twins aged about 20 and introduced themselves. They were afraid they had got leprosy and had come down from Ipoh to be examined. Curiously enough even the marks of their disease were roughly similar in size and over roughly the same area of the body.

Telling people they have got leprosy is one of the most unpleasant jobs I know and custom does not make it any easier. In the case of educated Chinese it is somehow easier to tell the man as shortly as possible that he has got leprosy and then ask him to come back and see you in an hour's time. By the end of an hour he has recovered from the shock, has thought it all out in his own way and is ready to discuss the next steps.

I told them as gently as I could that they had got it and suggested that they might go for a walk and talk it over between themselves. When they returned I waited for them to speak, for long experience has taught me that it is better to let them question me. Otherwise you may be trying to comfort the patient about problems that his mind has not worked round to yet. You may start telling him about treatment when all the time he is worrying about whether he has to pay for his food in the Settlement or whether he can use a false name to avoid his friends being implicated.

I told one of them that in less than two years with ordinary luck he should be back at his job again.

I could not tell the other what I knew—that long after his brother was well and fit he would still be in Sungei Buloh. Indeed from where he stood near my office I could have pointed out the hill side where he would be buried some day. He did not know that then, he does not know it now.

They are illustrations of a fact that we have only begun to realise properly in recent years, that there are at least two different kinds of leprosy. People knew vaguely before that there were different kinds of leprosy, but until recently it did not seem of much importance.

In the Philippines, however, a great deal of work has been

* Address delivered at the Kuala Lumpur Fortnightly Club. Reprinted from the *Malay Mail*, April 29th, 1938.

done to ascertain the exact nature of the differences. In Malaya we concentrated rather on the difference in their response to treatment and what was the best that we could do for each. We know now definitely that there are two main groups.

In one group treatment is much more effective than most people realise. We can in practically all the cases promise definite improvement. If they come in at any reasonable stage at all we can usually promise to clear those of any active signs of the disease.

Last year I had an old Chinese brought to me. He had had slowly spreading leprosy for 27 years and it had literally covered half of his body. The part affected was completely numb, with all the sweat glands paralysed. That is to say that when he sat in the sun one half of his body did not sweat and so became hot just like the bonnet of your car. The other half remained normal. Between these two areas was a great red bar like a bandolier running diagonally round the body. To-day after one year's treatment we have practically wiped away the 27 years accumulation of leprosy.

The other kind, unfortunately, is not yet nearly so responsive to treatment and in its worst phases seems to go on and on in spite of anything we can do. One man was lucky, he belonged to the benign type. His brother was unlucky; he had picked on the malignant variety—the old, old story of the one shall be taken and the other left.

It is, however, important that the public should know about this. The benign type are not of very much danger to the public, and the treatment is so effective that they could be dealt with in ordinary hospitals and outdoor dispensaries. This would free a large part of the leprosy world from the shame and horror of being dragged away from their families. So that the time may and undoubtedly will come when we shall see lepers in the streets again—not as in the old days through neglect, but because they have been recognised as having a special type of leprosy that we can control with relative ease and which does not seem to be infective. The benign type is thus doubly lucky—he need not be shut up and he can get a cure.

Leprosy is usually considered a rare disease, in fact I find that many people in England believe that leprosy is now extinct like the Dodo. It is partly due to a curious assumption at Home that nothing in the Bible is true now. During the Great War numbers of people were surprised to find that Jerusalem was a real place; they thought it was only in the Bible. So with leprosy. It was mentioned in the Bible and, therefore, can have no relation to anything real now. As a matter of fact at the present day leprosy is by no means a rare disease.

One in every 500 of the whole world's population—not Malaya—but the whole world's population is a leper. That is a very conservative figure—a Netherlands authority places it as one leper for every 380 people in the world.

Out of all the lepers perhaps one out of 50 is being cared for and not one in five hundred is being cared for as lepers ought to be.

This becomes very understandable if you consider the history of medical progress to find what a hopelessly brainless creature the human animal is when it comes to protecting him from disease. Clean water supplies, protection against typhoid and smallpox, infant welfare, maternity care, have all had to come to their own against determined opposition.

In England this year literally hundreds of children will die of diphtheria. Death from diphtheria is a grim and unpleasant way for a child to die and it is a grim and unpleasant thing to watch. Almost all these deaths are unnecessary and they could be stopped in a few months. But we do not do it.

As far as leprosy is concerned the world is not prepared to spend more than enough to give a certain amount of care to about one leper out of 50. The money spent on cosmetics in England, the U.S.A., would provide comfortably for every leper in the world. A stoppage of England's armament programme for two hours would provide food, clothing, care and treatment for all the lepers in the F.M.S. till 1965. Again a fraction of the money spent on tobacco, sweets or alcohol would provide for all the lepers in the world. In this respect the human race is very much like the millionaire who rides his Rolls Royce and smokes his big cigar, but cannot afford the money to get rid of a boil on the back of his neck.

There are more misconceptions about leprosy than about any other disease of which I know. One of the commonest is still the idea that leprosy is highly infectious.

Leprosy is, of course, speaking broadly neither infectious nor contagious in the ordinary sense of these words.

I can recall some interesting examples of the belief. I remember getting a bill from a Chinese detective who had escorted a leper to Sungei Buloh. He went home and burnt all his clothes and sent me the bill for his new suit.

There are three things we know about infection. One is that small children staying with lepers tend to develop leprosy. If we left lepers alone and instead took all their children away we might be able to stamp out leprosy much quicker than at present. A second thing is that it is extremely difficult for an ordinary adult to get leprosy even if he tries. People have tried and

scientists have inoculated themselves with the microbe of the disease and nothing has happened.

We may take it then that contact with leprosy even to the extent of germs being driven into the body has very little chance of infecting the ordinary adult.

Marriage with a leper rarely causes the other partner to get leprosy. Children are not born with leprosy; they contract it usually between the age of 5—10. If it were the sins of their parents it would shew at birth. And if anybody can see the hundred little children at Sungei Buloh and suggest that these happy smiling kiddies are a crowd of debauched young roues, then I can only say he is mad—hopelessly and incurably mad.

Lepers do not belong to any special class of people. They are an even slice out of the community. There is the wealthy towkay and the indigent rikisha puller; there is the schoolboy and the student and the teacher; there is the good honest tukan and the office kram; the tin miner, the rubber tapper and the Government servant. Most Government departments have a representative of one kind or another in Sungei Buloh—and most of the larger firms in Malaya.

It is a common belief that when a man gets leprosy his fingers and toes and nose and ears all drop off. It always summons up to my mind a vivid picture of attendants going round in the morning shovelling up the scattered ears and fingers and other appendages that have dropped off during the night.

Take the reality in contrast. Two different Government departments have sent me office clerks for treatment. They were not boarded out and when their months of sick leave were exhausted they returned to their jobs. One of these had a slight relapse and he was given another month's leave and is back in the office again. No one could possibly tell there had been anything wrong with these young men. So far as I am aware their ears and noses are still making the grade.

Now there are one or two things about Sungei Buloh that I think everyone with interest in Malaya ought to know. Sungei Buloh contains over two thousand patients and it is the largest leper hospital in the British Empire and it is the second largest in the world. As compared with other places, where different kinds of research, propaganda and survey work are carried on, Sungei Buloh is primarily a treatment centre, where experiments are constantly going on to improve our medical methods. Sungei Buloh aims also at providing a standard of nursing and comfort for the sick which is above that recognised anywhere else or ever has been recognised in the past. My job as I see it is not administrative nor in the scientific study of the chemistry and

culture of leprosy, but in treating lepers and learning from the results how to treat them still better. This is, of course, work that only a doctor and the staff can do. But there are two other things that Sungei Buloh tries to do that concern the public. To explain let me go back a little.

One day about 8 years ago I drove up to Sungei Buloh on transfer from Perak as Medical Superintendent.

I arrived at midday and in the afternoon went along to see what the place was like. There was disease, of course—leprosy in great open sores, but there were other things—scabies, ringworm, parasites, bruises from fighting—all the marks of degradation. Everywhere I saw the same look, sullen hopeless shamed outcast look out of deformed faces. The look haunted me and I had seen it before somewhere. And then I got it. It was at an internment camp during the war for 18-year-old soldier boys who had been found in the trenches with self-inflicted wounds. They stared out from behind the barbed wire at us marching past with the same beaten, shamefaced, hunted look. They said nothing and did not even shout for a fag. I had forgotten that look, but it came back to me then and I saw what was wrong with Sungei Buloh. Not the filth nor the sores nor the dirty torn clothes. These were easy. There was something more difficult. Here in Sungei Buloh were seven hundred people, leaderless, broken spirited people without morale, who knew they were scum and that there was a great gulf between them and all normal people. And that fine afternoon the memory of those eighteen-year-old soldiers with self-inflicted wounds gave me the clue to Sungei Buloh. My lepers had to do things to get back their self-respect and to get back a sense of normality. They would have to be led, for they could not do it themselves.

What I realised that first afternoon is still true. Much, of course, has been done. There was a time when never a day passed without me hearing the phrase *Ini macham sakit mati tidapa.* Now I never hear it. But every patient who is admitted into Sungei Buloh has to be rehabilitated, has to have his self-respect built up again. You must remember what a hell he has been through. Almost every leper who is able to think has thought of suicide. Hundreds of my patients have sat up at night staring into the darkness overwhelmed by a sense of horror.

Sungei Buloh exists, as I see it, and as I intend to have it, to give these men back their manhood. And that is where you can help. You can give me your old clothes—clothes are a big factor in restoring self-respect. You can give me gramophone records, toys, games, tennis balls, shuttlecocks, jersies, picture magazines. Ask your krani to send Chinese and Indian magazines

too. If you are going on leave and want to send stuff do not leave the packing of it to the boy. I once got a parcel consisting of five broken stengah glasses and a 1926 John Little catalogue. People ought to do more of that than they do. Every leper suffers from psychic mutilation from a crushed personality, from a sense of degradation. They are proud to feel that they are not being shunned. In the wards you will find English speaking dressers who will be proud to show you things. You will see nothing horrible and you will, if you have an eye for these things, see much that is fine. And you will have done a little bit towards making them feel that they are not regarded with loathing. I have heard that some people imagine that it would not be right to be seen sight-seeing or patronising among these poor people. Such people cannot understand what a leper suffers from. Such people forget that it is we who have made the leper what he is by shunning him and regarding him with horror by our use of the word leper as a symbol of all that is loathsome and decaying.

That is what you—the public—have done to him. I think it is up to you to come out to them very humbly and try to undo it. Get to know some of them and make them a visit from time to time. If you cannot come out—if you are transferred send them a letter. Bring them money and please do not tell them how sorry you are for them—both of these will accentuate their sense of inferiority which I am trying to break. Those who have visited Sungei Buloh can assure you that my patients are delighted to see you.

My other great problem which you can help me with besides getting back their self-respect is to get back their sense of normality—the two things are allied but not the same. There are little children there who live in a land of disfigurement and injections and iodine and bandages—they know no other world. For 50 cents a head one can take a hundred children to a deserted bit of sea shore and give them a whole day of perfect bathing, mud-slinging and gorging. There are no arrangements to be made, no buying or fixing transport. They just need one or two people to stand by them in their fear of the outside world. Toys and pictures, books and puzzles are useful to the children too.

Then there are the old and crippled to be encouraged and it is in this that you can see some of the finest examples of human courage that I have ever seen. You must remember that the crippled and mutilated ones know that there is literally no hope. Were a cure to come to-morrow with a triumphant exit from the Settlement, these would still remain to hobble round the deserted houses waiting for the day when their mutilated bones find rest on the hillsides opposite. Can you expect them to be normal?

It seems like asking too much—cut off from relations and friends, having leprosy, hands and feet twisted and numb, with nothing but death to look forward to. Think what it means for a woman to tell me that she cannot keep a mirror in her house because it makes her cry. If people like that threw in the sponge it would not be for us to judge. If they stick it out grimly we should admire them. What do they do? This is what they do.

I know a woman who has no hands and no teeth. She sews. I am not a judge of sewing so I don't know if it is good. She holds the needle between the stumps of her wrists and pulls it through with her lips. I know an old Chinese with no hands. He has two old milk tins with a hole through the bottom of each and a length of string tied between. On the middle of the string is a piece of cloth and he washes by dipping his stumps into the milk tins and slinging the cloth over his back. I have a typist with no fingers and no toes. I know it sounds impossible but it is true. He types with his knuckles and a very remarkable sight it is—just like a miniature boxing match. He does not get paid. Its just that he completely refuses to be on the scrap heap. These people make me wonder sometimes. There is no animal that will stand up to a paralysing mutilation—physical courage will not take you that far. It makes one wonder sometimes what it is these men and women have got that not merely faces their disease but soars right above it. In the course of my life I have seen a good deal of physical bravery in the face of pain and I have ceased to be sentimental or easily impressed.

What these men and women have got is something more, something that should be spelt with a capital S. These are people the world shuns; they are people I am very proud to have met. One day we will find the means to prevent men and women and small children having to face the long and deep cruelty of advanced leprosy. Until that day comes I hope that some of you will try to help them with your understanding, your good will, your visits, your friendships and your gifts. I am not offering you a duty or a task, I am offering you a privilege and I hope that you and the outside public will take it.

REVIEWS AND ABSTRACTS.

Immunity in Leprosy. Dr. A. Rotberg publishes an article in *Revista Brazileira de Leprologia* (Vol. V, p.45) on this subject and discusses immunity under epidemiology, pathogenesis and classification. He bases his observations on 1,529 cases in which he performed the "lepromin test." He reviews and analyses the previous literature on this test which has also been called the Mitsuda Reaction (after its originator) and the Leprolin Test. The author uses the name "lepromin," as the material is composed of a sterile suspension of leproma; the term "leprolin" might wrongly give the idea that the test is of the same nature as the tuberculin test.

The intradermal injection of lepromin produces in positive cases a nodule of the skin at the point of inoculation, reaching its maximum size about the end of the third week. If this nodule is less than 0.5 cm. in diameter the author counts it negative. He regards a positive result as a sign of allergy and resistance to leprosy, and a negative as a sign of anergy and susceptibility to Hansen's bacillus.

His hypothesis supposes a natural factor (factor N) which is inherited by some children but not by others. The individual inheriting factor N will, after contact with Hansen's bacillus, develop allergy; the individual without this factor remains anergic on contact with the bacillus, this latter group including all the bacillary or open cases of leprosy.

This hypothesis is based upon four observations :

(a) Lepromin Test positive (LT+) results in healthy children of lepers increase with their age, 5.7% being positive in the 0-3 age periods, 25.7% in the 4-6, 41.7% in the 7-9, 61.4% in the 10-12. 60.8% in the 13-15, 74.3% in those of 16 years and over. [It would be interesting to make a similar survey in a community where there is no chance of contact with leprosy.]

(b) LT+ cases are not found in non-endemic countries. [The evidence for this assumption is rather slender as it is based on the supposition that the positives found by Cummins and Williams in England, by Dubois in Belgium and by Boncinelli in Italy, would have been negative according to the author's standard.]

(c) LT+ results are obtained even in greatly debilitated leprosy cases. [It would be interesting to know if they continue LT+ in patients who remain debilitated over a long period.]

(d) Lepers with tuberculoid lesions, who almost always give LT+ results, do not develop lepromatous lesions, and patients with the latter type of lesion are almost always LT−. [This

non-transformation from one type to another is not upheld by some of the most experienced leprologists. However it is important that extensive tests be made to show whether LT+ cases change into LT−, whatever their clinical classification.]

In counting a positive lepromin case as allergic the author is at a loss to account for "lepra reaction," which has generally been counted of an allergic nature. Only six of his 220 cases with lepra reaction gave a positive lepromin test.

The author proposes to use the lepromin test in distinguishing and classifying cases. After dividing all cases into cutaneous and neural, the latter term being reserved for those with no signs of disease in the skin, he subdivides cutaneous cases according to the type of lesion (lepromatous, maculo-lepromatous, diffuse), the type of macule (erythematous, hypopigmented, involuted, tuberculoid or scarred), according to whether the macules are bacteriologically positive or not (+ or −); lastly they are divided into allergic or anergic cases according as they give positive or negative lepromin tests.

[The importance of this last item in the classification is the comparatively greater resistance to the disease found in allergic cases. Its importance will be considerably increased if it is a fact (as is held by the author) that this allergic condition is not lost, even though the patient becomes debilitated, and that he can never become a lepromatous or open infectious case.

Many unsuccessful attempts have been made to discover a specific diagnostic test for leprosy. From the prophylactic point of view, what is much more important than a diagnostic test is one which will show the resistance of the patient to the disease. Rotberg's contentions are that only a minimum of children are born without the N factor, that is to say with inability to develop immunity to leprosy whenever they are infected with it; and those who have acquired immunity, as shown by a positive lepromin test, retain that positivity and immunity through life, and are unable to become open cases. If these contentions are confirmed then prophylaxis becomes a very much simpler matter. Concentrate on the anergic population, as shown by negative lepromin tests, segregate the comparatively few anergic lepers from the rest of the anergic population, and the disease will cease to spread and will gradually die out. In assessing the anergic non-lepers the test would have to be repeated as, according to the author, allergy and immunity only develop after a first contact with Hansen's bacillus.

The following are some questions raised by the author's hypothesis, which await investigation :

(a) Using the same material, technique and method of reading

as the author, are lepromin-positive subjects found in countries where there is no chance of contact with the disease?

(b) In a community not subjected to leprosy contact, does the lepromin-positive population increase from birth onwards in successive age groups?

(c) Does a lepromin-positive case ever become negative; as a result of debility or other unfavourable circumstance, is he not liable to develop lepromatous lesions and become lepromin negative?

If the answer to these three questions is in the negative, and if the findings of the author are confirmed, then we shall have in our hands a most valuable means of simplifying leprosy treatment and prophylaxis.]

Positive Inoculation of Human Leprosy in a Hamster. Inoculation Negative in other Rodents. Archives de l'Institut Pasteur de Tunis, Vol. 27, No. 4, Dec. 1938, p. 327-340, by Etienne Burnet.

The author describes previous attempts to inoculate rodents, and especially the work of P. Jordan, who claims to have inoculated a white rat successfully, and that of S. Adler, who inoculated Syrian hamsters with human leprosy and demonstrated his results at the International Leprosy Congress. He describes his own experiment as follows.

In January, 1938, he inserted a fragment of leproma taken from an active skin lesion between the skin and muscle in three normal hamsters and in three hamsters immediately after splenectomy. On the 11th of May they were re-inoculated through a fine trochar on the other side of the abdomen. In only one of these animals, namely one of the unsplenectomised, was the inoculation successful when they were sacrificed on the 9th of September, 1938, 220 days after the first inoculation.

The following signs of positive inoculation are given :—subcutaneous leproma at the points of inoculation; large numbers of bacilli in the spleen, liver, kidneys, axillary and inguinal lymph nodes, and in an abscess of the testicle. Dr. Burnet discusses the possible objections that might be raised to considering this experiment positive.

Objection 1. That the subcutaneous leproma only showed multiplication of lepra bacilli in the inoculated tissue such as is observed in a fragment of leproma deposited on culture medium. The answer to this objection is that the development of leproma would have been immediate, whereas in this case it was delayed; and the leproma has not been autolysed, it resembles the small lepromatous mass which we have seen develop in rats inoculated with rat leprosy. Also in five other hamsters of the same age,

inoculated on the same day, in the same manner, and with the same material, nothing developed.

Objection 2. The bacilli seen in the liver, spleen and lymph nodes might have been mechanically gathered together by the lymph stream, or by phagocytic cells and does not prove active inoculation. In answer to this objection, he cites the other animals in which there was no sign of any bacilli.

Objection 3 is that there was not a positive inoculation but only a graft of leprous tissue. This also is answered by the fact that there were no active results in the five other hamsters.

Treatment of Lepra Reaction with Hypertonic Glucose Solution by J. Correa de Carvalho. (Revista Brasileira de Leprologia; Vol. V, Special Number, 1937. Translated from Portuguese by J. W. Lindsay.)

In March, 1936, we began our experiments with glucose solution in the treatment of lepra reaction. At first we used isotonic glucose solution the action of which in lepers during the period of lepra reaction was the subject of our work published in the *Revista Brasileira de Leprologia* in a special number in 1936 entitled " New treatment of Lepra Reaction and other Lepra manifestations." In that article we referred to the thermic reactions which isotonic glucose solution produced in patients with lepra reaction, and to the beneficial effects seen in the immediate regression of the erythematous nodules and other " reaction " signs.

Later we began to use a 30% hypertonic solution of glucose intravenously in doses of 5 to 10 c.c. giving injections on alternate days.

Our experience with the employment of hypertonic glucose solution in the treatment of leper reaction covers more than a year during which we have had the most excellent results. Its action upon leprosy reaction is prompt and decisive.

With the very first injections the temperature falls, the nodules begin to regress, and the general condition improves considerably. Hardly any effect, however, has been observed on the neuritic pain. Contrary to the effects observed with the isotonic glucose solution, the hypertonic solutions rarely produce thermic reactions in patients with lepra reaction.

The hypertonic solution acts through its strongly tonic and antitoxic properties producing a very intense diuresis.

Arêa Leão in his work " Anaphylaxis. Clinical Applications. Methods of Desensitization," refers to the application of the sugars in the following terms: " the sugars (glucose and saccharose) in hypertonic solutions have a powerful desensitizing

action combined with a general tonic action on the organism. By their effect on the water in the tissues they produce an abundant diuresis, and so act beneficially on œdema of the skin, causing it to diminish and disappear. The sugars have a very wide range of application in dermatology. Hypersensitive dermatoses, manifestation of food or medicinal intolerance and intoxication, benefit greatly by their application."

At present almost all our patients with lepra reaction are submitted to the glucose solution hypertonic treatment, and we give here a series of 74 cases so treated.

The results shown were :

Complete recession	38 patients	51.35%
Improvement	30 ,,	40.55%
Slight improvement ...	1 ,,	1.35%
Unchanged	5 ,,	6.75%

The 30 cases that showed improvement were recent cases of reaction, already getting some treatment, and with only one or two nodules appearing, their general condition being excellent.

The 5 patients which remained unchanged were intractable cases of reaction, with complications of chronic nephritis and other diseases.

The results of our observations enable to us conclude that hypertonic glucose solution in doses of 10 c.c., injected intravenously on alternate days, gives better results in the treatment of lepra reaction than any other medicines hitherto employed; its action is beneficial in all cases of lepra reaction.

Pregnancy and Leprosy by G. A. Ryrie, in a letter to the *British Medical Journal* says:—

" In the interaction of pregnancy and associated pathological conditions leprosy must be, I imagine, one of the few major systemic diseases in which such action is totally one-sided. Leprosy does not have the slightest effect on the course of pregnancy; pregnancy has a marked effect on leprosy. A slow but progressive spread of the disease is usual, first noticeable in the later months of pregnancy and going on long after delivery. A pregnant woman with mild symptoms of leprosy may and often does become an advanced " textbook " case in a year's time. The primary factor is, I think, mineral depletion, as in my last twenty cases a richer diet with increased calcium intake appears to check the tendency to leprosy aggravation.

" Metabolic disturbances of various kinds frequently precipitate an acute febrile dissemination of leprosy (lepra fever). In over seven years' experience I have never seen the strain of pregnancy or parturition cause lepra fever, although I have seen

very severe attacks after disturbances of a very much lesser nature, dietary indiscretions or a few days' constipation, for instance. The leprosy aggravation caused by pregnancy is insidious and chronic. In these cases which I see both parents are, of course, lepers. Routine examination of placenta, cord, and baby are constantly negative for *Mycobacterium leprae*, and the child, if removed from the mother at or shortly after birth, remains free from leprosy."

Leprosy in Brazil and its Prophylaxis, by Dr. H. C. de Souza-Araujo.

Leprosy was introduced by Europeans and by African Negro slaves, but is not uniformly distributed throughout Brazil. There is comparatively little in the north, with its 4 lepers to the thousand inhabitants. At the end of 1937 32,984 lepers appeared in the census, of which 11,835 were isolated. Of these, 6,585 were in the State of S. Paulo alone. Actually fifteen leprosaria function and fourteen are under construction. There are six "preventoriums" for housing the children of lepers. Courses on leprology are given in three of the principal States, and there are also two centres for research.

Recent Advances in Leprosy.

The Lancet of July 2nd, 1938, reports the Prosser White oration by Prof. Charles Flandin on this subject with special reference to the methods adopted for dealing with the problem in France.

Prof. Flandin thought that the time was ripe to bring before British dermatologists the present position of leprosy, as summed up at the recent congress of the International Leprosy Association held at Cairo, and to draw their attention to conditions in France, which might have considerable interest in any country dependent very largely on the effort expended in ascertainment of leprosy cases: but there were certain disquieting features in the present situation in Europe which might lead to a reconsideration of our attitude to the whole problem. Although it was almost a law that leprosy declines as social and hygienic standards rise, and although the great leprologists of the last generation had declared that they had never or hardly ever come across leprosy of indigenous origin in Western Europe during the whole of their lives, yet Prof. Flandin had found in the short space of three years ten cases in Paris, none of which had ever left France. He referred to the discovery of indigenous cases in England by Dr. J. M. H. Macleod, and stated that in certain other European countries, notably Roumania, the disease was said to be slightly on the increase.

Commenting on administrative methods, he expressed his conviction that the compulsory notification in force in France was useless. The leper would change his name and run the risk of prison rather than expose himself to the possibility of being shut up in a leprosarium. As in tuberculosis, the examination of family contacts was essential, but this was impossible through official machinery. The education of the public was perhaps the most important need. They must be taught that only prolonged and intimate contact as in family life was dangerous, and that leprosy could be regarded as less contagious than tuberculosis, and at least equally amenable to treatment. Meanwhile, he pleaded for close co-ordination between the specialists of England and France interested in the subject in order that, first, some ascertainment of the real numbers might be made, and secondly, such action as might be needed should be the result of the experience of both countries pooled in a *front commun de la lepre.*

International Jl. of Leprosy, Vol. VI, No. 3, July-Sept., 1938.

This is entitled "Cairo Congress Number" and gives the reports of the sub-committee (see *Leprosy Review*, Oct. 1938) and also abstracts of papers read at the Congress.

J. N. Rodriguez and R. S. Guinto write on *A Field Study of Leprosy.* A comparison is made of cases of leprosy found among the 6,063 inhabitants of Cordova, in the Philippines, when they were examined in 1933 with those found at a later examination two years later.

"Whereas 20 of the 45 closed cases recorded in 1933 were clinically active at that time, only 13 of them showed signs of activity in 1935, including one that became bacteriologically positive. There seemed to be a greater tendency to improvement of "closed" lesions among females than among males. Of 18 patients with macular lesions in 1933, nine were males and nine females; of the males, only one was classed as quiescent and one as arrested in 1935, while five of the females had become quiescent. Of 15 previously positive cases on parole in 1933, two were found to have died and four had relapsed since the first survey.

"There were 9 suspicious cases in which a definite diagnosis could not be arrived at in 1933. One was found to be tuberculoid leprosy on biopsy. Of the others, two were classified as "closed" lepers at the 1935 re-examination, three were definitely eliminated as non-lepers, and three were still considered as suspicious. There were 793 resident house contacts re-examined, and 105 other house contacts, no longer residents, who were examined for the first time. The data relating to these individuals is primarily of epidemiological interest and will be dealt with in a later report.

"Six new open cases had developed during the period between the two surveys. Only one came from the group of house contacts; the rest developed among individuals who were not known to have lived in the same house as a leper. One of the latter had been classified as a quiescent macular case in 1933; the rest either showed no lesions at all or, at most, only vague manifestations not characteristic of leprosy."

A Leprosy Survey of the Eastern Border Districts of Basutoland, by R. C. Germond, shows how under segregation and efficient inspection leprosy is apparently dying out of Basutoland. Among the 13,187 people examined, 42 new cases were found. The extraordinary benignity of these cases is stressed: 90.5 per cent. are N_1, while only 7.1 per cent. are C_1 and 2.4 per cent. C_1-N_1. More than 50 per cent. of the neural cases are clinically almost negligible, the rest are early and slight. Most of the recurrences are extremely mild, and none of them severe or obviously infectious. In the same paper the history of a leper family is given. There were 97 lepers in all in 4 generations, of which 67 have died and 30 are still alive. Of the former, 26 died in the asylum and 41 (including deserters and arrested cases) died at home. Of the 30 survivors, 16 are inmates of the asylum, 12 are arrested cases and 2 are incipient cases at present on parole and under observation. Considering these people in more detail, 2 belonged to the first generation, beginning about 1836; 29 belonged to the second generation, beginning about 1861; 51 belonged to the third generation, beginning about 1886 and 15 belonged to the fourth generation, beginning about 1911. As regards admissions to the asylum, it is noteworthy that in 1914 (at the beginning of the leprosy campaign) the patients taken in included members of the first, second and third generations. The first representative of the fourth generation was not admitted until 1924, at the age of 16 years. There can be no doubt that the fall in the last generation is the result of compulsory segregation.

E. Shionuma, K. Nagai and T. Maeda, in an article on *The Climate Theory in Leprosy*, contend that in cold climates leprosy is of a more severe nature than in warm. This is specially seen in alopecia, eye lesions, nerve symptoms, which are found to be more common and severe in the more northerly and colder islands of Japan than in the more southerly.

R. G. Cochrane and G. Rajagopalan write a preliminary note on the newly established *Children's Leprosy Clinic at Saidapet*, near Madras City. They propose to keep children under observation in their homes and watch the course of leprosy in early untreated cases. They hope as a result of this investigation that further epidemiological factors will be brought to light, and thus to contribute towards the control of the scourge among children.

Sister H. Ross writes on *Pyretotherapy in Leprosy*. The rectal temperature of the patient is raised in a Kettering hypertherm. Three courses of weekly treatments were given: the first course consisted of eight treatments; the second, after a rest of

seven weeks, of six treatments; and after a rest of twenty-six weeks a third, of six treatments. During each treatment the rectal temperature was elevated to 105-106°F., with an average of 105.8°F. This temperature was sustained for five hours in four cases, and for one to three hours in one case. One patient refused the third course. The patients were carefully selected. The physiological and biochemical changes which took place in the body were studied. No clinical or bacteriological improvement is reported.

Norwegian Lepers in U.S.A. by H. P. Lie. A further proof is given of the spread of leprosy by infection, as opposed to heredity, by Hansen's examination of Norwegian emigrants to America. He found some 200 cases of leprosy among them, but in no Norwegians born in America had the disease shown itself. Heredity cannot be cancelled by emigration to another country. He explained the fact that the disease did not spread from the 200 original cases to their children by the better climatic circumstances and especially by the more roomy housing conditions and greater personal cleanliness observed in America.

G. A. Ryrie records *An Infantile Macular Eruption* in a child of 48 days, born of a mother with diffuse cutaneous lesions of leprosy in the form of serpiginous macules with faint erythematous macules. The bacteriological findings were somewhat doubtful, but " had I seen such a lesion in an adult I should have diagnosed it as a leprotic macule without hesitation. During the year 1937 three other similar cases have occurred in the Children's Home in Kuala Lumpur, two in Chinese children, the third in an Indian. They showed the same characteristics, macular eruptions of a few weeks duration unlike any of the skin rashes of children, and with a marked resemblance to tuberculoid leprosy. The lesions were bacteriologically negative in all cases."

Leprosy in the French Camerouns. (Le Devoir National).

Leprosy is a very common affection in tropical Africa. The *Service de Santè* has created an original organisation. The non-infectious lepers, and there are many such, have been left in the villages. Those who present the danger of contamination for their contacts have been grouped in agricultural colonies where they receive the care necessary to their condition. In the agricultural leper colonies life is almost that normally prevailing in the villages. The inhabitants work and cultivate plantations just the same as their healthy relations, and often recover.

In 1935 the number of lepers in the Camerouns was computed at 10,727, of whom 4,097 are living in agricultural colonies. It

goes without saying that the early cases also remain under supervision and are treated by the doctors of *L'Association Medicale Indigiene.*

The Treatment of Leprosy at the St. Antoine Leprosarium at Harrar, Ethiopia, by Jean Féron. **Revue de Médecine et d'Hygiene Tropicale,** October 1938.

Dr. Fèron acted as doctor in charge of this leprosarium from 1930 to 1936. He describes what he states to be a daily treatment which is completely painless and gives 100 per cent. of cures in macular leprosy, 50 per cent. of cures in tuberous leprosy, and in other cases, stabilisation (arrest of disease and return to a normal life). His trial with the ordinary remedies such as chaulmoogra and its esters and soaps, gave inconstant results. " It being considered in a general way that the heavy metals stop growth of bacilli, and that copper in particular neutralises certain toxins, such as tetanus and diphtheria . . . . it is therefore natural that we should have recourse to simple preparations of copper. Copper prevents the proliferation and puts an end to the morphological cycle of Hansen's bacillus . . . . The treatment that we have now established at Harrar for some of our patients is as follows :—

1. Monday, Wednesday and Friday : Injection I.V.Z. Cu 3 c.c.
2. Tuesday, Thursday and Saturday : Injection I.V.Z. Or c.c
3. Monday and Thursday : We dissolve in the syringe 1 ampoule : 1 ctg. cyanide of mercury in 2 c.c. of distilled water.

(I.V.Z. is a fine colloidal preparation of the metal.)

The addition of cyanide of mercury has the following objects :

1. As a nerve sedative.
2. Promotion of the penetration of gold and copper ions which increase the diffusion of cyanide of mercury in the nerve centres.
3. Preventive and curative treatment of ocular leprosy, which is so grave and common among whites."

He states that " The leprosarium at Harrar forms a veritable agricultural colony in which the able-bodied lepers work, thus regaining their strength and forgetting the length of the treatment and their distressing condition. The treatment may last many months before any apparent amelioration appears in the state of the lesions. The general condition is improved rapidly. The lesions change their aspect and sensation returns in the first place. It is generally at the end of about six months after the restoration of sensation that the lesions recede and gradually disappear."

Unfortunately the number of patients treated, the length of time that they were under observation after their " cure " and the standard adopted for estimating when " cured " are not mentioned.

A Treatment of Perforating Ulcers in Leprosy, by H. Mehta, (Jl. of the Malaya Branch, British Medical Association, Vol. 2, No. 2, Sept. 1938). The treatment consists of subcutaneous injections of a freshly prepared solution of Rivanol.

" In preparing the solution absolute cleanliness is, of course, essential. As it deteriorates if kept for more than twenty-four hours, it is advisable to use freshly prepared solutions. The solution is the following:—Rivanol, gr. 1; glucose, gr. 2; calcium lactate, gr. 1; sodium thiosulphate, gr. 2; aqua, c.cm. 10. In making the solution rivanol should be dissolved separately in warm distilled water and added to the other ingredients.

" In giving the injection care must be taken to introduce the solution into the subcutaneous tissue. Intradermal administration will result in ulceration. Even with all this care, consequent on the expression of the fluid along the needle track, a small necrotic ulcer may form, but this heals rapidly with no dressing whatsoever. The immediate result of the injection is the appearance of a swelling with pain and intense itching; the former lasts for two or three days and then subsides. Mention need hardly be made of the necessity for taking due precautions against sepsis. The sites selected for injections are along the nerve paths supplying the part affected, proximal to the lesion: but it is equally important to infiltrate the immediate vicinity of the ulcer with the solution. Areas where the swelling will cause undue pain and even damage to the tissues, such as over the bones, at the vicinity of the tendon sheaths and joints, should as far as possible be avoided.

" For an ulcer of the big toe, inject 3 c.cm. of the solution in the centre of the sole and 1 c.cm. in three places round the ulcer. For ulcers of the sole of the foot, inject 3 c.cm. in the external, back and internal part of the calf and 3 c.cm. in the hollow of the sole, and 2 c.cm. in two or three places round the ulcer. The subsequent injections should be given in different places."

Treatment of Lepra Reaction with Omnadin Injections, by H. Boenjamin (Medische Berichten, Sept. 1938).

The author treated 12 leper patients at the Plantingen Leper Settlement who were suffering from lepra reaction. Of these 12, 10 gave favourable results. The course consisted of two or three injections which were given intramuscularly in doses of 2 cc. daily. The patients stood the injections well without serious local reaction.

Leprosy in Queensland. The Adelaide Advertiser, Australia, November 19th, 1938, announces that " The Director-General of Health in Queensland (Sir Raphael Cilento) reported that the gradual increase in the incidence of leprosy among the aboriginal population, and to some extent among the white people of Queensland, was a serious matter. The council recommended a grant of £8,000, spread over five years, to assist the Queensland health authorities in investigating this matter."

Death by Desiccation of Lepra Bacilli. (Mouvement Sanitaire, October, 1938).

The germs, freed from all medium, reduce *in vacuo* and, suspended in saline, the colour test of oxido-reduction if they are living, but not if they are dead. Messrs. Marchoux and Prudhomme, who have applied this method to the bacilli of human and rat leprosy, have communicated to the Academy of Medicine that it permits them to confirm that the two germs lose simultaneously all their powers of reduction in less than 30 minutes of heating to 60° centigrade and desiccation. There is thus a biological analogy between the two bacilli, and it is important in the prophylaxis of leprosy that the bacilli of Hansen and of rat leprosy, when desiccated, cease to be infectious.

Rat Leprosy. Experimental Infections of White Rats by Contact and by Food. By P. H. J. Lampe. (Geneeskundig Tijdschrift voor Nederlandsch-Indie. Afl. 4 Deel 78, 1938).

The author summarises his paper thus:—" In these experiments rat-leprosy could be transmitted to young white rats by contact with white rats which suffer from *leprous skin lesions*. The contact included clawing, biting and cannibalism, and it seems highly probable that this " aggressive " mode of contact played an important role in the experimental results (local preference of bacilli manifestations for cervical and axillary lymph nodes). Ectoparasites were not observed and contact with wild rats can be precluded.

An attempted transmission of the disease to young white rats by contact during 50 weeks with white rats affected with the *glandular* form of the disease, gave negative results. This negative side of the experiment seems valuable, though it concerned only two contact animals and one source of infection. The experiment, however, lacks the total devouring of the tissues of diseased animals (infected lymph nodes), which may happen in natural conditions.

The possibility of a *transmission by food* (imitation of cannibalism) was experimentally proved with 100% positive results (on very young white rats), in contradistinction to positive results in a small percentage of instances described by other authors. The resistance of the virus in the dead animals and the posthumous dispersion of the virus (soil-contamination) needs further research.

The result of these experiments, together with facts concerning the endemicity of the disease, suggests that the " aggressive " contact with rats which suffer from leprous skin lesions (only a few and expelled from the community) and the cannibalism

of infected rats (of all types) is of high significance for the natural spread of the disease, as far as the mutual contact of rats plays a role in this connection. One could even accept this mode of transfer as the actual factor, if it were not for the normal aspect of the glandular form of rat leprosy in *wild* rats which makes this dubious.

The glandular form of rat leprosy in wild rats is characterized by a certain preference for the inguinal nodes, which does not agree with the type of lymph node affections to be expected from a transfer by "aggressive" contact and cannibalism. This ordinary picture of the glandular form of natural rat leprosy may be connected with the frequent occurrence of lesions and sores in the back and hind limbs of wild rats, usually attended with a non-specific inflammation of the inguinal nodes, and due, probably, to bites by pursuing animals. This happens in nature and not in the experimental cages. Speculations are obvious: infective bites by infected rats(?); open sores as portal of entry(!); inflamed nodes as *locus minoris resistentiae*. Nevertheless, the pathogenesis of this more or less regular affection of the inguinal nodes in wild rats is still a doubtful question, to which the experiment—an extremely disproportionate imitation of natural conditions—gives no convincing answer".

REPORTS.

Leprosy in Burma. Report on State of Public Health for 1937.

Three hundred and fifty-seven deaths were reported from this disease during the year under report. There is, however, no doubt but that it is a much more serious problem than would appear from these figures. The fact is that mortality from leprosy is regarded only in towns, and, therefore, we have no real information as to its incidence. The problem is not easy and it is not believed that the extension of compulsory notification would necessarily yield the information desired. Compulsory notification of this disease which at present is only in force in Mônywa and Maymyo might result in even more evasion than exists at present with voluntary measures.

The 375 deaths reported during the year show an increase of 65 deaths over the previous year, and give a death rate of 0.25. But these figures cannot be accepted as reliable as the largest number of deaths were recorded in Rangoon and Mandalay, where leper asylums exist and consequently deaths are to be expected and are reported accurately. Such accurate information

as does exist with regard to the incidence of leprosy in Burma, has been obtained from surveys that have been carried out in rural areas by the Public Health Department. These surveys show that the last recorded census figure of 11,127 lepers is very wide of the real total. A properly carried out survey revealed in the case of Meiktila District a figure of 16.57 lepers per 1,000 of population. It should be clearly understood that, while it is believed that the total number of persons afflicted with this dreadful disease may come to as many as 200,000, it is not thought that leprosy is rapidly increasing. It is probable that an increase in our general knowledge regarding this disease and the interest displayed in it during the past few years have revealed a state of affairs prevalent for many years. Anti-leprosy measures are urgently called for to prevent a possible flare-up as a result of neglect in the past, and to prevent its incursion from the smaller villages and the rural areas in districts in which it is most terribly prevalent into the towns and large villages where it is now comparatively rare. A special Leprosy Officer is entertained on the cadre of the Department and has for the past year or so endeavoured to interest local bodies in the establishment of leper colonies for the voluntary segregation of victims of this disease. It is not believed that it will ever be possible to segregate all infectious cases of leprosy in Burma; it is thought, however, that by this means it will be possible to segregate a sufficient percentage of infectious lepers so as to effect a material reduction in the incidence of this disease in the generations yet unborn. Much obscurity still surrounds the epidemiology of leprosy, but most authorities now believe that infection is most likely and most dangerous in childhood. Public attention and interest in this disease has recently been aroused by the appeal made by His Excellency the Governor on the occasion of his opening the Rangoon Health Week Exhibition at the end of the year under report. An Association has been formed with the object of attempting to materially reduce the incidence of leprosy. It is to be hoped that this Association will receive that financal support from the public without which little or nothing can be done, and that next year's report may be able to include a description of real progress in anti-leprous activities in Burma.

With regard to existing activities, leper colonies have flourished for some time at Mônywa and Minbu. A Roman Catholic Mission and the American Baptist Shan Mission ran successful colonies at Kengtung. During the year new colonies were opened in Meiktila, Salé and Magwe, while at Shwebo, Hlegu, Bhamo and Kyonmange it is anticipated that colonies will shortly be inaugurated. The authorities in Thatôn are also considering the

possibility of opening a colony in that district. All these colonies have clinics attached to them, in which lepers, both colony inmates and outdoor patients, are treated by specially trained Sub-Assistant Surgeons on specific week days. Both the Mônywa colony with 97 inmates, and the Minbu colony with 53 inmates, have continued to work satisfactorily throughout the year. The colony run by the American Baptist Shan Mission at Kengtung has 625 inmates, while that managed by the Roman Catholic Mission at the same place, had 114 old inmates, with 55 new admissions during the year. Both these Missions are to be congratulated on their efforts to deal with this problem among the highly infected Shan villages. In June the colony at Meiktila was opened with 6 highly infectious male lepers, and by September this number was increased to 11. It is most pleasing to be able to record here the assistance given to this new colony by local benefactors; Senator U Ba Nyan most generously donated a brick building for use as a clinic, and U Than Pe undertook the whole cost of a new cottage which is now under construction on the colony grounds. Both Magwe and Salé Colonies were opened in December, with accommodation for 18 and 8 lepers respectively. In actual fact there are 9 lepers at Salé as one lives in a separate cottage built by his relatives. This year also saw the opening of more clinics throughout the country, and there are now a total of 23 centres of this nature all over Burma. Attendance at Mônywa, Minbu, Meiktila, Yamèthin and Wakèma are all encouraging, while the number of treatments given to lepers at Hlegu, Dabein, Kyonmange, Sagu, Thazi, Mahlaing are all satisfactorily high. The new clinic in Ye-U is reported to be popular. Special mention should be made of the clinic at Shwebo which had an average attendance of 250 lepers, which is a record when compared with any other place in Burma.

The Mission to Lepers.—Report of Sixty-four Years Work in India and Burma.

As usual this is a most interesting and artistic production, illustrated with many excellent photographs, and Mr. A. D. Miller, the Secretary, is to be congratulated on his work. There are now 10,590 lepers in institutions of the Mission and in subsidised homes, and an almost equal number are treated as out-patients. There are 965 healthy children of lepers in homes of the Mission, or in aided homes. Of an expenditure of £62,470, some £35,000 was met by voluntary contributions, the balance being Government and Local Board grants.

One of the oldest of the Leper Homes, that at Purulia, is celebrating its 50th anniversary this year. It says a great deal

for the non-fatality of leprosy that two of the original lepers are still alive. A new leper home has just been opened in Fyzabad, United Provinces, so that the work of the Mission is still expanding.

In a review of the medical work, Dr. Lowe, of the British Empire Leprosy Relief Association (Indian Council), who acts as Honorary Medical Adviser to the Indian Auxiliary of the Mission to Lepers, writes :—" Generally speaking, in the homes of the Mission the number of infectious patients admitted is increasing and I think that this is as it should be. A non-infectious patient may be admitted, treated and discharged, but he occupies room which might otherwise be used by an infectious patient who is endangering the health of his relatives and associates. The argument may be used that apart from treatment the slight case may become infectious. In some instances this argument may be true, but in many we know that it is not. It will thus be clear that the number of patients discharged is not necessarily a good indication of the quality of the medical work done. If in coming years the number of discharged patients falls, it will probably be due to the fact that more patients with the severer forms of leprosy are being admitted.

" In the course of my work I sometimes visit leprosy institutions, some run by the Mission to Lepers and others by other agencies. There are several things which often strike me about the institutions of the Mission compared with other institutions. The first is the excellence of the arrangements made for children. I sometimes have to try to arrange for the admission of a child to a leper home and, if possible, I send the child to one of the homes of the Mission, because I know that there the child will be really well looked after. Another thing is the relatively high standard of the general health of the patients. They are usually healthy, bright, clean and free from secondary infections of the skin, such as scabies. This fact indicates a high standard of medical care. A third thing noticeable in the Mission's homes is that the patients have much to do, both work and recreation, while another is the spirit of the institutions, and the friendly relations between the staff and the patients, created largely because the staff have a real spirit of service. All these things indicate the great value of the medical work of the Mission."

CORRESPONDENCE

Leprosy in the Solomons.

The Editor, *Leprosy Review,*

Dear Sir,

I have read with interest the summary of the survey of the British Solomons (*Leprosy Review,* July, 1938). I have worked here for a good number of years now, and have a great interest in them and their people. The survey has made us "Leprosy-minded." I have to thank Dr. Innes for many "tips" received as I accompanied him in the villages near this hospital.

May I comment on a few points?

It was very unfortunate that the surveyor found it impossible to visit the western part of the group (not shown on the map on page 124). The people there are of a different type to the rest of the group, are more refined, intelligent, artistic, and supply a goodly percentage of clerks, postal assistants, etc. of the group. The population there is about 12,000, and is roughly one-eighth of the whole population.

Referring to this region, the report says that, from evidence, and from the trend of the present survey, there is probably an incidence of 0.5 and 0.6% in the west. There are no lepers on Choiseul, one of the larger islands. I must say, Sir, that I am sorry to see such definite figures put down. They suggest that the incidence there is more or less definitely established. But this is NOT so. The place was not visited by the surveyor, it cannot be judged from the trend in other islands, because the people are different, and their habits and customs different, and also because the evidence is not correct. The island of Choiseul, where there are supposed to be no lepers, does contain lepers, for I worked there for three years and established a small leprosarium on the island.

(b) Again, too, on this important and populous island of Malaita, where I am trying to tackle the leper problem, the same thing applies. The surveyor had meant to return, and examine the rest of the place, or at least, some further areas, but was not able to. The people who were not seen are different altogether from those examined. Some of them are nomads, others are related to San Cristoval, and as these "unsurveyed" people constitute about 30% of the total population of the island, they constitute a big possible source of error if they are computed on the same lines as those in the north—which they seem to have

been. In collecting lepers for the leper colony, I have found two "nests" of the disease, which, I think, must constitute an area of a high leper incidence rate. The report shows a greatly varying incidence of leprosy in different places, and this is due to the isolation brought about by the constant warfare which has gone on for a very long time, and has separated the areas most effectively. Hence the difficulty in estimating how many lepers one area contains from the number that another happens to contain.

(c) It is very easy to be wise after the event has happened, but, in looking back over the figures, I find the same old factor which robs our surveys of any approach to accuracy. What of the great mass of people who escape examination? In North Malaita here, in a population of 17,750, there were 8,000 of them. The survey brings out the important point that leprosy is most prevalent in the bush, and these missing folks are bush people mostly. Why have they avoided the survey? They know the seriousness of the possibility of having their names on a Government Leper List. As they will hide a murderer, so they can hide a leper. It would have been of the greatest value to us, and to all who are interested in the Solomons, if we could have got some idea of the amount of leprosy, and indeed of other diseases, existing amongst those people. These two, three, or more individuals out of every four, spoil every survey. I cannot help wondering, Sir, whether it would not have been more profitable for a few representative areas to have been selected, and the whole of the population of those areas to have been examined. From these areas figures could have been computed which, in my non-expertness, would have been a truer estimate of the leper incidence than the larger figures which have been collected.

(d) The survey emphasises the point that our natives are much in need of soap, and that skin diseases abound here. This is unfortunately only too true. Many villages are, and have been for long years, placed with an idea of defence and not of water supply, and the top of a hill is not going to abound in water. Washing has thus been a secondary consideration. My suggestion is that with skins such as exist here, it would be impossible, even with more than one pair of eyes observing, to spot every case, especially where the patch is not well marked, or is very early, or happens to be covered with a "calico," no matter how small the amount of covering may be. The survey found 138 cases. and to these, amongst 10,245 people examined, are added 12 cases as a possible error. For the reasons given above, I think this is much too small a percentage.

It is my opinion, therefore, that the lepers computed for this

populous island, at least, can only be a general estimate, and should, I think be considered as a low one.

I am, Sir,

Yours faithfully,

CLIFFORD JAMES,

Brit. Solomon Is., 24.9.38.

Dear Sir,

Ref. to Letter of Dr. James of Fauabu, date 24.9.38.

I thank Dr. James for his letter and comments. I agree that the Survey was incomplete, and regret with him the leaving out of the West. I think that Dr. James' remarks should be given full attention, and added on, so to speak, to my figures and statements. One does not even begin to pretend that the full truth of incidence is known in this or any leprosy country. What we seek is to gain a useful picture. The picture for Nigeria, say, is quite distinct from that of Queensland. I think we have begun to form at last such a picture of the Solomons, and hope that Dr. James and all medical men resident there will continue to fill it out and fill it in.

In his concluding paragraph, Dr. James gives as his opinion that the estimate of the survey is a low one, that there must be many more leprosy cases than suggested by the figures. I agree that it is very probable. In fact, I hope that anti-leprosy work will include further surveys in the Solomons. The establishment of active work for lepers always profitably may include further surveys.

JAMES ROSS INNES,

Cawnpore, U.P. 29.10.38.