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Editorial.

SINCE we last went to press the Association has sustained a severe loss in the death of Sir Andrew Balfour. Sir Andrew's valuable help and advice will be sadly missed, the more so as he had been connected with the British Empire Leprosy Relief Association since its foundation in 1923. We associate ourselves very sincerely with all who mourn the loss of this outstanding man of science and would wish to express our deep sympathy with Lady Balfour and her family.

The Secretary has just returned from the Leonard Wood Memorial Conference on Leprosy. This meeting was a great success, and every member came away confident that it was absolutely unique and that never before had a conference on leprosy been so productive of results. The time and money spent in the effort to attend has been eminently worth while. The conference was in session from January 9th until the 23rd, and twenty-three members attended. It was no mean achievement for twenty-three persons, all with different experiences and viewpoints, to come to unanimous conclusions on every subject raised. It is hoped to devote a large part of the next issue of the REVIEW to the findings of this Conference, and the résumé issued by the Executive Committee of the Conference will be published.

Printed copies of the full memorandum of the Conference will be available shortly, and those of our readers desirous of obtaining copies should communicate with us.

One of the important decisions come to was the founding of an International Leprosy Association; the main objects of this Association will be to encourage and facilitate mutual acquaintance and collaboration between persons of all nationalities engaged in leprosy work, and to publish a scientific journal of leprosy. Details of the Association will be given in our next issue, but it might be well to say that the President of the Association is Dr. V. G. Heiser, of the Rockefeller Institute. One of the Vice-Presidents is Dr. E. Muir, and among the councillors is Sir Leonard Rogers. The Editor is Dr. H. W. Wade, the Medical Director of the Leonard Wood Memorial, associated with whom is Dr. H. Lie of Norway, and Dr. James L. Maxwell, of China. Dr. R. G. Cochrane has been appointed Secretary, to whom all communications should be addressed. Needless to say, all office-bearers are temporary, and will be subject to re-election when the International Leprosy Association is completely organised.

We express our sincere satisfaction that such an organisation has come into being, for Sir Leonard Rogers and others in the British Empire Leprosy Relief Association have noted the need for such a scientific body for many years. We would wish the new Association many years of useful and productive work.

We are glad to bring to the notice of our readers in this number of the REVIEW, the first part of an article on Quinine Therapy in Malaria, by Dr. Philip Manson-Bahr. Malaria is a serious problem, and many workers in leprosy will welcome clear guidance from such an authority.

We are reprinting extracts from "Leprosy" in "A System of Bacteriology," and we do this because we feel many of our readers would otherwise be unable to avail themselves of this excellent contribution to leprosy literature.

The articles on a survey in S. Rhodesia and on the leprosy problem in British Guiana are of extreme interest and deserve close study. It is hoped others will be stimulated to make similar surveys and report the results.

We should like to draw the attention of readers to the article on Gold Treatment of Leprosy by Prof. Hoffmann, and mention that Schering Ltd., has offered to supply samples if workers wish to test out this treatment. Small doses of the heavy metals such as gold and antimony are known to control lepra-reaction while large doses may induce it.

Quinine Therapy in Malaria.

PHILIP MANSON-BAHR.

General Principles Involved.

THE treatment of malaria is dealt with in this article in general terms with special reference to its aspect as a frequent complicating factor in other diseases, especially those of a chronic or debilitating nature, such as tuberculosis or leprosy. Malaria as a complication is often of a particularly intractable nature and what is emphasised below is particularly applicable, namely that in order to eradicate the malaria infection it is a most necessary adjuvant to combat the co-existing diseases as well. That means to say, as far as leprosy is concerned, the specific treatment for leprosy must go hand in hand with specific antimalarial treatment, and the two must be combined so as to conduce as much as is possible to the well-being of the patient. Fresh food, fresh air, and moderate exercise are almost as necessary as the rational treatment with quinine.

That quinine is a specific for malaria no one will be found

nowadays to question seriously, but all are by no means agreed upon the methods of its practical application, or its dosage. Here I would merely set forth my own beliefs upon the principles and methods of its practical application. What is the generally accepted therapeutic dosage of quinine ; how and when it should be applied ? How long should the course of quinine be ? What are its limitations ? These and cognate questions I will endeavour to deal with.

Although quinine has been known to practitioners of medicine over three hundred years, there is by no means as yet that unanimity regarding its dosages, its limitations or uses which one would like to see accorded to such an unrivalled specific. First of all, I would state my belief that as there are three species of malaria parasites producing, as it were, in man three distinct and recognisable fevers, so there are differences in the behaviour of these parasites and their associated fevers to quinine. The same rule of therapeusis is not applicable to all, and I think this is readily admitted by those who have had some experience of this subject. The three parasites are the benign tertian : *Plasmodium vivax*, the subtertian ; *Plasmodium falciparum*, and the quartan, *Plasmodium malariae*. I think too, that it may be stated in general terms that, of the three, the subtertian is the most readily amenable to quinine in many of its aspects and the parasite is most readily extirpated by the drug, the quartan is the most resistant, whilst the benign tertian occupies a position midway between the two. By this, I mean to state that though the individual attack is readily cut short by quinine, yet the actual infection is more difficult to eradicate from the body, and relapses readily occur even when quinine is exhibited in relatively large doses over a long period. And then there are very varied opinions regarding the amount of individual dosage of quinine, the total dosage and the methods of its administration. There have been occasions, as for instance, during the War, when really heroic doses of quinine were exhibited often to unwilling subjects with the idea of totally extirpating the parasites from the body through overwhelming them with toxic doses of the drug. Then again, there are practitioners in England who shrink from using that dosage of quinine which is regarded with equanimity by practitioners in tropical countries. At present, however, it is refreshing to note that sane opinions prevail and that we have once more returned to what I might term the Mansonian tradition regarding quinine therapy.

There is another aspect of the subject with which I

would preface my remarks, and that is the generally neglected issue of the bodily resistance to malarial infection. In the tropics, amidst uncongenial and unphysiological surroundings, when the body is enfeebled by continued malarial fevers, notably benign tertian, then it appears to be remarkably resistant to quinine. We are most of us familiar with the acute, intractable and alarming aspect which malaria infections assume in time of war, stress and famines. The rapidity with which malaria spreads and the malignant form it assumed in Russia subsequent to the Revolution, are an example of this. The rapidity with which malaria infections disappear altogether, often without the aid of quinine therapy, when the victim returns to a more salubrious climate, better food and better living conditions, afford an example of what the *vis medicatrix* can do to exterminate the infections.

There are misconceptions too, regarding the longevity of the malaria parasites in the human body subsequent to primary infection. They have not a limitless existence as is sometimes supposed. The life of the benign tertian parasite in a temperate country subsequent to initial infection is one of about three years, that of the subtertian one year or less, whilst that of the quartan is the most prolonged probably five or more years.

There is yet one other point to be considered, and that is my belief that, as in other prolonged infections, the *primary attack* is more amenable to quinine treatment than are subsequent relapses. It is possible, I believe, on these occasions (which I admit are rarely encountered) to extirpate the infection in the human body by energetic, prompt, and timely exhibition of quinine and in fact, nearly every tropical practitioner can point to individual cases of malaria where a *Therapia magna sterilisans* appear to have been obtained by quinine.

(To be continued.)

Gold Treatment of Leprosy.

W. H. HOFFMANN.

DURING the last decade great progress has been made in the treatment of leprosy, and the change of attitude from the desperate nihilism to the hopeful situation of to-day is really marvellous, especially for those who in their practical work have had the opportunity of seeing this change in peoples' minds. The great altruistic institutions have begun to dedicate all their energy in saving as many victims as possible from a disease which should become more easily prevented in the future.

One of the most outstanding therapeutic advances is in the domain of acute infections of the eye. These are the most dreaded of all complications of leprosy, and almost invariably after years of suffering result in blindness. This fact is shown by the large number of blind inmates in leprosy establishments, and in the blind lepers who live as beggars along the roads in the more primitive countries. This tragic situation is fortunately much improved since the introduction of modern chaulmoogric treatment, and in many cases modern therapeutic measures in leprosy will be sufficient to prevent the more severe eye infections, and if special treatment is started from the very beginning, that is with the first symptoms, the outlook is very hopeful.

Generally the affection of the eyes begins with keratitis and ititis, which in so many cases would result in a panophthalmitis and the final destruction of the eyes because they did not respond to any treatment.

From my own experience in Habana during the past years I have seen in more than thirty cases of ocular leprosy the remarkably good effect of two organic gold compounds which are sold under the name of Krysolgan and Solganal. These have already given very satisfactory results in my experiences in tuberculous infections of the eye, so I feel certain that they will also have a curative effect on eye infections in leprosy. As soon as the first injection has been given the patient feels the relief because the irritation of the eye, photophobia, eipihora and the dreadful pains disappear in a magical way. As the injection and other inflammatory symptoms diminish the visual power is also markedly improved and with it the general state of health and the spirits of the patient, who does not feel so helpless as before. As a matter of fact ocular complications have become rare in the large home of Habana since the treatment has been applied as soon as a fresh case presented itself.

Several leprologists have also confirmed this statement regarding the good effects of Krysolgan and Solganal in eye cases. Col. Kirkpatrick (late professor of pathology at the Medical College, Madras, also ophthalmologist at the same college) in a private communication tells me of the excellent and beneficial results in patients of his who were treated with preparations of gold salts.

The technical application of the gold treatment is very simple, and it can be recommended for general use.

Krysolgan is not toxic for the healthy organism. The preparation does not directly attack the specific germs in the human body, but has a stimulating influence on the diseased tissues increasing their antibody production. By the sudden

decay of the specific tissue and resorption of the corresponding toxic products, sometimes an allergic febrile reaction has been observed in the treatment of tuberculous cases which make it necessary to be careful. But in leprosy this reaction seems to be less marked and I have really never seen any alarming or untoward effects which demanded my special attention or interfered with the treatment.

As the action of the preparation in the body is not a bactericidal but rather a catalytic one, it does not depend on high doses. Smaller ones are often sufficient or better, so that it is largely a matter of therapeutic skill and personal experience to adjust the dose so as to obtain the best results in an individual case and avoid doing any harm to the patient or his eyes.

Krysolgan is a pale yellowish powder which is sold in sealed ampoules in a series of increasing doses of 0.0001 gram, 0.0005 gram, 0.001 gram, 0.01 gram, 0.05 gram, 0.1 gram. The powder contained in one tube is always dissolved in 2 c.c. of freshly distilled perfectly sterilised water and injected under aseptic conditions beginning with the smallest doses which are increased with each injection as long as they do not produce an allergic reaction. By diluting the injections with the same quantity of saline solution they are still better tolerated. Generally one injection is given every five to seven days, and not more than six or seven injections should be given in one period of treatment in eye cases, because as a rule the effect will be complete after the first three to four injections and often a good after-effect may still present itself if the treatment has already been finished. Eventually the injections may be repeated after an interruption of two to three months, but only exceptionally will this be necessary in eye cases, because from my experience the good curative influence is not only rapid, but also permanent, and I have never seen a tendency to relapse in acute and not too far advanced cases, if once cured. Of course, chronic cicatriceous cases cannot be expected to give the same favourable results as the acute inflammatory processes, though even in such more advanced cases the treatment might be tried and may have some useful influence. Though perhaps it does not repair what has been destroyed already nor the visual power that has been lost, it may considerably allay the very molesting pains of the patient. At all events, it is necessary to begin the treatment as early as possible, if the least irritation of the eye has presented itself, and the visiting surgeon should always pay special attention to see that the slightest eye affection, perhaps neglected by the patient himself, should immediately

find the corresponding treatment as a prophylactic measure by which it is absolutely possible to prevent further complications and blindness in almost all the cases. For this reason the gold preparations should always be at hand in the homes and also in the eye clinics which may have to deal with patients suffering from leprosy.

The treatment of Solganal, a modification of Krysolgan, is similar. The preparation is still less toxic and is usually supplied in bigger doses of 0.025 gram, 0.05 gram, 0.1 gram, 0.25 gram, 0.5 gram, which are also dissolved in 2 c.c. of distilled water in each case and injected intravenously with the necessary sterility. There is still another modification called Solganol B. for subcutaneous injections, but in leprosy I generally prefer the intravenous treatment.

Considering the great effect of gold salts in leprotic infections of the eye I feel sure that these preparations should be of practical importance also in the general treatment of the disease, especially if they are combined with chaulmoogra oil. I have personally seen some very encouraging results of gold treatment in leprosy, and several authors have had the same experience. Paldrock reports very favourably on the gold treatment of leprosy combined with freezing of the nodules of the skin by carbon dioxide. Further experiments should be carried out with gold preparations. It has still to be determined which forms of leprosy are most suited for this treatment and it is possible that the therapeutic results may be more marked in one stage or type of the disease than in another.

I feel convinced that in leprosy we should not rely exclusively on one medicament, but should try all the methods available in order to obtain complete success. Though chaulmoogra oil is an important therapeutical agent still I have seen many good results from its combination with other preparations. Only by long experience and systematic trials will it be possible to find the indication which fully corresponds in each individual case. Because of the great hope of present day therapeutics nothing should be left untried to help the patient to get rid of his infection.

I suggest that a fair chance should be given to the new chrysotherapy in leprosy, because it is simple and promising, and we have only begun to study its possibilities. But in no case should gold treatment be omitted if the eye of a patient is affected and in danger, because our experiences already allow us to hope that by its early application it will always and easily be possible to treat such cases and to prevent great and long lasting sufferings, blindness and loss of sight.

Leprosy.

E. MUIR.

PART I.

Extracts from a Chapter on Leprosy in "A System of Bacteriology in Relation to Medicine," Vol. V. (Privy Council, Medical Research Council).

THE only evidence of the vital persistence of *B. lepræ outside the human body is afforded by a few scattered instances of patients who have developed lesions under circumstances which pointed to the infection having remained alive for some time on some instrument, fabric or other article. A few illustrations may be mentioned :— (1) A highly infective cook worked in a household for some years, with the result that his employer developed the disease. (2) A boy with bare knees played about in a house formerly inhabited by an infectious leper, and from which all the furniture had been removed by the previous occupant, except the mats on the floors ; the boy afterwards developed leprous lesions, but on his knees alone ; (3) Hansen mentioned the case of a young man showing signs of infection one year after he had worn a pair of old drawers given him by a leper ; (4) Ginders records a statement by a Maori chief that, when leprosy was formerly prevalent, it was spread by giving the sleeping mat or clothes of a leper to an enemy. The absence of positive cultural and inoculation findings, however, makes more accurate knowledge impossible.

The power of B. lepræ to persist inside the human body and the analogies of tuberculosis and rat leprosy help to give us data from which the degree of extracorporeal vital persistence can at least be guessed at.

SOURCE OF INFECTION.

The impossibility of obtaining positive results either in vitro or by animal experiments makes it unlikely that B. lepræ ever multiplies in nature outside the human body. While it is possible that it may remain alive for a considerable time outside the tissues, there seems to be much evidence that infection is as a rule due to prolonged and close contact

The recent International Conference on Leprosy held in Manila recommended that the organism of leprosy should be referred to as *Mycobacterium lepræ*.—Editor.

with patients suffering from the types of leprosy in which *B. lepræ* are found in very large numbers (B^3 cases). In these cases acid-fast bacilli are shed from ulcerating nodules, abrasions of the skin, in the nasal discharge and in the droplets of saliva which are expelled from the mouth when patients shout, sing, cough or breathe violently. The presence of the organisms in droplets may be proved by placing a glass slide before the mouth of such a patient when coughing, and then fixing and staining, when numbers of acid-fast bacilli may be found. While such patients are always potential sources of infection, they are even more so in the reactionary phase. It is then that nodules ulcerate and discharge bacillus-laden pus, and that the nasal discharge is more profuse. In this phase also, *B. lepræ* are found in the fæces, doubtless having been swallowed with the saliva, and in the urine, having been carried in the blood-stream from breaking-down lepromata to the kidneys.

The most dangerous patients are often those who, without showing any marked outward signs of leprosy, discharge organisms from the nose or from ulcerating nodules under their clothes. In countries where the disease is endemic, like India, such patients are not at all uncommon. It should be noted that the majority of ulcers on the fingers and toes are trophic in nature, and seldom contain infection. Of 250 leprosy ulcers examined by the author at the Purulia leper asylum, only three showed acid-fast organisms; the remaining 247 were trophic ulcers. It is remarkable that the public and even some physicians look upon these trophic ulcers as the chief source of danger, and wish to isolate patients suffering from them, while not recognizing the true danger in the infectious cases mentioned above.

INSECT CARRIERS.

The possibility of transmission of leprosy by insects has been carefully considered by various workers. As shown by Marchoux and Bourret, the mechanical carriage of organisms on the feet of house flies is a not unlikely method of transmission. Evidence as to the infection of the gut of flies is conflicting; the India Commission of 1890-91 found all trials negative, but other investigators have found on an average 50 per cent. of infected flies.

Scabies is a common disease among lepers and the classes among which leprosy is common. The gut of *Acarus scabiei* found on lepers is seldom infected, but there is no doubt that auto-inoculation is favoured by the scratching induced by the presence of this parasite. The same is true of lice

and ticks. Bed bugs are also qualified to carry infection. Rogers and Muir (1925) summarize the investigations of eight workers who found on an average infected gut in 9.9 per cent. of bugs fed on lepers, but only 0.88 per cent. positive when the insects were collected from the beds of lepers.

Only four out of 631 mosquitoes caught on lepers by various workers were found positive.

Lebœuf (1912), after doing a considerable amount of work at this subject, reviewing his own work and that of others, considers that, though insects may help in the transmission of leprosy, the part they play is at most an insignificant one.

METHODS OF TRANSMISSION.

Up to the end of the eighteenth century the generally accepted theory was that leprosy is a disease which is spread by contagion. But in the nineteenth century, largely due to the teaching of the Norwegian authorities, Danielssen and Boeck, in their book published in 1848, the theory of heredity became popular. This was upheld by a special committee of the Royal College of Physicians of London in 1862. Even as late as 1891, the special India Leprosy Commission placed in their report: "Though in a scientific classification of diseases leprosy must be regarded as contagious and also inoculable, yet the extent to which it is propagated by these means is exceedingly small." Hutchinson, at that time one of the greatest authorities on leprosy, held that leprosy was caused by the eating of decomposing and badly preserved fish; commenting upon the report of the India Commission in 1890-91, twenty years after the discovery of the specific organism by Hansen, he wrote: "I feel convinced that if leprosy be contagious at all, it depends but to an almost infinitesimal extent upon contagion for its spread." Fortunately the Executive Committee, who appointed the India Commission repudiated their views and declared in favour of contagion. All subsequent authorities and conferences have declared in favour of leprosy being a contagious disease, and the International Conference which met at Strasbourg (in 1923) based all their resolutions upon this understanding: "Il faut faire savoir aux populations que la lepre est une maladie contagieuse."

The question of intrauterine transmission is also a difficult one. Pineda has shown that infection of the placenta and cord is not infrequent, and he has found post-natal infection in the child. Rodrigues reports four out of fifteen placentas infected. Sugai and Mononobe (1913) state that

they found *B. lepræ* in small numbers in the circulating blood of ten out of twelve children born of leprous parents, and in the placenta in nine cases ; and also that the specific organism was found in the blood of a new-born child whose mother was not leprous, but whose father was. They also write that, if *lepra bacilli* are injected intravenously into pregnant rabbits, they are found after twenty-four hours in the heart of the fœtus.

The unanimous opinion of all, however, seems to be that, with one or two possible exceptions, children who are separated from their leprous parents at birth, and are thereafter kept free from all chance of infection, do not develop leprosy, and that for practical purposes leprosy may be regarded as due to post-natal transmission.

PORTALS OF ENTRANCE.

The possible portals of entrance are the nasal, buccal and pharyngeal mucosa, the skin and the respiratory and gastrointestinal tracts.

Stricker promulgated the theory that the nasal mucosa was the most frequent site of inoculation, as he found bacilli in over 83 per cent. of nasal septa in lepers. Kitasato found numerous bacilli in the epithelial cells of the noses of eight out of sixty-eight healthy persons who were either the children of lepers or were living with them. On the other hand, Brinkerhoff and Moore (1909) made a nasal examination of 392 healthy persons in a highly endemic area, and found only one infected ; and in Culion Leper Colony Solis and Wade (1925) found that of 250 children living with leprous parents, no child showed primary nasal infection who did not at the same time show positive skin lesions. It is possible that in cold climates, where the body is more protected by clothes and nasal catarrh is more common, the nose is more liable to inoculation than in warmer countries where the skin is less protected and, therefore, more liable to abrasions through which infection might enter. The fact that acid-fast bacilli are not found in the nasal mucosa does not, however, preclude the possibility that inoculation has taken place through the mucous membrane of the nasal septum. In early skin lesions, smears and sections frequently fail to show any acid-fast organisms ; it is also possible that early nasal lesions may fail to give positive bacteriological results when a scraping is examined. In favour of this may be mentioned the frequent history, noticed by the author, of dry rhinitis preceding more definite signs of leprosy.

There is little or no evidence for or against a primary infection of the buccal and pharyngeal mucosa, lesions of

these parts not becoming evident until they are well established in the skin of the face.

The skin is the most frequent site of first-noticed lesions. One thousand and fifty histories of these were collected by the author from all parts of India. The face, ears and external or extensor surfaces of the limbs showed the largest number ; while the scalp, neck, flexor aspects of the limbs, the abdomen and especially the waist were comparatively exempt. It was noticed that lesions of the feet were more common in stony districts, but seldom occurred in alluvial districts without stones. It is not contended that these first-noticed lesions indicate the sites of inoculation and represented definite primary lesions comparable with those found in syphilis. In some cases they may have been primary, but in others some local injury may have located an infection pre-existing in the body.

The question of insect transmission has been mentioned above, and it is probably that the chief rôle of insects is not as vectors, though they may act as such to a certain extent, but as sources of irritation leading through their bites to auto-inoculation, the patients scratching in the organisms lying under their nails or on the surface of the body.

There is no positive evidence as to respiratory infection. Leprosy of the lungs does occur, but its infrequency and the fact that it only appears in cases in which the disease is well established in other parts of the body, are against this being a common portal of infection.

The gastro-intestinal tract does not show lesions, but this is no reason why it may not be a portal of entry. It has been shown that tubercle bacilli and even carbon atoms can be carried through the gastro-intestinal mucosa into the body, and it is possible that lepra organisms may enter in the same way. In support of this may be mentioned the analogy of rat leprosy. Marchoux was able to infect rats with this disease by feeding them on rat leprosy material, and the author and Henderson have done the same.

The probability is that the nasal septum, the skin and the gastro-intestinal tract are all portals of entry, that the frequency with which each of these is implicated varies with different countries, customs and other circumstances, but that the relative frequency of each is a matter which is not at present known.

FACTORS INFLUENCING TRANSMISSION.

There are four factors which very markedly influence transmission :—

(a) The closeness of contact. There is abundant evidence to show that while leprosy may be transmitted by occasional and casual proximity it is much more frequently associated with a house, room, and, most of all, a bed infection. The joint family system in India, the common, family box bed in colder regions, sexual and sartorial promiscuousness, and the close contact of the child with its mother in the earlier years are all important factors in the spread of infection.

(b) The length of contact. The longer the contact the more are the chances of transmission taking place.

(c) The infectiousness of the patient. This is very important, and is a factor that has not been sufficiently considered. It is in the nodular skin type (B^2 and B^3) that the danger really lies.

(d) The state of health and natural resistance of the person who comes in contact. There is reason to believe that the healthy human body is not as a rule subject to leprous infection, and that when the disease occurs it is due to lowering of resistance plus infection.

(To be continued.)

We are indebted to the Controller of H.M. Stationery Office for permission to reprint this article—Editor.

A Medical Survey in Southern Rhodesia.

B. MOISER.

THE primary object of the survey recently conducted in Chibi Province was to ascertain the number of cases of leprosy in that area, but the opportunity was also taken to examine the natives for other diseases, particularly venereal.

The most thickly populated parts were chosen for the purpose, examination shelters erected at convenient points, and the natives warned to present themselves on certain dates.

These shelters were made of bush poles and grass, with a grass roof over a part. Each was of about 30-ft. by 15-ft., divided into two parts, in one of which the people stripped, and then walked into the second part, carrying their clothes, where they were examined, and departed to have any medicine or dressings that were prescribed, given to them by the native dresser, stationed in another small shelter. Separate shelters were erected for men and women, the latter bringing their children with them.

The party consisted of the Medical Superintendent of the Leprosy Settlement, his wife, who looked after the catering,

two European nursing sisters, the Assistant Native Commissioner of the district, who knew the natives and their language well, and who acted as clerk, one native female nurse, one native dresser or orderly, and some five or six native messengers. The party travelled by car, whilst a lorry conveyed the tents and baggage from camp to camp.

The survey lasted about three weeks, during which 6,814 natives were examined, the greatest number in one day being 944. Cripples were brought in on sleighs, and the local chiefs attended to give any help. The scene was one of much chatter and banter amongst the natives, howling of babies, &c., but it was essentially one of order. It was surprising to see the long, patient, well-behaved queues of men and women, and the look of interest and anticipation in their faces. They evidently expected some sort of treatment, and we were told later of their disappointment at not receiving injections of some sort with a needle. They were however, quite pleased with a dose of salts or a pill, or a dressing or ointment. The children considered that a sweet or two was the best medicine of all! Sweets and medical surveys go well together!

The result of the survey is as follows:—

Leprosy ...	...	35 cases	5·1 per thousand.
Syphilis ...	...	96 „	14·0 „
Gonorrhœa ...	...	21 „	3·0 „
Yaws ...	...	15 „	2·2 „

Of the thirty-five cases of leprosy seen, twenty-seven were early, five advanced, and three burnt out. To these should be added the twenty-two cases who already have been admitted to the settlement, giving a case incidence of 8·3 per thousand for the district, which, I think, is somewhere about the real figure. This figure is a very high one, but it is obvious that it represents the minimum.

It would be rash to apply this figure to the whole population of Southern Rhodesia, but it certainly looks as though there are not less than 6,000 or 7,000 cases in the Colony, of whom some 2,000 should be segregated in institutions as being infectious, whilst the others should be treated in clinics under the various Medical Officers, with trained native orderlies.

A surprising feature of the survey was the discovery of the early cases of leprosy, most of whom were quite unaware of the nature of their malady. I am quite sure that there will be no difficulty in persuading these cases to come voluntarily for treatment, and that it will not be necessary to apply the provisions of the Leprosy Suppression Ordinance,

a most useful piece of legislation, but one which it is proposed to keep as much as possible in the background. It is, of course, well recognised nowadays that the system of voluntary segregation is the only one likely to achieve success. Discharged patients from the settlement are the best propaganda, and they are already effecting a good deal. More remains to be done to make the settlements attractive, and this, too, is being accomplished.

As regards syphilis, although ninety-six cases were clinically diagnosed, there is very little evidence indeed of the disease in adults. Almost all the cases seen were merely small mucous condylomata near the orifices of the body in children. The commonly expressed idea that the natives are "rotten" with syphilis is entirely fallacious, whatever may be the results of serological tests.

Gonorrhœa is practically non-existent in the country districts.

Skin diseases. An itchy papulo-pustular condition is very prevalent in the northern part of the district. I believe this condition to be common all over Africa, but, fortunately, it is easily cured with an antiseptic and sulphur ointment. Scabies is responsible in some cases. The absence of large sloughing ulcers and abscesses was a pleasant surprise.

Eye diseases are far too common. Corneal ulcers, opacities and hypopyon cause much disability. The same history is elicited in every case, namely, that it began in childhood. Thorns are the cause of the trouble, and more attention should be paid to the eyes of children.

Malaria. There was no evidence of heavy infection. Enlarged spleens in children are quite rare.

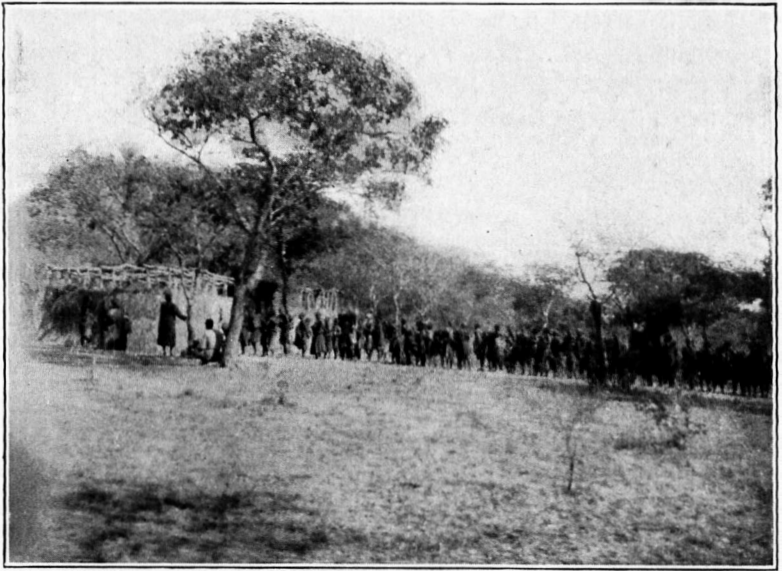
Filaria. One case only of elephantiasis (of the leg) was seen, whilst a case of scrotal infection has been seen at the Settlement. One case of "Calabar Swelling" (*Loa loa*) presented himself. There was no evidence of Guinea Worm (*Medinensis*).

Dentition. The very large amount of dental caries was remarkable. It was quite exceptional to see a perfect set of teeth. The natives are meat eaters.

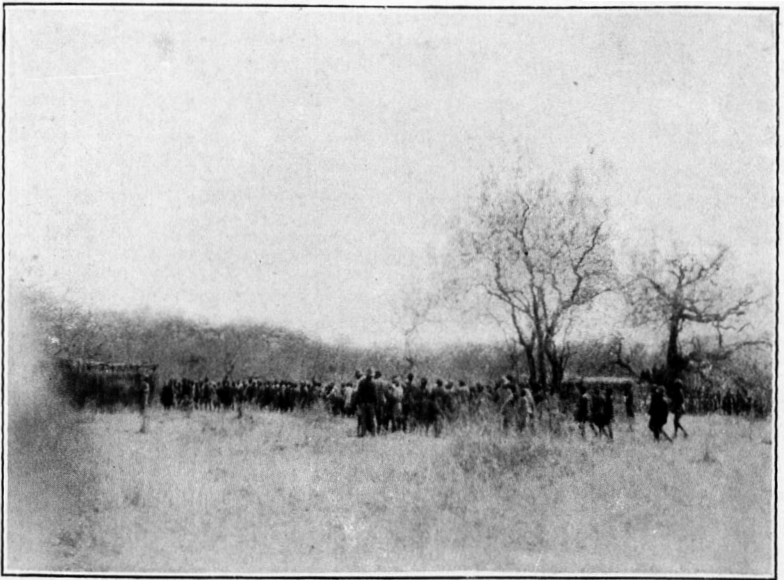
Epilepsy occurs occasionally, and is well known to the natives. Two cases of Actinomycosis of the jaw were observed. Inguinal hernia is rare, and umbilical, though quite common, causes no inconvenience.

Circumscision is not usually practised. About twenty cases of phimosis occurred.

The cost of the survey was, I believe, about £150, and was money well spent. It is hoped to carry out further surveys



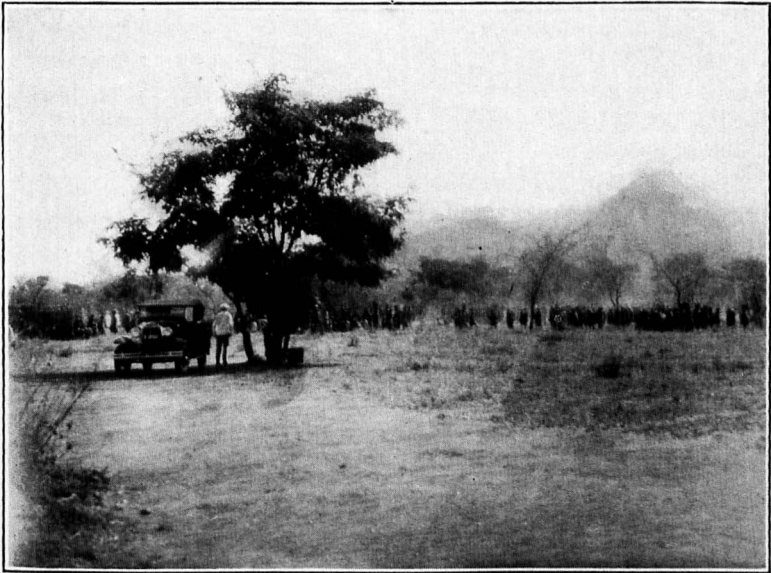
QUEUE OF WOMEN WAITING FOR EXAMINATION.
(CHIBI MEDICAL SURVEY.)



MEN ASSEMBLED DURING CHIBI MEDICAL SURVEY.



GOMOHURU LEPER SETTLEMENT, S. RHODESIA.
HOSPITAL AND MALE PATIENTS.



A CROWD WAITING TO BE EXAMINED.
(CHIBI MEDICAL SURVEY.)

in other parts of the country later, when the experience gained from this, the first survey, will be of great assistance. There will be no need to endeavour to conceal the fact that we are looking for cases of leprosy, as we did on this occasion. The opportunity will be taken to talk freely on the subject, and to induce them all to come to the Leprosarium of their own free will, with very good prospects of returning to their homes in a couple of years, and in many cases much less, with the disease permanently arrested.

The Leprosy Problem in British Guiana.

F. G. ROSE.

BRITISH GUIANA, the only British possession on the South American mainland, has never been slow either to adopt or to enforce measures for the treatment or eradication of leprosy. The Mahaica Leprosy Hospital, whose buildings stand on grounds over sixty acres in extent, was established in 1858, the well-known leprologist, Hillis, being its first Medical Superintendent, and here Professor Deycke worked in 1910. Compulsory isolation was adopted as early as 1905, conditional discharges in 1911 ; at the present time the proportion of cases rendered negative and conditionally discharged bears comparison with that of any other settlement in the world. Every modern line of treatment has been or is being explored, and is available for those who wish to take advantage of it.

In British Guiana leprosy was not always endemic. To this day, by all accounts, it is unknown among the true aborigines, the Indian tribes of the interior. Introduced by the African slave traffic and fed by indentured immigration from India, after more than a century it shows no startling increase, though it must be admitted that it holds its own. Never was there such an opportunity as is now placed before this country completely to eradicate the disease. But the great obstacle to anti-leprosy work here lies in the psychology of the inhabitants. The East Indian seems to regard leprosy with a species of quiet fatalism ; it inspires in him no special abhorrence. Not so the others ; they are still haunted by the spectre of the decrepit victims of advanced leprosy who once formed the bulk of the inhabitants of the Hospital. The diagnosis of leprosy is to them as a sentence of death, Rumour, fiction, training, biblical tradition, all unite to inspire an indescribable horror of the disease. The priest from the pulpit compares leprosy to mortal sin. It is said

that one member of the Legislative body holds his breath as he motors by ; many people would sacrifice a large sum rather than pay even a casual visit to this hospital. Indeed, in the past the chief source of information as to the existence of cases of leprosy has consisted in anonymous letters, inspired by dread or malice or a mixture of both, addressed to the Medical Superintendent of the Leprosy Hospital, the Medical Officer of Health, the Surgeon-General, or the Police. To these people the word leprosy conjures up a hapless, helpless, mutilated cripple, "*sans* teeth, *sans* eyes, *sans* taste, *sans* everything."

It is against this well-nigh immovable bedrock of prejudice that it is necessary to fight. Such an attitude obstructs leprosy work in two ways. In the first place it interferes with the discovery of early cases, which is so important, for it leads to concealment till concealment is no longer possible, which is to say, till effective treatment becomes more difficult. Secondly, it restricts the opportunities of employment of discharged cases.

While in India, in 1928, I asked the Superintendent of the Purulia Leprosy Settlement if he experienced this difficulty. He explained that the patients were drawn from so large an area that the employer was seldom aware that the patient had had treatment at a leprosy centre.

Here, where the population is smaller, and the tendency is to consider everyone else's business as one's own, it would be very difficult to keep such knowledge from interested parties. So irrational is the prejudice, moreover, that, paradoxical as it may seem, a sufferer who has never been to the Leprosy Hospital inspires less terror than one who has been an inmate, and thus presumably received thorough treatment.

Notwithstanding, do not think that I am asserting that the position is not improving. Slowly but surely the knowledge is permeating the general population that the disease is not incurable, that it is, in fact, when taken early, one of the most amenable diseases to treatment. There is moreover in British Guiana a form of local patriotism which, if skilfully exploited, is a valuable asset. To illustrate this, some time ago, in doing leprosy survey work, I found a portion of the colony, long regarding itself with legitimate pride as a kind of health-resort, heavily infected with leprosy. A medical colleague, aware of the sentiments of the inhabitants, assured me that it would be dangerous for me to revisit this district owing to the resentment aroused by the publication of this information. On the contrary, however, as I anticipated,

every single sufferer seen by me on that survey is under treatment, and every infectious case isolated, and so far from resentment having been aroused, there now exists a very healthy determination to rid the district of the reproach of so high a leprosy index.

Particularly effective propaganda is the discharge of cases without stigmata of leprosy, able to earn their own living in the outside world. I estimate that in the districts visited by me in the course of my survey work, over 90 per cent. of the cases are now known, and under treatment.

From May, 1926, when I was appointed Medical Superintendent of this hospital, to November, 1930, 166 persons have been discharged, and it must be borne in mind that well over 90 per cent. of the cases now discharged are persons sound in wind and limb, as against a percentage of about thirty under previous conditions. Of this number, twenty, that is 12·4 per cent., have had a recurrence of symptoms. Wade and Lara, from the Culion Island Settlement, have, however, pointed out that in many of these cases one is dealing not with true relapses, but with an "interruption," an inevitable stage in the progress to a permanent negative. Thus considered, six of these cases, in which symptoms recurred within six months, cannot be considered as true relapses, thus reducing the number to fourteen, or 8·7 per cent. Of the twenty, eleven became negative again shortly after, and have remained so, one remains negative, but has lost his sight from corneal ulceration, one has died from intercurrent disease, while the remaining seven have improved considerably, but not yet to such a degree as to make it possible to discharge them afresh.

Another aspect of the leprosy problem concerns itself with the early negative case, not requiring isolation, but regular and vigorous treatment. One finds that it is not difficult to induce patients discharged as negative to attend the hospital periodically for examination and treatment. With those who have never experienced the restrictions of life in a settlement, the case is, however, entirely different. The slow progress of the disease, the inconvenience, not to say impossibility at times of leaving their work to attend at a centre over twenty miles distant, where the difficulties of transportation involve the loss of a full day's work, conspire to make them irregular in attendance and difficult to persuade that it is necessary to undergo so lengthy a course of treatment. Unfortunately, the present financial condition of the colony puts the establishment of district out-patient clinics beyond the reach of the authorities,

and makes it necessary either to persuade these cases to come into the leprosy hospital or to leave them entirely without treatment.*

No opportunity for propaganda is lost. Magic-lantern lectures have proved very popular, and have been the means of inducing many cases to present themselves voluntarily for treatment. Indeed, one can point with pride to the fact that, for the first time in the history of this hospital, the majority of those admitted have been so admitted at their own request, while in four and a half years only one person has been tempted to abscond.

Moreover, whereas in 1927 only 57·9 per cent. of the inmates were able-bodied, capable of fending for themselves without assistance, at the present time 66·4 per cent. are in that happy condition, in spite of the fact that over 100 able-bodied persons have been discharged as negative.

To conclude, the position of the leprosy campaign in British Guiana at present stands thus :—

With 288 in the Leprosy Hospital, about 250 discharged conditionally and living outside, there are probably over 600 cases of leprosy in a population of 300,000, representing an index of two per mille. There is urgent need of more survey work to serve the purpose, both of ascertaining the true extent of infection and of inducing suspects to come forward for examination and treatment.

No less urgent is the need of out-patient clinics to supply the wants of those who are not required to be isolated for the protection of the public health.

A new Leprosy Ordinance, which is a great advance on the one now in force, is about to be introduced before the Legislative Council, and it is hoped that, with assistance from the British Empire Leprosy Relief Association, all the measures indicated above will be in force in the coming year.

If this proves to be the case, I am confident that it will not be many years before we shall be able to show, like Norway, statistics demonstrating the gradual decline of leprosy in British Guiana.

*The Association has just given a grant of £500 for the purpose of further survey work and the establishment of clinics.—Editor.

Leprosy in Uganda.

R. G. COCHRANE.

UGANDA with a territory about equal in size to Great Britain and Ireland and with approximately one-eighth of the population, has an estimated incidence of leprosy of 20,000. The leprosy situation here is entirely different from that of the Sudan. Firstly, the disease is widespread over the whole territory, secondly, the people are more sophisticated and less amenable to strict discipline, and lastly there are so many lepers that it would be a physical impossibility to confine to one area all known cases. While any anti-leprosy scheme must be as complete as possible, the amount of money earmarked for leprosy should bear some reasonable proportion in comparison with the general medical budget. This is especially the case where the financial resources are limited. Few colonies can spend as much as 25 per cent. of their total medical allotment on leprosy as is done in some countries.

For administrative purposes Uganda is divided into four provinces, *viz.*, Northern, Eastern, Buganda and Western, and the leprosy situation will be considered in each of these provinces.

Northern Province.

The exact situation in this province is unknown. At Arua, on the Sudan border, there are a few cases of leprosy being treated at the local Government hospital. There are five leprosy camps throughout this province, accommodating some seventy-six patients. Little can be suggested regarding measures to be taken until further information regarding the type and incidence of the disease is available. As the Arua district of the Northern Province is within a sleeping sickness area, and as periodical inspections are carried out, much information could be gathered regarding the disease if medical officers, when on the look-out for sleeping sickness, would also keep a watch for cases of leprosy. Leprosy is a disease which lends itself to a rapid survey, for not only can the majority of cases be very easily discovered from an examination of a group of natives, but in many instances the infective and non-infective cases can be readily separated.

Although the incidence of leprosy in the N. Province is surmised to be high, it has been considered that venereal disease is the more pressing problem. While not wishing to minimise the danger and importance of venereal diseases in a

community, yet leprosy is so slow in its spread that its presence is not so likely to receive official notice. However, as venereal diseases in general, and syphilis in particular, are one of the chief predisposing causes of leprosy, any measure which aims at their eradication will indirectly benefit the leprosy campaign. It was suggested, therefore, that the venereal diseases campaign should be rigorously pursued, but at the same time a preliminary survey of the number of cases and the type of leprosy should be undertaken, and until more accurate knowledge of the situation is obtained all that can be done is to encourage known sufferers to come to dispensaries for treatment.

Eastern Province.

This is one of the most heavily infected areas in the whole of Uganda, and has the unenviable reputation of being one of the worst areas for leprosy in Central Africa. There is a good deal of evidence suggesting that leprosy has been spreading in the Eastern Province during the last twenty-five years. There are two possible causes for this.

(1) The people have no fear of the disease and the tribes, especially the Teso, are ignorant and dirty, and do not understand the elements of cleanliness.

(2) During the past quarter of a century roads have opened up the country to such an extent that every part of the country is easy of access.

Thus a disease such as leprosy may have been introduced into areas which were previously cut off from close communication.

For the purposes of this report the Eastern Province can be considered in three areas: (1) The district around and in the vicinity of Lira. (2) The district around Ngora. (3) The district around Mbale.

(1) Lira District.

It appears that there are two heavily infected foci in this district.

(a) Kuman county.

(b) Kwania county.

(a) The former area comprise the region around Lake Kioga, and is rather inaccessible. There is a government dispensary contemplated at Kabermaido, and this would make a convenient place for an out-patient centre, and later, if necessary, a colony. It has been suggested that until some general plan is organised for the whole of the Eastern Province an outpatient centre should be organised at Kabermaido

with a reliable native medical officer in charge. All patients coming to this dispensary should be treated and the danger to others of cases in the contagious stage of the disease impressed upon the people and particularly on the chiefs. In such a highly infected focus a leprosy colony might be considered at a later date.

The focus in the Kwanja country is not so inaccessible as that of Kuman. There is a camp at Aduku which is accessible by the medical officer situated at Lira. In the camp there are about 100 cases segregated. It should be possible to meet the needs of this district by developing this camp. It has been estimated that there are some 2,000 sufferers in the district. From the brief survey it is calculated that for this area the number of infective cases per 100 is about eleven ; this would mean that if the accommodation of this camp were doubled it would meet the need of the district fairly satisfactorily as far as the infective cases were concerned. At Soroti the out-patient centre which was started by Dr. Wiggins, has been taken over by Government. With the development of the camp at Aduku and extension of the work for early cases at Lira and Soroti the situation for the Kuman country should be fairly well met.

Ngora District.

Dr. Wiggins of Ngora has developed an extensive anti-leprosy work in this district. When the Secretary visited Uganda there were four out-patient centres and the infective cases hospital at Kapiri was in the process of construction while the children's hospital at Kumi was occupied. As a result of the withdrawing of a mild measure of compulsion the attendance at the various out-patients centres fell off very markedly. At one time the total attendance was somewhere between two and three thousand. The Secretary in his report stated that at present the most important step was to organise a system whereby infectious cases and children are isolated, and until a scheme had been formed to deal with cases in every stage of the disease, the question of trying compulsorily to enforce treatment on all sufferers from leprosy would only confuse the issue. Further, the present available medical staff was unable to cope with the situation arising out of compulsory treatment.

Since the Secretary's visit the infectious diseases hospital at Kumi has been opened and filled and the total accommodation is 150. Since the end of April (1930) children have had to be turned away and the chiefs informed that no more could be taken in. The first batch to be discharged

was sent out last January, and an equal number of new ones admitted. A trained nurse is now in charge of the children at this hospital. The hospital for infectious cases at Kapiri was opened last November, and there are already 120 patients in residence.

Mbale District.

In this district, the Secretary toured for three days and visited some twelve villages, and during this time he came across over 700 cases of leprosy. It is estimated that in this one area there are probably at least 3,000 sufferers, and that the percentage of highly infective cases was about 10 per cent., and that of mildly infective cases was as high as 16 per cent. A large number of apparently healthy adults were seen who had one or two patches of hypopigmentation which had been present for years. It was felt that these cases were individuals who had acquired a mild infection and owing to their high resistance, the disease had not advanced and had become arrested, the few hypopigmented areas remaining being permanent. The question of the presence of the so-called "abortive case" opens up an interesting point in connection with field investigation. In the Mbale district it is distressing to realise that except for a few cases treated at local dispensaries very little is being done for the rest.

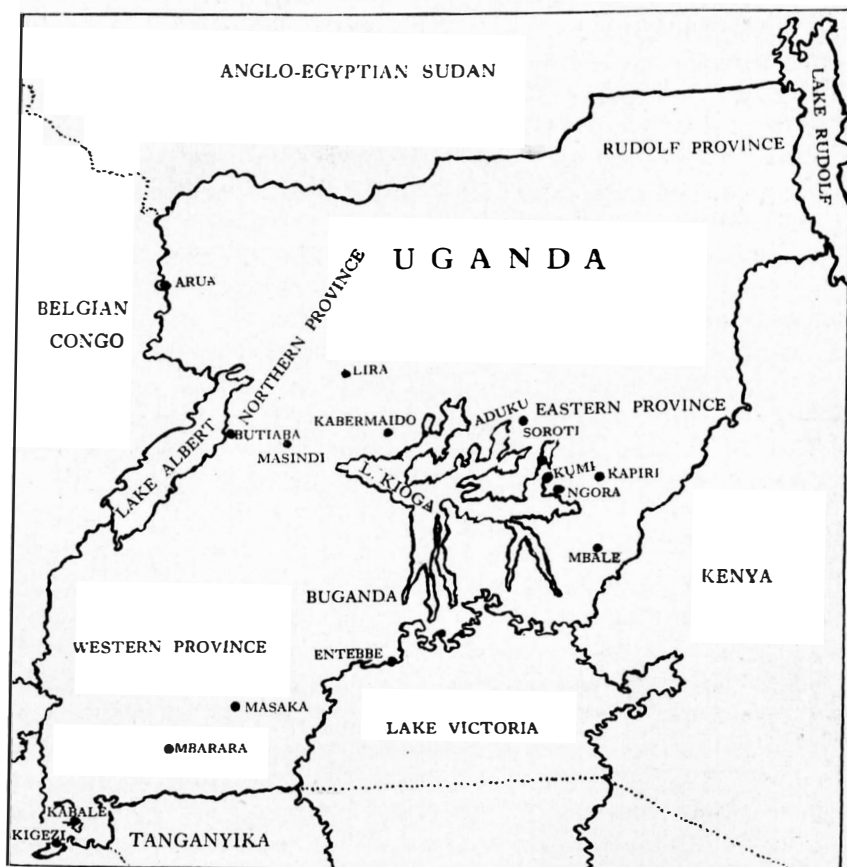
Western Province.

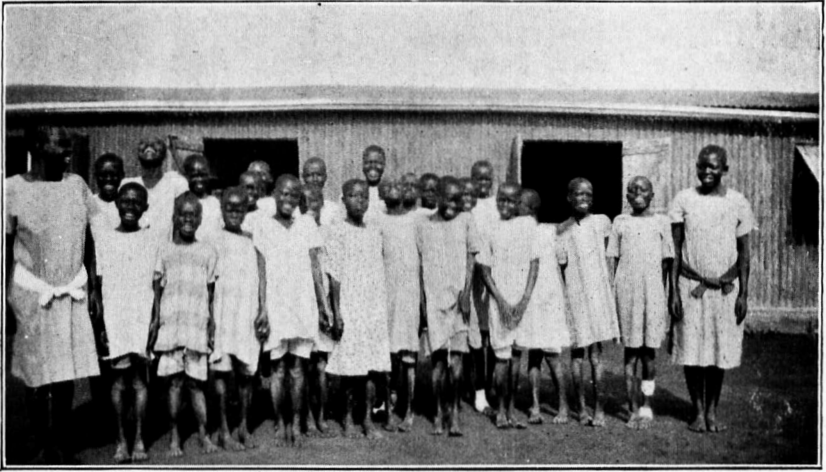
There are undoubtedly a large number of cases in the Western Province, and the Kigezi district represents a large foci of the disease. The fact that impressed the Secretary on his tour in this area was the large number of highly infective cases seen, whereas the percentage of this type of leprosy in the Eastern Province was about ten; in the Western Province the percentage was as high as 50 per cent. The difference in the relative incidence of infective and non-infective cases in various areas needs further study, and systematic field work linked up with a well organised leprosy hospital, I feel sure, would reveal epidemiological factors of great importance.

Drs. Sharpe and Smith are organising a leprosy settlement on an island in their district and as it is hoped to publish an article by Dr. Smith shortly, this aspect of the work will not be touched.

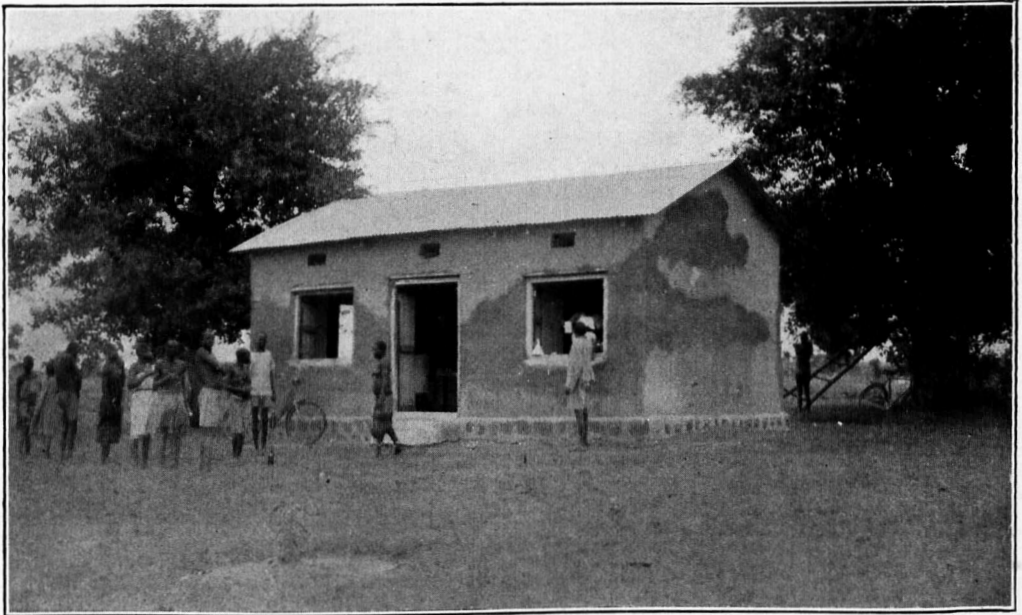
It is an interesting and arresting fact that territories adjacent to the Belgian Congo have a very high incidence of leprosy. Both in Belgian and British Ruanda it is said that

SKETCH MAP OF UGANDA SHOWING MAIN TREATMENT CENTRES





A GROUP OF HAPPY LEPER GIRLS AT KUMI, UGANDA.



LEPROSY TREATMENT STATION, NEAR NGORA, UGANDA.

the number of cases of leprosy and the incidence of the disease is even higher than in the Kigezi district. Certain parts of the Belgian Congo seem to be highly endemic areas from where leprosy has spread to adjacent territories.

Buganda Province.

This province, consisting as it does, of the Kingdom of Buganda is more developed and the people are more highly civilised than any other part of Uganda. As a result it is not surprising to find that the people have a great dread of the disease. While it is said that there is little leprosy in Buganda yet where there is such fear, it is quite possible that a great deal is hidden, especially in the earlier stages. From statements by officials it appears that the incidence of leprosy is highest in those parts of the province which border the Eastern Provinces. This is to be expected, considering the high incidence in the latter area.

The Government is contemplating an extensive survey of leprosy throughout the territory which would include Buganda.

It will be seen from the foregoing information that the problem in Uganda is one of immense magnitude, and at present only the fringe is being touched. So vast is the problem and so inadequate the resources that the Secretary in his report stated that at present it was a physical impossibility to treat all sufferers from leprosy in Uganda, and therefore, the first aim should be to concentrate on the treatment of early cases among children, and isolate, where possible, infective cases. The Secretary in his report suggested the appointment of a full time leprosy officer, and the development of a model leprosy settlement in the Mbale district. If this were done, and a system organised which embraced dispensary treatment, field investigation and propaganda throughout the territory, this combined with the work the Mission to Lepers is doing in the Eastern and Western Provinces, should go a long way towards the control of the disease. Unfortunately financial resources are so meagre that at present there is little prospect of any such complete system being organised.

Leprosy Policy in Basutoland.

P. D. STRACHAN.

ALTHOUGH the problem presented by leprosy in Basutoland has certain aspects which are very similar to, or identical with, corresponding aspects in most parts of South Africa, there are certain other aspects which modify very considerably the policy which it is possible to carry out in Basutoland, the other Protectorates and the Native reserves, as compared with that which is possible in the greater land area of the Union of South Africa, owned and mainly occupied by Europeans. It is true that the last mentioned area contains also a large Native population of farm and industrial employees, but these, being in the employment of Europeans, can be kept more easily under observation, and can less easily escape to places of concealment on that account.

It is probable that the types presented by the disease are very similar in all parts of South Africa. Any marked differences in type that may be found would be due to several causes, among which may be mentioned in their order of importance the time during which the disease has been endemic in any area, distance from the coast, height above sea level and latitude. It is well known that a disease in a community becomes modified by a long period of endemicity, the severity of type and endemicity diminishing as the time increases. Leprosy appears to have been noticed among the Hottentots and bushmen of the southern Cape at a comparatively early period in the short history of the country. Dr. Macfarlane, late Principal Medical Officer of Basutoland, who spent the most of his life in the service of the territory, has expressed the opinion that leprosy was unknown among the Basuto fifty years ago, and that it was introduced into Basutoland by the Griquas from the south of the Orange Free State, who trekked through Basutoland to Griqualand East. The Griquas are a mixed race of Europeans and Hottentots.

Leprosy is said to be more severe in type and more liable to be complicated with intercurrent affections, such as pulmonary tuberculosis, in most low-lying areas. The climate of Basutoland is determined by conditions the opposite of the last mentioned. The height of the inhabited areas above sea level varies from 5,000 to 8,000 feet, and the latitude of the territory is in the neighbourhood of 29 and 30 South. The winter is dry and cold or cool, and the rainfall in summer

generally takes the form of short heavy falls accompanied by lightning. The coldness of the winter, in the opinion of the writer, militates to some extent against cleanliness in the personal habits of the people ; they are not given so much to the washing of their bodies as the people of Bechuanaland, who live at a lower latitude and a lower altitude.

In the Native reserves under the Government of the Union of South Africa there is a certain amount of self-government through representative councils, and one would expect the enforcement of leprosy regulations conflicting with tribal customs to be more difficult in the reserves than it is in the areas occupied by Europeans and detribalised Natives. In Basutoland the difficulty of upsetting Native customs is much accentuated by the fact that the Basuto do not regard themselves as a conquered people. Their attitude towards the British Administration is that of a people who have entered into a voluntary alliance, and asked for paternal guidance. Like the Scots and the Russians, they may have been repulsed, and they may have lost territory, but never since they became a nation have they been conquered by an enemy.

In Basutoland a National Council of Chiefs and nominated educated Natives, presided over by His Honour, the Resident Commissioner, sits for some weeks every year to discuss new legislation and other matters. If the pious resolutions passed at these assemblies in the past had been carried out in practice by the chiefs the leprosy situation to-day would have been much easier than it is. Unfortunately, for the most part, the chiefs and headmen are ignorant, conservative and inert.

By proclamation towards the end of 1913, segregation was made compulsory, and the concealment or the failure to report the presence of a case in a village, was made a punishable offence. Early in 1914 the present settlement was opened for the reception of patients, and several hundred were admitted, most of them in a very advanced stage of the disease. The chiefs appeared to have made a good effort to collect sufferers, and it was hoped that the effort would be continued.

When the writer became Superintendent of the asylum in February, 1923, the population was 487. By the middle of June it had risen to 502, and by the end of December it had fallen, through discharges and deaths, to 467. The number of new admissions in that year was 66. In his first annual report the writer expressed the opinion that the population had probably passed through

a maximum. Unfortunately this was an erroneous opinion, based upon a misconception of the conditions existing outside the asylum. The maximum was a maximum only in the mathematical sense of this superlative, and the Superintendent was destined to experience several maxima and minima of that kind before he realised the true state of matters.

For the next three years the population fluctuated between 437 and 500, and the admission rate was from 70 to 80 per annum. In 1927 and 1928 the numbers of admissions were 105 and 115 respectively. These increases might have been due in part to an increase in the incidence of the disease, in part to some pressure put upon the chiefs by the Administration.

In June of 1928 a committee appointed for the purpose of devising means to limit the increasing expenditure on leprosy, reported that short of abandoning the existing policy altogether, no limiting of expenditure could be foreseen so long as the Government continued to rely upon the co-operation of chiefs and headmen only. The committee recommended that special machinery should be devised by the Government for the purpose of finding and bringing in the lepers, and that persons responsible for the harbouring of easily recognisable cases of leprosy should be prosecuted and punished as offenders against the Leprosy Proclamation. Before the end of 1928 a number of prosecutions had taken place, and the effect of this was seen in an increased rate of admissions early in 1929.

The special machinery recommended was the appointment of a number of Native Inspectors, trained in the diagnosis of leprosy, whose duty it would be to scour the country on horseback looking for cases, paying particular attention to their relatives who were, or had been in the asylum, and reporting on the welfare of persons discharged to their homes on account of the apparent arrest of the disease.

At first two "Health and Welfare Inspectors" were appointed from among the guards at the Leper Asylum, and, after a period of training, they began work in April, 1929. In that month the writer spent twelve days with one of these inspectors traversing a mountainous area in the east of Basutoland. On this expedition four cases were found, two of them very early, and two very advanced. As a result of this experience the writer expressed the opinion that a larger number of inspectors would be required if the whole territory were to be traversed once a year. It was decided, before appointing more inspectors, to observe for some months the rate at which the two would be able to

work a portion of the west of Basutoland, which, besides a large mountainous area, contains on its border a strip of comparatively flat, agricultural and thickly populated country, 15 to 20 miles wide.

By November of 1929 the activities of these inspectors, combined with greater pressure put upon the chiefs, had resulted in an unprecedented influx of patients to the asylum. The total number admitted in 1929 was 184. Nevertheless, the two inspectors in a year succeeded in working through only about one-third of the total area of the territory, containing considerably more than one-third of the population.

In the beginning of 1930 four more inspectors, temporary servants bearing the title "Leprosy Inspectors," were appointed, and, after a period of six weeks' training at the asylum, they were sent to the various districts apportioned to them in March and April, 1930. With one of these the writer made a nine days' expedition in an agricultural area in the north-west of Basutoland, during which three cases were found.

It is now hoped that these six inspectors will be able to work through the whole territory at least once every year, and that the admission rate to the asylum, which is already beginning to show signs of falling off, will fall very considerably after the country has been once completely combed through. The proportion of patients being found in an advanced and highly infective state of the disease is still far too high, but it is hoped that this will diminish *pari passu* with the numbers being admitted.

The number of patients admitted during the first half of 1930 was 72, and the present population of the asylum (August 23rd, 1930) is 688, *viz.*, 314 men and boys, and 374 women and girls. Sixteen patients have just been certified fit for discharge, and a much larger number of discharges before the end of this year is contemplated.

It is proposed to build two villages for males and females at sites on the Asylum Farm nearly a mile distant from the compounds. The patients sent to live there will be the less disabled so-called burnt out cases, who have no home to go to in Basutoland, and the early slightly infective cases, in which the prospects of cure by the injection treatment are good.

The population of Basutoland is over half a million, and the number of lepers, including those in the asylum, is probably about one thousand, so that the incidence of the disease is in the neighbourhood of two per thousand of the population.

The greater part of the country is covered with mountains, of which the peaks are from 7,000 to 10,000 feet above sea level, and from 2,000 to 5,000 feet above the level of the western border and the neighbouring parts of the Orange Free State. The difficulties in the way of instituting a system of voluntary submission to treatment at treatment centres, in no case further than ten miles from a patient's home, are at present insurmountable. Even if the country were flat and medical officers could be stationed at the geometrically most advantageous points, say, each at the centre of a hexagon of 20 miles longest diameter, forty-seven medical officers would be required. The expense in salaries and the building of quarters would be altogether prohibitive. About half that number of medical officers might be able to supply treatment to every leper by means of peripatetic tent dispensaries. In addition to salaries in this case there would be the expense of several riding and pack horses for each man with his attendant, and probably permanent quarters would also be required; for it would be impossible to obtain a sufficient number of medical men willing for any length of time to spend their lives as "plain men dwelling in tents." Besides, treatment to be fully effective, should be administered by men of experience, who have learnt how to treat the patient, rather than the disease. It is also certain that most lepers would not walk or even ride ten miles as often as once a week with sufficient regularity to derive benefit from treatment. Even in the compounds, where they are all within one hundred yards of the dispensary, the regularity of attendance for injections is only about 50 per cent. of what it should be. To be effective, voluntary submission to treatment without segregation would have to be supplemented by grants of money from the Government for the purpose of feeding and clothing many of the patients in times of scarcity; for it seems obvious that in the absence of the necessities of life drug treatment of any kind could be of little avail.

The highest ideal at which we can aim in Basutoland is to have leprosy voluntary treatment centres at each of the Government dispensaries in seven districts or sub-districts. Maseru dispensary could be excluded because it is within five miles of the Leper Asylum, where voluntary treatment to the most promising cases could be given at the villages about to be built. All advanced and comparatively hopeless cases would still require to be compulsorily segregated at the Asylum.

A patient in an early and slightly infective stage of the

disease should be given the option of going to live in the neighbourhood of a treatment centre, and in the event of acquiescence, the chiefs should be compelled by means of an exchange, to provide land for the patient's family or guardians near a treatment centre. In the event of a patient's attending for injections irregularly without a reasonable excuse, that patient should be compulsorily segregated in the Leprosy Asylum. The threat of such compulsory segregation would conduce to a greater regularity in submitting to treatment than that which is possible at the Asylum itself, where no means of compelling submission to treatment exists.

Grants for Leprosy Work.

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

NYASALAND.		£
Seventh Day Adventist Mission, Malamulo	...	235
NORTHERN RHODESIA.		
Dr. H. S. Gerrard, Kasenga Mission, Namwala...		50

These grants have been made for the provision of buildings and simple housing accommodation for cases undergoing regular treatment. Applications for financial aid will be sympathetically considered by the Committee, and all applications should in the first place, be sent to the Director of Medical Services of the Colony concerned, who will forward them to the Secretary of the Association.

Literature.

A Year's Development. Report, 1930.

Leprosy, Summary of Recent Work, Nos. 20 and 21. Reprint of Leprosy Sections from the Tropical Diseases Bulletin.

Distribution of Leprosy in Nigeria with Special Reference to the Aetiological Factors on which it depends. By Dr. T. F. G. Mayer.

Leprosy Review, Vol. II, No. 1, January, 1931. Issued quarterly by the Association. Price 2s.

Leprosy in India, Vol. III, No. 1, January, 1931. Issued quarterly by the Indian Council of the Association.

INDIAN SECTION.**Leprosy in an Urban General Dispensary.**

A SURVEY OF ONE YEAR'S WORK.

DOUGLAS N. FORMAN.

THERE seems to be a consensus of opinion that the dispensary plays an important part in the campaign against leprosy in a given area. Most, if not all, of the available reports of out-patient of dispensary leprosy work, however, have come from institutions specialising in the management of this disease. The object of this survey is to present the chief data collected from the records of all the leprosy patients examined and treated during the course of the routine work of a general dispensary situated in a city, within the period of one year—November 1st, 1929, to October 31st, 1930.

During the year, under review, 70 individual leper patients visited the dispensary a variable number of times. Even those who made only a single visit have been included in the survey. Most of the group were "old" patients, who had been under observation for months or years previously. The main points upon which we have attempted to obtain accurate information are: the proportion of lepers; age, sex, occupation, duration of the disease, and the length of time under observation and treatment; the type of disease, with bacterioscopic findings; the number of injections administered to each patient during the entire period of treatment and during the year under review; the presence of intercurrent diseases; and the degree of improvement.

Dispensary Statistics.

During the course of the year about 32,250 visits were made at the city dispensary by approximately 8,000 individual patients of all kinds. These figures include the three main clinics of the dispensary, the pay clinic, the charitable clinic, and the student clinic. By far the largest proportion of the leprosy group attend the mid-day charitable clinic, which cannot be said to have any special "reputation" for the treatment of leprosy. To be sure some of the patients know that they are suffering from a "blood disease," and having heard that "injections" are given with a certain degree of abandon at the Jumna Dispensary, they have a vague idea that they might be helped there; and so in a general way perhaps lepers are attracted somewhat more than by the average dispensary where "injections" are

not given so freely. At the pay clinic, the writer's honorary connection with the Naini Leprosy Settlement is undoubtedly a minor factor in the attraction of better-class patients, a few of whom have been referred to him by private practitioners in the city or nearby towns.

Aside from these two features which tend to increase slightly the size of our leprosy group, we feel that the number of cases of leprosy is fairly representative of that to be found in any city charitable dispensary. The Rural Dispensary figures have not been included in this survey. Allowing for the loss of records by incorrect filing, we would estimate that about one in every 800 new patients presenting himself or herself at the dispensary is suffering from leprosy.

Of the 70 patients :—

41 reside in the city (Allahabad).

22 come from surrounding villages.

7 come from neighbouring towns.

This proportion of villagers (one-third) is a little higher than the average for the city dispensary where villagers constitute about one-fifth of the total attendance. Practically all the patients from neighbouring towns, within a radius of about 100 miles, attend the pay clinic ; coming from such places as Benares, Satna, Pratabgarh, Machhlishahr, Fyzabad, Mirzapur, &c. They make monthly or bi-monthly trips to the dispensary for re-examination, and advice with regard to the further course of treatment, taking away with them sufficient fresh material for a course of injections, which are administered by local physicians or compounders in the towns of their residence. This plan, though far from ideal, works very satisfactorily in the case of intelligent patients of means.

Age, Sex and Occupation.

The seventy patients who form the basis of this survey were divided as to sex and age, as follows :—

Men	...	...	...	...	...	55
Women	...	...	...	...	...	11
Children	...	...	...	...	...	4
(all boys below 15.)						

Ages by decades :—

First decade	...	0	Fifth decade	...	13
Second decade	...	4	Sixth decade	...	11
Third decade	...	19	Seventh decade	...	2
Fourth decade	...	21			

As one would expect, a large majority of the cases fall within the 20 to 49 age group. Since about one-third of the patients attending the general clinics are women, the proportion of women lepers (one-sixth) is far below the general proportion.

Unfortunately our records are not complete with regard to data on occupation. The list includes lawyers, shopkeepers, servants, food-sellers, peasants, sweepers, labourers, and students.

Clinical Types of Cases.

In attempting to classify the cases roughly from the point of view of proportion and degree of "skin" and "nerve" involvement, Dr. Muir's scheme has been used in a somewhat modified form. "A" has been used to designate "nerve," and the numerals, 1, 2, 3, the degree of invasion; "B" skin, and "C" to designate the totally burnt-out cases. To this one would like to add + and —, to indicate whether the course of the disease in a given case is on the "ascent" or "descent" of "Muir's curve"; but perhaps the addition of another symbol would not help one to visualise the type any more accurately.

The seventy patients have been classified as follows* :—

A ₁	...	...	...	8	A ₂ B ₁	...	...	14
A ₂	...	...	...	6	A ₂ B ₂	...	...	13
A ₃	...	...	...	0	A ₂ B ₃	...	...	4
A ₁ B ₁	...	...	...	11	A ₃ B ₂	...	...	1
A ₁ B ₂	...	...	...	10	A ₃ B ₃	...	...	1
A ₁ B ₃	...	...	...	1	C	...	...	1

This too, is very much as one would expect, the mixed types predominating, with a fair proportion in the early groups.

The bacterioscopic examinations of skin clippings and nasal swabbings for lepra bacilli reveal the following :—

Skin clippings	positive	...	...	...	26
	negative	...	...	...	38
	not done	...	...	...	6
Nasal Swabs	positive	...	...	...	12
	negative	...	...	...	48
	not done	...	...	...	10
Skin positive and nose negative					10
Skin negative and nose positive					1

*In the recent International Conference leprosy was divided into two types, viz., N=Neural and C=Cutaneous. The numerals 1, 2, 3, affixed to the letters indicate the advancement of the disease. It was recommended that as far as possible the word "leper" should be deleted from conversations and writings.

These figures only help to confirm one's opinion that the diagnosis of leprosy is based largely on physical examination. Bacterioscopic examination is of value, in a few cases, in aiding one to differentiate leprosy from other conditions, such as fungous diseases of the skin and leishmaniasis. As indicated, nasal swabbing has proved of very little value in this group.

Body Charting.

All leprosy patients are "charted" soon after their first appearance at the dispensary, and re-charted approximately every three months. The charting which is a tedious, time-consuming and exacting procedure, is done by a specially trained assistant. Anterior and posterior rubber-stamps are used for the outline.

Intercurrent Diseases.

In addition to the regular initial history, physical and bacterioscopic examinations, all patients are subjected to most of the routine laboratory procedures, which include examinations of stool, urine and blood specimens—the Kahn test for syphilis and the night-blood concentration for microfilariae. A permanent record consisting of an 8-in. by 5-in. card, to which leaves and charts can be attached *ad lib.*, and which is filed according to the name (alphabetically), is used for all patients, including those suffering from leprosy.

An analysis of the intercurrent diseases and conditions present in one group shows the following:—

Some intercurrent condition present in 37				53	per cent.
<i>Filariasis</i> —night-blood positive	14	...	...	20	„
<i>Syphilis</i> —					
Kahn positive	18	...	...	25	„
Kahn positive	6	...	...	8.5	„
<i>with</i> clinical evidence of syphilis.					
Kahn positive	12	...	...	17	„
<i>without</i> clinical evidence of syphilis.					
<i>Intestinal Parasites</i>	15	...	...	21.5	„
<i>Miscellaneous</i> —					
Chronic bronchitis	...	...	...	3	
Aneurysm	...	...	...	2	
Pyelitis	...	...	...	1	
Filarial manifestations	...	...	...	5	
Gonorrhœal urethritis	...	...	...	1	

Malaria—acute and relapsing, was in evidence in a small proportion of the patients.

It seems to be especially worthy of note that the commonest intercurrent condition found in this group is filariasis, night blood positive. If all the patients manifesting pathological changes indicative of a filarial infestation, hydrocele, inguinal and femoral adenitis, funiculitis, lymph-angio-vairx, &c., had been included the percentage incidence would have been considerably increased. Suffice it to say that as a result of our experience we consider filariasis not only the commonest inter-current disease in this area, but the most serious common condition associated with leprosy. Its presence seems to constitute an important factor in the production of "reactions" as well as increasing the frequency and severity of inflammations about the site of injection. Then, too, filariasis is practically uninfluenced by any form of treatment, except perhaps temporarily by intravenous injections of antimony; attacks of filarial fever interrupt the course of specific anti-leprotic treatment; and finally, it has a constantly debilitating effect on the general health of the patient. We are convinced that sufficient cognisance has not been taken of the presence and deleterious effects of filariasis in leprosy patients.

Syphilis, its presence and importance, in the bulk and in individual cases, as a factor in lighting-up or increasing the severity of the leprosy infection, is difficult to determine accurately. Those of us who are working in a general clinic, such as the Jumna dispensary, watching the results of thousands of Kahn tests in both leprosy and non-leprosy patients, and comparing the serological with the clinical findings, are accustomed to see the former coincide with the latter in a very large majority of the non-leprosy cases. The impression is that the "Kahn" runs true to form in the general run of patients. This is not our impression, however, in the case of the leprosy group. We are convinced that leprosy, especially where there is fairly marked skin invasion (B_2), will not infrequently give a positive Kahn reaction. This conviction is strengthened by the figures given above: two-thirds of the Kahn-positive cases revealed no clinical evidence of syphilis in history or on examination. All of them were B cases.

With regard to the management of these cases we might mention that a positive Kahn reaction is disregarded unless it is backed-up by very suggestive or positive clinical data; or unless it occurs in an "A" patient. Then the patient is treated for his or her syphilis just as intensively as any

member of the non-leprous latent syphilitic group. The arsenicals are used *ad lib.** Then the course of E.C.O. (75 per cent. ethyl ester hydnocarpus, undistilled, in olive oil) and bismuth salicylate (5.5 gm. to 100 c.c. liquid paraffin) are usually run concurrently, one injection in each buttock twice a week.

Unfortunately the data available on the serological results of treatment are not sufficient to warrant conclusions.

Duration of the Disease.

It is impossible to secure accurate information from many patients on the question of the duration of the disease. One feels that most patients do try to tell, with a fair degree of accuracy, how long they have noticed certain symptoms ; but in most cases one is convinced that the disease has existed for months, or often years previous to the date indicated by the average patient as the time of the commencement of the symptoms. This period ranges from two weeks to twenty-five years in the group under review, with an average duration of a little less than four years.

Period Under Treatment.

This is one of the most discouraging features of the whole study. To be sure, if all patients in India co-operated as one would like them to co-operate, the existing medical institutions would be hopelessly swamped by their visits.

Four of our patients came only once to the dispensary, and 17 were under treatment for three months or less. One a young European has been coming regularly for eight years and nine months. However, the average period under treatment for the entire group is 16 months, which is rather gratifying on the whole.

The 70 patients have received, in the entire periods during which they have been under observation, altogether 3,498 injections, which is an average of almost exactly 50 injections per patient. During the year under review, they have received 1,319 injections, which is an average of only 19 injections per patient. These totals might be augmented somewhat by including the injections given to those half-dozen or more pay clinic patients who received treatment in their home towns under the supervision of the clinic.

* This has been made possible through the kindness of two firms, E. Merck, of 916, Parrish St., Philadelphia, and The Haverro Trading Co., of 15, Clive St., Calcutta, each of whom supplies us with Neo-arsphenamine and Neo-salvarsan, respectively, at a cost of Rs. 3, per 4.5 gm. tube, which is usually sufficient for ten injections, a cost of less than 5 as. per injection.

Nevertheless, in spite of these rather discouraging figures, there is a very strong impression among the dispensary staff that of all the large groups of patients, including the syphilitic, the tuberculous and the leprotic, the latter are the best co-operators. The figures indicate that a certain proportion, perhaps one-third, who decide to stick, do so with a wonderful degree of patience and fortitude.

It is of interest to note that of the 70 patients we succeeded in persuading only one man to be admitted to the nearby Asylum at Naini.

Printed instructions in the appropriate language or script, Urdu, Hindi, Roman Urdu, or English, are given to most patients. This leaflet reads as follows :—

INSTRUCTIONS TO PATIENTS SUFFERING FROM LEPROSY.

You have leprosy: which is caused by a particular organism that enters the body, either through the delicate membrane of the nose and throat, or through an abrasion in the skin. It is always acquired by being in close contact with somebody who already has the disease. You may not have been aware of such contact. Possibly it occurred in childhood, during which period a person is especially susceptible to infection by the bacteria of leprosy. Food, clothing, dishes and fingers contaminated with these organisms can carry the disease. Once they gain access to the body they enter the blood, and later, perhaps many years later, give rise to the manifestations which are characteristic of the disease, small discoloured patches on the skin; little raised nodules on the body, chiefly the face; areas of anæsthesia, mostly common on the hands and feet.

Treatment.

This is a matter of at least two years' absolute co-operation with the dispensary. Success depends largely on commencing treatment early and continuing it faithfully. If the manifestations are not marked there is a 30 per cent. chance that the progress of the disease can be arrested.

Report at the dispensary for injections, which are given twice a week, on Wednesdays and Saturdays. In addition, take regular moderate exercise. Spend as much time as possible out of doors. Sleep outside all the year round. See that your food is fresh and prepared with care. Eat plenty of fresh vegetables, and drink half a seer or more of milk each day. Bathe daily. Expose the body as much as possible to the air and sunshine. Get your sleep regularly.

Prevention.

Because of the danger to others you are urged to go to the home at Naini. There you will receive regular treatment, just as at the dispensary. Quarters, food, water and a small money allowance are provided. In addition, you are given for cultivation as much land as you can care for properly. You may take a near relative with you, and any children you may have will be well cared for and educated in the homes for lepers' children.

By going to the Asylum you will probably save someone from contracting the disease. But if it is really impossible for you to go, carry out the following instructions as best you can :—

Give up your present work if it brings you in close contact with others, or necessitates your handling food or clothing. Substitute farming or wood-cutting, if conditions will permit. In your home live separate from the family, using your own bed, clothing, dishes and room or screened-off portion of the verandah. Keep everybody, especially children, away from yourself, your room and your personal belongings. Do not cough or sneeze without covering your mouth and nose with a handkerchief.

Bring every member of your household to the dispensary for examination.

Results.

Admitted to the Asylum	...	...	1
Inadequate treatment	...	...	15
(Less than 10 injections)	...	...
Retrogression	...	...	0
Slight improvement	16	...	30 per cent.
Moderate improvement	18	...	33 "
Marked improvement	16	...	30 "
Arrested	4	...	7 "

These figures need little comment. As usual, one is struck by the large number, 93 per cent., of patients who manifest some degree of improvement, and the very small proportion of those in whom the disease is arrested or clinically cured. One unfavourable feature is not apparent in these figures, and that is that after several months or years of treatment the general condition of a few of the patients could not have been said to have "improved," although the disease leprosy showed definite signs of retrogression. However, on the whole, the results are gratifying, and our conclusion is that a general dispensary has a place, and in some ways a very important place in the campaign against leprosy.

Short Report on Mercury Salicylate and its effect on the Kahn Reaction.

M. WARDMAN.

IN 1927, Dr. Cochrane mentioned that Dr. Wilson, of Korea, was using mercury salicylate in the treatment of syphilis in leprosy. As avenyl was so expensive, it was suggested that a trial of the former drug should be made. Unfortunately, owing to several unforeseen happenings, it was impossible to carry out an extensive test. The following shows the result to date :

<i>Case.</i>	<i>1st Kahn.</i>	<i>Treatment.</i>	<i>Last Kahn.</i>	<i>Remarks.</i>
Case I (Female).	+++	Five injections from Oct. 11th, 1929, to Dec. 15th, 1929.	+ —	
Case II (Female).	++++	Eleven injections from Aug. 20th, 1929, to Feb. 18th, 1930.	+ —	2nd course begun.
Case III (Female).	+++	Six injections from Oct. 22nd, 1929, to Jan. 7th, 1930.	++	
Case IV (Female).	++++	Eight injections from Apr. 17th, 1928, to June 8th, 1928.	+	
Case V. (Female).	++++	Eight injections from Aug. 13th, 1929, to Oct. 8th, 1929.	++	
Case VI (Female).	+++	Four injections from July 26th, 29th, to Nov. 23rd, 1929.	+ —	
Case VII (Female).	++++	Six injections from Aug. 20th, 1929, to Oct. 22nd, 1929.	+	
Case VIII (Female).	++	Six injections from Aug. 20th, 1929, to Oct. 28th, 1929.	+	
Case IX (Female).	++++	Fifteen injections from Nov. 2nd, 1928, to Nov. 1st, 1929.	+	Two courses.
Case X (Male).	+++	Twenty-six injections from Nov. 14th, 1928, to Feb. 24th, 1930.	++	Three courses.
Case XI (Male).	+++	Ten injections from Aug. 12th, 1929, to Apr. 17th, 1930.	+ —	2nd course begun.
Case XII (Male).	++++	Twenty-three injections from Mar. 21st, 1929, to Jan. 16th, 1930.	+++	Three courses.

Routine treatment consisted of eight intramuscular injections into the gluteal region of $\frac{1}{2}$ gr. of mercury salicylate in hydnocarpus oil 5 c.c., given as far as possible at weekly intervals. Unfortunately, the intervals were not always regular owing to illness or absence of patients, and so proper courses could not be given. In some cases the courses were repeated. Several cases have been omitted from the above list because they left the asylum before completing treatment, or before the final Kahn test was made.

The drug is being given further trial because the results so far obtained are distinctly promising.