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Editorial.

THE EDITOR, Dr. Robert G. Cochrane, is meeting with a warm welcome everywhere in Africa. His experience is proving of great service to leper workers, from whom much appreciation of his helpfulness has been received. Unfortunately, he has had attacks of malaria and pneumonia which called for hospital care and treatment, in consequence his itineracy has been somewhat interfered with, but we hope to see him back again in this country towards the end of July.

Although a copy of his paper on " The Classification and Routine of Leprosy " is likely to appear in an early edition of the Kenya Medical Journal, we think it will be greatly valued by workers in other fields. Certainly, we offer no apology for its presence in the present number of THE LEPROSY REVIEW.

For the same reason we are deservedly giving Dr. E. Muir's contribution on " The Causes of Painful Injections " wider circulation in these pages.

There are certain diseases which exact a heavy toll on the careless and uncleanly worker, and, willy-nilly, for his own protection he has to conform to modern ideas of hygiene. Because the Lepra Bacillus is apparently less active than others of the granulomata group, there is no reason why the attendant on leper subjects should be indifferent to health conditions. Consequently, we welcome Dr. G. Gushe-Taylor's reminder of our responsibilities as custodians of public health. The value and force of example should never be lost sight of, and he who would have health and cleanliness to reign among men must himself be considerate to the elementary laws of health.

We are always glad to receive contributions from leper workers and investigators in any field of service. In publishing the Rev. F. W. Ross's paper on " After a Year's Work—Jottings from an Indian Treatment Centre," we feel sure that it will create an interest and a fellow feeling in the minds of lay and professional worker alike. This work of healing the leper is well worth while, and therefore it is not surprising to find that notwithstanding the difficulties experienced in the early months of his stewardship, Mr. Ross is at present planning and hoping for an extension of his work among lepers.

H. F.

Classification and Routine Treatment of Leprosy.

R. G. COCHRANE.

(*Part of a lecture delivered to medical men in East Africa.*)

THE two chief difficulties which face the medical man when he first begins to take an interest in leprosy are, firstly, the difficulty of classification, and, secondly, that of treatment.

It is at once apparent to anyone beginning to take an interest in leprosy that the text-book descriptions of maculo-anæsthetic, mixed, and nodular leprosy, do not always meet the situation. Workers in India use a classification which was originally worked out by Dr. Muir, and I therefore propose to describe the course leprosy tends to take and then apply this classification to the various stages of the disease. In the first place, I wish to emphasize that each stage of leprosy is more or less closely related to the previous stage. On reading standard text-books, little indication of such a relationship is given, each form of the disease being described separately, and the impression conveyed is that they are entities in themselves. In describing what might be termed a typical leper history, I do not suggest that every subject of the disease goes through this course, for there are many modifying factors. In almost every case, however, previous steps of the disease can be traced, and not infrequently the history of the patient can be followed from the commencement as early nerve leprosy, through the various skin stages, until the case finishes up in the late secondary, anæsthetic stage, the disease having died out.

The country in which the disease passes through the various stages most typically is India, but I have seen enough early cases in Africa to feel sure that the disease does not differ materially from that seen in India.

Leprosy is a disease which does not readily gain a footing in the human body, and unless the patient is very susceptible to the disease, it attacks the most vulnerable tissue, which in this instance is nerve tissue. In the vast majority of cases the earliest signs of leprosy then, are those of nerve involvement. I shall not have time to enlarge on the question of how the mycobacteria of leprosy gain entrance to the nerve tissue, suffice is it to say that the bacilli can be demonstrated around the nerve terminals and in the nerve sheath. The

various changes seen giving rise to the clinical features of the disease are, first, œdema and swelling resulting from the presence of the organism, then contraction as a result of fibrous tissue formation. The signs which indicate nerve involvement are, in the order of importance from the treatment point of view, as follows :

1. Depigmented, or more correctly, hypopigmented patches.
2. Anæsthesia, first to very superficial touch, later pressure sense is gradually lost.
3. Nerve enlargement.
4. Muscular paralysis.

1. *Depigmented Patches.*

The commonest situation for these are the cheeks, outer aspects of the limbs, over the region of the scapulæ, and the buttocks. The patches are light in colour, but in the very dark skin may have a coppery appearance. The condition is more accurately described as hypopigmentation, as the depigmentation is never so complete as in leucoderma.

2. *Anæsthesia.*

This is the commonest and one of the most certain signs of nerve involvement in leprosy. At first the anæsthesia is very superficial, and therefore any method which tests pressure and not tactile sensation may lead to erroneous conclusions. Thermal sense is lost early in the disease, but later pressure sense also disappears. It should be noted that hypopigmented patches, although sometimes anæsthetic, are not generally so. It is along the cutaneous distribution of the ulnar and peroneal nerves that anæsthesia is commonly found.

3. *Nerve Enlargement.*

Associated with anæsthesia there is frequently seen enlargement of the superficial nerves. The usual nerves to become enlarged are the ulnar, peroneal, and great auricular, although I have not seen gross enlargement of the latter nerve so commonly in this country as in India.

4. *Muscular Paralysis.*

This is usually a late manifestation of leprosy, and by the time this is apparent the disease, as a rule, is in the advanced stage. In passing, I might mention that the development of the disease is not necessarily a matter of time. One patient may have had the disease a longer time than another, yet on account of some factor raising his resis-

tance, he may not be in such an advanced stage as the one who has been infected for a shorter period of time. As a general rule, however, the longer he has had the disease the greater the likelihood is that his signs are advanced. While muscular paralysis is usually a late manifestation, an exception to this is the facial nerve, which may become involved early in the disease. As a result of pressure of the bone in the stylo-mastoid foramen, the nerve is speedily permanently damaged, and thus facial paralysis does not tend to recover.

The stage which I have described is classified as early nerve leprosy, and may be denoted by the symbol A1. It cannot be too strongly emphasised that this stage is not contagious, and, where possible, lepers belonging to this group, provided they attend for treatment as out-patients in a dispensary or suitable clinic organised for the purpose, should be allowed to continue their employment.

Skin Leprosy.

If the early nerve leper remains untreated he may sooner or later show signs of skin involvement unless his resistance is high, in which case the disease may become spontaneously arrested, or become localised in a nerve or group of nerves, and never become generalised. Therefore it is at this stage that the leper complains of symptoms which mainly show themselves in vague rheumatic pains, general malaise, and periodic febrile attacks. These attacks may last from a few days to many weeks, and, if severe, may reduce the patient's vitality to such a low ebb that he readily falls a prey to some intercurrent disease, or he may rarely die as a result of the cachexia caused by repeated reactions. The chief signs of this stage of the disease are :

(*a*) Skin rashes.
(*b*) Nodules.

(*a*) *Skin Rashes.*

These are first seen at the periphery of the hypopigmented patches. As a result of a reaction, perhaps during treatment, or because of some factor which lowers vitality, *e.g.*, an attack of malaria, the depigmented patches become red, and the periphery becomes raised, and where no bacilli could be found they can now be demonstrated.*

*At the periphery of the patches take a pair of scissors curved on the flat and snip a piece of the skin out, smear it on a slide and stain the smear as for tubercle bacilli.

(*b*) *Nodules.*

These appear as a result of a blood stream infection, and this stage can be conveniently designated as miliary leprosy, on the analogy of tuberculosis. The skin stage is the contagious stage, for not only can bacilli be demonstrated from skin clippings, but also from smears or scrapings from the mucous membrane of the nasal septum. While the nose is not infrequently positive in this stage of the disease, I believe that the nose is never the primary source of infection. The skin stage of the disease can be denoted by the symbol B. According to whether the patient has few, moderately large, or myriads of bacilli demonstrable in nasal smears or skin clippings, the leper is said to be in the B1, B2, or B3 stage.

In the majority of cases leprosy dies out of the body, leaving the patient mutilated but free of his disease, that is, leprosy can be described as a self-healing disease. Lepers, unless they die of some intercurrent infection, or more rarely succumb during an attack of lepra fever, usually reach this stage. In a certain number of instances the disease may not advance further than the early stages, and the patient become healed of his disease without resulting deformity. In the advanced skin form this process of natural arrest may take many years, and even after all outward signs have disappeared, bacilli can be demonstrated in lymphatic glands on post-mortem examination. Hence the fallacy of giving potassium iodide as a test of cure.

The body overcomes the disease by encapsulating the bacilli in fibrous tissue, this tends to contract, and thus nerve and other tissues are destroyed. As a result of this, the characteristic deformities appear. The absorption of the small bones of hands and feet are largely trophic manifestations. This last stage is styled secondary anæsthetic leprosy, and is denoted by the symbol A2. All the bacilli have disappeared from the skin, and the patient is once again not contagious, but treatment can do little for such cases. The older writers used to refer to this type as " Lepra-mutilans." It is important to realise that trophic ulcers after healing are very liable to recur unless the patient is under constant observation. The breaking down of such ulcers is not necessarily an indication of activity, and is more often due to lack of cleanliness.

I shall now give the stages of leprosy in the form of a summary, and I trust the classification will be apparent.

A1 = Early nerve leprosy (non-contagious).
B1 = Early skin leprosy (contagious).

B2 = Advanced skin leprosy (contagious).
B3 = Very advanced skin leprosy (contagious).
A2 = Secondary anæsthetic or burnt-out leprosy (non-contagious).

There are various intermediate stages which may be denoted as follows :—

A1—B1. Early nerve leprosy passing into the early skin stage.
B1—B2. Early skin leprosy passing into advanced skin leprosy.
B3—A2. Very advanced skin leprosy passing towards the secondary anæsthetic form.
A1—A2. Early nerve form passing to late nerve form and missing the skin stage altogether.

Grants for Leprosy Work.

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

	£
TANGANYIKA.	
Capuachin Fathers' Mission, Kipatimu	50
SUDAN.	
Church Missionary Society, Lui	200
NYASALAND.	
White Fathers' Mission, Mua	50
INDIA.	
Rev. F. W. Ross, Raniganj. For new centre ...	100
KENYA COLONY.	
Church of Scotland Mission, Tumutumu	90

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

Leprosy in Ceylon.

C. SIVASITHAMPARAM.

CEYLON is an island in the Indian Ocean, situated to the south-east of India, 25,332 square miles in extent, with a population, according to the last census, of 4,497,700, exclusive of military and shipping. The great bulk of the population is Sinhalese, and the others in the order of numbers are Tamils, Muslims, Burghers and Malays. The climate is tropical, and fairly healthy.

The measures adopted by the Ceylon Government to check the spread of leprosy are governed by Ordinance, which gives the necessary legal power for compulsory segregation of lepers in an asylum, after being examined by a Board consisting of two Medical Officers, and on obtaining the pleasure of His Excellency the Governor ; or the granting of home-isolation, provided the conditions required by the Ordinance are fulfilled. Government has also the power to repatriate Indian leper immigrants, through the Controller of Indian Immigrant Labour, as soon as the relatives who can take charge of them are traced in India.

Leprosy is endemic in Ceylon, and it has been known for over 250 years, the asylum at Hendala having been established in 1708, during the Dutch Period. It is not possible to give an accurate estimate of the number of lepers in the Island, on account of the absence of a proper census, which is difficult to obtain owing to the general tendency of the lepers to conceal themselves, due mainly to compulsory segregation in an asylum, and to the possible social degradation of the whole family. There are at present about 1,000 known lepers, but an estimate of about 3,000 for Ceylon would not be far wrong.

The Distribution of Leprosy in Ceylon.

Ceylon is divided geographically into nine Provinces, five border the sea, and are called the Maritime Provinces, and the remaining four form the Kandyan Provinces. Leprosy is most prevalent in the Maritime Provinces. The conditions prevailing in these Maritime Provinces for the spread of leprosy are at present unknown.

Leper Asylums.

There are two leper asylums in Ceylon for the segregation and treatment of the disease, maintained at the expense of the Ceylon Government.

1. The Hendala Leper Asylum is about six miles from Colombo, and is situated on a block of land, 26 acres in

extent, near the mouth of Kelani River. It is built in the form of a hospital with large wards, the males being separated from the females. Husbands live apart from their wives, and marriage between lepers is not allowed. Each block has an infirmary where very advanced cases and intercurrent acute illnesses are treated. At present it has accommodation for 406 males and 102 females. The patients are given all facilities for occupations, such as flower and vegetable gardening, carpentry, tailoring, shoe-making and pottery. Indoor and outdoor games are provided. Removal to a more spacious site and the building of an up-to-date leper settlement is under consideration.

2. The Mantivu Asylum is on the Eastern coast. It has recently been built on the latest plan, with isolated two-roomed cottages, each accommodating three or four patients. Sufficient ground is available for purposes of cultivation.

Staff.

A full medical staff is provided at each asylum, and the nursing is carried out by Religious Sisters of the Franciscan Order.

One thousand and thirty-five cases were treated at both asylums during the year 1929, of whom 881 were Ceylonese, 152 Indian immigrants, and two Europeans.

Treatment.

Various methods of treating leprosy have been tried in the two institutions in Ceylon, but the only treatment carried on at present is the injection of E.C.C.O., which is a mixture of the Ethyl Ester of Hydnocarpus Oil with Creosote and Camphor in oil.

The E.C.C.O. is given by the method of subcutaneous infiltration to the Deltroid and Gluteal regions or the outer side of the thighs, twice a week, commencing with ½ c.c., and going up to 5 c.c., increasing by ½ c.c. each time.

Of nearly 750 patients in the two institutions in Ceylon, 554 (432 males and 122 females) have availed themselves of the injection treatment during the year 1929. There has been an increase of over 200 taking treatment as compared with the figures of the previous year. The treatment is not compulsory. It is impossible to get startling results in institutions like these, where most of the patients are admitted after the disease has progressed for several years. Even in these cases the drug is doing some good in arresting the further progress of the disease The early cases show very encouraging results.

Number discharged from the Asylums.

Patients who have shown improvement after a course of injection treatment are bacteriologically examined three times, at intervals of one month. Those found free from Bacillus Lepræ on three successive examinations are discharged on parole on condition that they report themselves every three months to the nearest Medical Officer.

Of the patients discharged during the year three have returned to the asylum with fresh outbreak of ulcers.

A Form of Medicinal Treatment in Severe Cutaneous Leprotic Fever.

T. B. WELCH.

THOSE concerned in the treatment of lepers encounter much difficulty from time to time in dealing successfully with severe cutaneous leprotic fever. While very severe cutaneous reactions are somewhat infrequent, they may, in the second and third stages of leprosy in Muir's classification, *i.e.*, in the stages of extension and of elimination, by their prolonged duration, cause serious exhaustion, and they occasionally terminate in death. Moreover, in the stage of extension, the patient on recovery from the fever, may be more heavily involved in leprosy than before, through dissemination, with grave prejudice to his chances of ultimate re-establishment. A further point of importance is that the application of modern methods in the treatment of lepers, in which the immediate objective is often the production of the mildest reactions clinically recognisable at short and regularly recurrent intervals, involves some risk of the eliciting of reactions of impredicable severity; this risk is, however, reduced to a minimum if the patient is under careful observation, and if the earliest indication for the modification or temporary suspension of treatment is promptly acted upon. Measured against the benefits reasonably to be expected in suitable cases, this risk becomes a minor matter; nevertheless, even where all possible care has been exercised, severe reactions are very occasionally brought about by treatment.

In consequence of the very variable duration of attacks of leprotic fever, if untreated, it is difficult to assess the value of any method of treatment unless a large number of cases have been dealt with. It is proposed herein to describe a method that has been used with marked success in the majority

of the very many cases treated thereby during the last four and a half years. As a result of the experience so gained, the following claims are thought not to be excessive, viz. :—

(*a*) That the fever is often at once, and usually, but not invariably, speedily controlled.

(*b*) That, even if the patient is in the second stage of leprosy, new lesions associated with the attack of leprotic fever usually fail to become permanent.

(*c*) That the retrogression of pre-existing lesions, which occurs with some frequency in lepers in the third stage of leprosy after an attack of leprotic fever, occurs in still greater frequency as a result of the treatment to be described.

There are, however, occasional cases in which success is not immediate, and a very few that prove entirely resistant ; in the latter, one or other of the various methods that have been advantageously used, of which a summary is given by Green (1929)[1] may prove more successful.

The procedure for which such considerable claims are advanced is an adaptation of that recommended by the late Sir Archdall Reid and others (1921)[2] for the treatment of patients in a large variety of acute febrile conditions. It consists essentially in the giving in combination of Aspirin, Phenacetin and Dover's Powder.

Treatment is carried out in the writer's practice as follows :—The patient on admission to hospital is wrapped in a blanket, hot-water bottles are applied, and he is given a large cup of tea as hot as he can drink it, preceded by the following powder :—

Aspirin	grs.	x.
Phenacetin	grs.	v.
Pulv. Ipecac. Co.	grs.	v.
Calomel	grs.	iv.

In about two hours, during which the patient has been kept wrapped up as above, the very heavy sweating induced begins markedly to diminish ; clothing and bedding are now changed, and later the patient is given two ounces of Mist. Alba. Thereafter he receives the above powder, the calomel, however, being omitted, morning and evening, the additional means of inducing severe sweating being applied as before, until his temperature has been normal for two or three days, and then the powder, etc., are given once daily only for several days.

Almost invariably the establishment of free sweating is accompanied by a falling temperature and relief of distress. The fever and associated symptoms may recur, but, even so, they are likely to be less marked than at first, and are again

controlled. The patients speedily learn the benefits of the procedure, and willingly tolerate its transient discomforts. No ill effects sufficient to cause anxiety have been noted in dealing with many patients varying widely in age and in general condition; even the old and the debilitated have proved, with hardly an exception, quite able to profit by this treatment.

It is hoped that the procedure described may be tried elsewhere in severe reactions, and that its merits will be found not to have been over-estimated herein.

REFERENCES.

[1] Green, R. (1929.) Some Observations on the Leprous Reaction. *Trans. Roy. Soc. Trop. Med. & Hyg.*, Vol. xxii, No. 4, January, 1929.

[2] Reid, Archdall, G. (1921), and others. The Treatment of Acute Toxæmia. *B.M.J.*, June 4th, 1921, and following issues. (Correspondence.)

Treatment in Persia with 2 per cent. and 6 per cent. Alepol Solutions.

H. A. LICHTWARDT.

FOR three and a half years we have been giving regular medical treatment to the lepers residing in the village of Mehrabkhan, a short distance from Meshed. For the first eighteen months we used the ethyl esters of chaulmoogra oil intramuscularly, and found them quite satisfactory, except that in the larger doses they occasionally caused much discomfort, and at times abscesses were produced. (In a quarter of 1 per cent. of the cases there were abscesses of the buttocks.)

Following this for another period of eighteen months, we used " Alepol " intramuscularly and intravenously in the specified 3 per cent. and 1 per cent. solutions, varying the method according to the needs and desires of the patient, the condition of the buttocks, the accessibility of the veins, etc., etc. We observed that the " Alepol " was not nearly as irritating as the ethyl esters of chaulmoogra oil, and that the lepers " enjoyed " their injections more than the previous ones. The changing, in an individual, from intramuscular injections to intravenous ones, when his thin buttocks offered no more available tissue for injection, was always appreciated by the patient. In those cases where the veins became obliterated or were difficult of access, it was possible to resort again to the intramuscular administration.

It is of course very difficult to state definitely which treatment was most effective therapeutically, but our observation was that " Alepol " produced favourable results more rapidly than the ethyl esters of chaulmoogra oil.

The injections of " Alepol," both intramuscularly and intravenously, were given twice a week in increasing doses of 1 c.c., if the condition of the patient permitted it. If the leper developed more nodules, if his ulcers became more extensive, or if he had fever or other complications, such as nephritis, the dose was not increased—often radically decreased to a dosage which he tolerated. Occasionally it was necessary to discontinue injections for several weeks in patients with an extended course of fever, painful lepromas of the cornea, etc.

The 3 per cent. solution intramuscularly and the 1 per cent. solution intravenously were given up to as much as 32 c.c. twice weekly without any disconcerting reaction, the only objection being to the actual bulk of the dose which caused a certain amount of discomfort, when injected in the buttocks. It was therefore decided to use solutions 100 per cent. stronger in order to decrease the actual c.c. of solution given, and now for more than three months we have been using the 2 per cent. and 6 per cent. solutions of Alepol in distilled water (with 0·5 per cent. carbolic). Intramuscular injections are given unless contra-indicated, and in a number of cases we have given as high as 22 c.c. of the 6 per cent. solution without bad results. Intravenous injections as high as 12 c.c. of the 2 per cent. solution have been given with no untoward results. The only caution we would suggest is not to increase the dosage too rapidly (*i.e.*, not more than 1 c.c. increase per week), as we found that five patients had a severe œdema of the face and neck following too rapid an increase in dosage. This reaction soon subsided when the injections were omitted for a week or ten days. We are now giving injections twice weekly to 110 lepers, and find that this more concentrated solution is readily tolerated and without unfavourable results. In cold weather the solution should be warmed to body temperature, as otherwise it is liable to cause discomfort to the patient.

In addition to the above treatment, the various lesions of the lepers are dressed twice a week, mercurochrome being applied to the open sores, and they are then dressed with sterile gauze and bandaged. Nodules are painted, a few at a time, with 50 per cent. trichloracetic acid. For a period of several months we gave potassium iodide orally to selected cases among the healthier, stronger lepers, but in at least

50 per cent. of these cases it produced unfavourable results after a short time, and had to be discontinued. Intravenous injections of 20 c.c. of 5 per cent. sodium iodide solution weekly was efficacious in a number of lepers who were unable to take potassium iodide orally. Special conditions, such as syphilis, malaria, worms, nephritis, diarrhœa, etc., are, of course, treated by the required therapy.

Persia being a high, dry country, with much sunshine and little rainfall, the leprosy problem is not as big a one as in some lands, but the disease is one which can be and should be eradicated in a decade or two with the proper co-operation of the government and other interested parties. At present this is the only place in all Persia where regular medical treatment is being given to the lepers, and new cases come in every month from various parts of the country, and from Russia and Afghanistan also. It is strange that practically none of the lepers are really Persians, the most are inhabitants of Persia ; about half of them are the Mongol-type Berberees from Afghanistan way, and the other half are Turks from the western border of Persia. In co-operation with local Persian agencies, as well as outside organisations, such as the American Mission to Lepers and the British Empire Leprosy Relief Association, we are doing what we can to rid this portion of the world of this horrible and unnecessary disease.

Leprosy in the Hills of Assam.

G. G. CROZIER.

MY personal experience with leprosy in the hills of Assam is largely limited to the Garo District and the Manipur State. I have but little personal experience of the incidence of the disease in other regions. Some 25 years ago, in the Garo Hills, I made careful investigation in many villages, and raised a cry of alarm which was printed in the " Indian Medical Gazette." Government investigation followed, and " proved " that my statements were " unfounded." A few years later Government opened a hospital for the treatment of leprosy in that district. The subject is being more carefully dealt with now in that district, though still far from effectively. In my report, which the Government delegate " proved " unfounded, I showed that the disease was *very* common in four large villages, and that there were some cases in other villages, and that in the opinion of leading men of those four villages the number of cases had

greatly increased in the last 25 years. I began systematic treatment and propaganda on the subject.

In 1918 I began a similar work in Manipur State. I was then informed that there were 160 lepers in the State. Since then the Mission Leper Colony at Kangpokpi has admitted 208 cases, and the State has started work for lepers, and has admitted over 200 cases. The State service is both hospital and dispensary. The Mission has no dispensary leper work, for there are no lepers living near. The State work is for the people on the plains, mostly Hindu and Mohammedan ; the Mission work is for the people of the hills, Animists and Christians. The State is co-operating generously, and with excellent spirit, in this work for the hill people : they provide the support for the patients, the sum amounting last year to Rs. 2,718. I am told they have budgeted Rs. 3,000 for the present year, but seem to be getting a bit nervous about the rapidly increasing amount, and to feel that although the number of cases may increase, they will have to decrease their grant.

At the Kangpokpi Leper Colony 57 cases have been discharged as probably cured, and 95 cases are at the moment (middle of April) under treatment. Other cases are liable to arrive any day. It is a great regret to the Superintendent that other responsibilities and shortage of funds have made it impossible for him to carry out scientific tests for concurrent diseases and the useful bacteriological examinations ; clinical evidence only has been relied on for admission and for discharge, but results seem to justify the method—there have been but few returns or relapses of those that have been discharged. The patients are housed partly in rough board cottages with fireplaces, and partly in temporary grass huts. A good treatment shed and infirmary has just been completed, and work is now under way to bring water in a pipeline from a mountain spring three-quarters of a mile away, and distribute it to the Colony. Plans are in hand for the construction of two more cottages and a church, and plans ought to be considered for the separation of the children not yet evidently lepers.

There are five clearly-marked regions in the hills of the State, the north-east, the south-east, the central north, the north-west, and the south-west. No survey has been made of the south-east, though many cases have come from there. No survey has been made of the central north, and no patients have come from there. The north-east has been carefully combed, and though there are said to be no cases remaining, several cases have come from there this year, and

others are likely to be discovered. The Subdivisional Officer of the south-west has reported that there are probably but few left in that region. In the north-west there are some, and probably many cases are still in the villages, as many have come from that region. A State order has been passed that all cases must come to Kangpokpi or live outside their village. It is, of course, impossible to make this order really effective, but it is helpful and educative.

Five things are needful in this movement to eradicate the curse of leprosy :

1. Restore a wholesome fear of the disease so that cases shall not be secreted. This is important both to the patients and to the people.

2. Treat all cases, specially the early ones, and in so doing spread abroad the good news that early cases are likely to be cured and returned home.

3. Segregate all cases, both early and late, to protect others from infection. I know that I am not in agreement with many authorities in advocating this, but I still believe it to be vital. I am aware that trustworthy cases living near treatment centres can be " segregated at home." This has its advantages as well as its dangers, and very real dangers they are when it is remembered how the disease runs in families.

4. Give a comfortable home to the incurables and the maimed. I consider that these should not be left at home, nor left to roam at large, even though the evidence does seem to prove them non-infective. Some " burnt-out cases " seem to have active relapses strikingly like the acute stages of earlier cases.

5. Not only from a purely Christian point of view, but also and distinctly from a medical point of view, we should give them the message of eternal joy. Some government institutions seem to fail just here. The treatment they give is good, but the psychological and the spiritual influences are neglected, and they complain of failure.

The writer deprecates a tendency to over-boldness in the matter of relative weakness of infectivity of this disease. A distinct restoration of fear is of value both among the people and among the workers ; and on the part of the workers a clearer realisation that we are dealing with vital germs whose activity is not sufficiently known, but none the less real—not a cowardly, terrified fear that would probably make several of us inmates of an asylum. Let us not be over-bold in our knowledge and in our ignorance. Reasonable precautions are not out of order.

The economic element in this disease is a great one.

Nearly two-thirds of my total number of cases are in the middle third of life—and this is one very important factor in the rapid spread of the disease, it being in the most active stage of life both of men and women—and in the last third of life the cases decrease rapidly, but very few of them being active workers beyond 50 years of age. Nearly all who reach that age are broken in health and badly maimed.

Looking at the results of the first ten years of treatment in this State, it does not seem unreasonable to the writer to again express the hope that by the end of twenty or thirty years the hills of the State will be practically free from this disease. Other hill regions may be more difficult than these, but a vital faith, a definite policy, and a determination to accomplish something need not result in disappointment. At least, that is the opinion of the present writer.

The Curability of Leprosy.

E. MARCHOUX.

LEPROSY is curable in the same way as tuberculosis, and the methods that prove efficacious for the treatment of the latter are efficacious also for the former.

Leprosy, like tuberculosis, may cure spontaneously. If this method of cure has not been reported very often, it is because early diagnosis of the disease is difficult, so difficult, in fact, that it is rarely made. When leprosy shows itself by external signs it is already very far advanced, and has reached a stage exactly comparable to that of cavernous tuberculosis. It is no wonder then that spontaneous cure is not seen to occur in manifest leprosy. But when earlier infections are studied carefully, regressive phenomena may be observed which are comparable to those occurring in incipient tuberculosis. Doubtless the general state must be favourable, and the patient must have those conditions of comfort, rest, good food and fresh air that are required by consumptives.

I have observed in the laboratory the spontaneous cure of a sewer-rat, *Mus norvegicus*, whose inguinal glands, punctured at the time of capture, contained Stefansky's bacilli. After being kept for some time in the laboratory under good living conditions, it was killed in an apparently good state of health, and at autopsy showed nothing more, amidst a considerable panniculus adiposus, than some glands of small

size free from all bacillary infection. This observation, unique, but well authenticated, induced me to recommend my pupil, Dr. Lebœuf, who was going to take up anti-leprosy work in New Caledonia, to hunt up in the colony the cases previously discovered by Auché. The latter, in 1898, had examined cutaneous fragments from 29 persons apparently unaffected by leprosy, and had found amongst them seven who were harbouring Hansen's bacillus. Lebœuf traced five of these individuals. Two had become evident lepers, two others had died, one in 1906, the other in 1911, without showing any outward signs of leprosy : the fifth was still in good health, and living in his tribe free from all infection.

Here, then, is a case subjected to successive examinations by two perfectly qualified observers, which proves that spontaneous cure may occur in man as it does in the rat.

Observations of this kind would doubtless become very common if we possessed signs for discovering leprosy in the early stages as easy to demonstrate as those by which we can diagnose incipient tuberculosis. We should have still more astonishing surprises if we possessed for leprosy a reagent of a sensitivity as great as that of tuberculin. Without doubt we should in leprous areas obtain proportions, if not of 98 per cent. as for infections with Koch's bacillus (for the latter is carried by very subtle means), yet certainly of unsuspected size. There probably exist discrete infections like those we find in the murine leprosy of the majority of sewer-rats, which remain quiescent in some gland, and never become generalised, but continue unnoticed throughout life. In order to develop, the infection certainly needs a favourable soil : an organism subject to nutritional disorders that allow the development of the Hansen bacillus as also of the Koch bacillus. These conditions are found together in lepers, who are nearly always consumptives also. The same methods of treatment that succeed in raising the general condition of the latter, and in enabling them to resist the infection, are therefore to be recommended for those infected with Hansen's bacillus.

There is no doubt, moreover, that objective treatment gives remarkable results. Progress due to the researches of the firm of Bayer, and to those of Sir Leonard Rogers, in the use of chaulmoogra oil and its derivatives has enabled, if not perfect cures, at least equivalent improvements to be achieved. Iodine, arsenic, antimony, copper and gold have also procured regressive phenomena.

Lastly, in my laboratory, Dr. Markianos has obtained relative successes by the use of defatted Stefansky bacilli in

man as well as in the rat. It is allowable to suppose that the researches undertaken will lead to still better results. Valtis and Markianos also, under my observation, have obtained the regression of large ulcers in the rat by the use of BCG, which in the hands of Pons and Chastel (1), Jouenne and Guilbert (2), Remlinger and Bailly (3) and Mme. Delanoe (4), has given results in man. We have not had the same success : the patient who had been subjected to this method of treatment reacted violently. No doubt there was a concomitant tuberculous infection which provoked the appearance of the Koch phenomenon, and was the cause of the intense rise of temperature observed by us. It would be necessary, as with tuberculin, to work with extremely weak doses of a thousandth or a ten-thousandth of a milligram.

In this connection I should like to refer again to these reactions, which by some leprologists are regarded as favourable. The fact is that after an outbreak of symptoms, disquieting by their violence (fever, suppuration, etc.), the tubercles are generally seen to disappear, and the skin to take on a normal appearance again. But there is another side to the picture. This reaction, like that produced by tuberculin in consumptives, involves a mobilisation of the microbes, and all too frequently, alas, it is followed after a more or less short interval by ocular accidents, so that the benefits do not always compensate for the disadvantages. In my opinion, it is better to avoid these violent reactions.

From this brief statement I think the following conclusions may be drawn :

1. Leprosy is curable in the same way as tuberculosis.
2. The discrete forms are capable of spontaneous cure.
3. A fortiori these discrete forms are more accessible to treatment.
4. We possess in the therapeutic and hygienic arsenal weapons that are efficacious against the disease.
5. The progress that it would be most desirable to see realised is that which would furnish us with the means of discovering discrete infections with Hansen's bacillus as easily as tuberculin proclaims the presence in the organism of Koch's bacillus.

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(2) Jouenne and Guilbert, *Ibid.*, 1927, xx, 91.
(3) Remlinger and Bailly, *Ibid.*, 1928, xxi, 283.
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The Causes of Painful Injections.

E. MUIR.

(*Reprinted from "Leprosy in India," January*, 1930.)

HYDNOCARPUS oil and its preparations when injected into the tissues frequently cause a certain amount of irritation followed by swelling and induration and occasionally by the formation of abscesses. When the oil has been prepared from fresh, ripe seeds by cold extraction, this irritation is, as a rule, less or absent altogether.

The oil should be stored in bottles, and should be sterilised by heating to 120° C. for half-an-hour either in an autoclave or an oil bath. This heating should, if possible, be carried out while the oil is still fresh. It is possible that there is a lipase or other ferment in the oil which causes the formation of the irritating substance ; if this is so, the immediate sterilisation of the oil after extraction would destroy the ferment and prevent the formation of this irritant.

In the Philippines the boiling of the oil or esters with 0·5 per cent. metalic iodine until it becomes brown is found to render the oil or esters less irritating but not less effective.

Other causes of painful injections are :—

(*a*) *Infection of oil when it is too cold and therefore very viscous.*—Such oil instead of filtrating through the tissues is apt to cause a cavity and tearing of the muscles or connective tissue. It is not unlikely that hæmorrhage caused in this way may result in a aseptic abscess formation. Oil when injected should always be of the body temperature or slightly warmer. A convenient way to heat the oil is to heat the syringe by first sucking in oil heated to a temperature of 130° C. and after evacuating this to pour the oil to be injected into the heated barrel of the syringe. The oil is then heated to the required temperature. Care must, of course, be taken that the oil is not too hot.

Hydnocarpus ester or a mixture of equal parts of hydnocarpus oil and esters have the advantage of being less viscous and therefore filtering through the tissues more easily without tearing them. Esters are also for this reason more easily and rapidly absorbed.

(*b*) *Injecting the oil too rapidly.*—The slower the injection is given the less likely it is to tear the tissues and the more rapidly it is absorbed. The method of dividing the dose into several parts, which may be given in

different directions with only one puncture of the skin, has also this advantage.

(*c*) *Injecting into a part which had been inoculated a short time before*, and in which the tissue reaction of the former inoculation is still present. It is well to divide the sites suitable for injection and to take them seriatim so as to avoid this.

We generally find that undistilled esters and sodium salts prepared from painless oil are themselves comparatively painless.

Personal Prophylaxis by Healthy Workers.

G. GUSHUE-TAYLOR.

DURING the past three or more years it has been the writer's privilege to visit some twenty-five institutions for the treatment of leprosy situated in ten different countries. These visits have been made possible by financial grants and official appointments made by the Japanese Government-General of Formosa. Certain observations and incidents have prompted the writing of this article, the object of which is to raise a note of warning to workers in leper hospitals and colonies, to doctors, nurses and non-professional staff members, as to their methods or lack of methods in the prevention of the spread of leprosy to themselves. The note raised is not alarmist nor is it hysterical, but in an age of preventive medicine the least the workers may be expected to do is to take reasonable precaution against themselves falling victim to the disease—be it tuberculosis, leprosy or any other infectious or contagious disease they seek to treat. If a nurse, in caring for a patient with enteric fever, goes down with the disease, blame is attached to herself and to her institution for her lack of care. She is not a heroine, but just incompetent and careless. If by carelessness a worker in leprosy contracts the disease, he or she by that offence against the laws of preventive medicine has done a dis-service to the campaign against leprosy. We who preach preventive medicine should practise

its laws, and so strengthen and not weaken that campaign, the object of which is to rid the world of leprosy.

The following are some incidents observed which have convinced me of the necessity of ventilating this subject :—

A healthy worker examining a leper patient is called out to see some visitors and the customary handshake follows.

A healthy worker with ungloved hands is examining breaking-down leprous nodules and expresses the fluid material with thumbs, the discharge covering the whole of the nail-bed. It was seven minutes by the clock before the hands were washed by a perfunctory swill around in disinfectant, and immediately the process is repeated, again soiling the nail-bed, and again by the clock eight minutes pass before the hands are washed. A smear was taken of the material and the slide being examined was red packed with lepra bacilli. A nail-bed so grossly infected by leprous discharge even by prolonged washing could not be entirely rid of bacilli.

In his endeavour not to convey infection to his clean patients, a surgeon seeks to keep his hands clean and avoids contaminating them. If a careless worker contracts leprosy, it is not due to the fact of working amongst lepers but to careless habits.

A healthy worker changing money for leper people handles their coins, and takes no precautions as to washing hands, the process continuing an hour or more.

Healthy workers in dressing room or laboratory, assisted by lepers, in some cases infective skin cases, the healthy and unhealthy handling the same instruments, test-tubes, forceps, trays, handles of doors, chairs, etc., and with little evidence of washing the hands, or washing at prolonged intervals.

Healthy workers opening doors, gates, and windows of leper houses. Further, entering leper houses and wards and sitting on their chairs, tables and beds and indulging in " pawing " of leper patients.

Healthy workers shaking hands with leper patients. Notes of cases handled by leper and healthy people.

The superintendent of one institution did not believe in the theory that leprosy was contagious and used no preventive measures.

Healthy workers spending whole sessions with arms bare to the middle of the biceps, injecting without gloves, much palpation of patient at each injection, little or no evidence of washing of hands.

A question which has been running in my mind for some

time is what is the incidence of leprosy in workers among leper people? India is a highly infected country. The total number given by the last census was a little over one hundred thousand or about one in three thousand of the population. This number is considered to be far below the actual figure representing India's lepers, but it will serve for our present purpose. If among those who work among leper people, there be infected one doctor, nurse or lay worker among three thousand so engaged, such an incidence would be rated high. During my travels I have learned of over a dozen healthy workers in countries visited who have contracted leprosy within the past fifty years. At the same rate of incidence as obtains in India, these should represent thirty-six thousand healthy workers. Will anyone say that there has been this army of healthy workers directly or indirectly working with leper people during the past half century? It is to call attention to this danger that after discussing the subject with well known leprologists I have continued in the preparation of this paper.

Leprosy is contagious, but exact mode of transmission from the patient to the healthy, whether by nose, skin or alimentary tract, is not known, though there is a great probability in favour of the first two mentioned as primary routes of entry.

Familiarity breeds contempt, and this seems to be true in this regard. In order not to offend the unfortunate patient who is all too conscious of the stigma of his complaint, and perhaps to drown any smouldering fear in their own breasts, some workers may cultivate the contempt of familiarity, and think but little of the remote possibility of personal infection.

On my suggesting to one worker the use of gloves in injecting patients, the reply was the high cost of gloves, the deteriorating effect of oil on rubber, and the inconvenience, all of which excuses would hardly weigh against one worker in that institution contracting leprosy out of say three thousand who may work there during the next how many years? And this institution was instructing other workers in the modern treatment of leprosy. As a matter of fact, in the out-patient clinic for lepers of which I am in charge, if my healthy workers were not allowed gloves to wear, they would refuse to give the injections.

One is emboldened to publish this communication by the practice observed in use at Culion Leper Colony, Philippine Islands, the largest colony in the world, and one from which some of the best work on the disease is emerging. A

week spent in that colony gave the impression of good work being done with a splendid *esprit de corps* between workers and patients. There was always in evidence soap and water, basins of disinfectants, gauze in alcohol, and these were used though not to the extent of causing a medicinal dermatitis. Patients opened the doors for the healthy workers, who did not sit on the patients' beds, tables nor chairs. Separate chairs or stools were kept for healthy people (in our own clinic the patients' stool is coloured a mahogany and the workers' white, and they are not interchanged). Records were not seen by me to be handled by patients and healthy workers. No leper patients were seen to be working in the pathological laboratory. Culion has a separate coinage minted for use in the colony, and no money used there found its way into the general circulation. I do not wish to say their preventive measures never broke down, but they were carried out with what seemed to be a happy tacit understanding between both sides. The patient realised his infective condition, and did not wish to do anything which would endanger the healthy worker, while the latter maintained a very cordial attitude towards the patient. The patient was not in any way depressed by the fact that the healthy worker refrained from "pawing" him in the intimate fashion common amongst ordinary patients.

It is with the end in view that the methods used in this famous colony, and found easily practicable there, may be adopted and practised in all other leper institutions that this paper is written. We should take reasonable precautions and this can be done without being fussy or objectionable to our patients.

One change, long over-due not only in leper hospitals, but in many famous general hospitals the world over, is the elimination of the common towel, the old-fashioned roller towel, in favour of the small individual or paper towel so popular in Canada and the United States of America. A piece of thin towelling or gauze or bandage material eight to ten inches square is sufficiently big for an individual towel, and can be easily washed and sterilised.

Much could be said in favour of liquid soap when one sees the dirty messes into which even some medical men put their ungloved fingers. It does not require much imagination to dislike the idea of using the piece of common soap after the experience referred to in the previous sentence.

If the nose be a route of entry it would seem wise to use a mask; but while this is used by a very small minority, it would be very difficult to devise and use a mask which,

while efficient would not too greatly embarrass the worker.

In "Leprosy Diagnosis Treatment and Prevention," Dr. E. Muir says: Precautions to be taken by Doctors and Attendants:—

"(1) Never touch an infectious leper or any article which he has used or touched without thoroughly washing the hands immediately afterwards.

"(2) In attending to lepers or dressing their wounds use rubber gloves where possible, at least, this should be done in cases which are highly infective. . . ."

Other directions under this heading are given which may be had by reading the book itself, but these quoted are sufficient to indicate that those leading the world in anti-leprosy work are alive to the necessity of the care which this paper seeks to inculcate.

These rules may seem a counsel of perfection, but it should not be impossible to avoid the faults enumerated in the earlier part of this article, in fact, one would say emphatically, that every effort should be made to eliminate or minimise points of contact between the healthy worker and the infective patient, this for the sake of the worker, his or her family connections and society at large, as well as in the interest of the great game in which we are engaged, namely, to rid the world of leprosy.

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After a Year's Work.

Jottings from an Indian Treatment Centre.

F. W. Ross.

A YEAR or so ago I had no intention of starting a treatment centre, and could have given excellent reasons why it was impossible for me to do so. That was because I had had no occasion to come up against the leprosy problem in the villages. As superintendent of a leper home, I was not entirely devoid of information on the subject. I knew the statistics of our district, and suspected that they were inadequate, and left it at that. I had enough work on hand without bothering with what was the responsibility of the health authorities.

One day the magistrate sent us a batch of cases from a place 20 miles away. They were followed by another party, and, in spite of the distance, a few cases began to attend at Raniganj as out-patients. When the total reached a dozen, Dr. Ghose and I decided that it might be interesting to have a look at that area, and in due course we went.

As we had no official standing, our investigation was somewhat superficial, but we solicited the help of one or two local men, and depended on tact and friendliness. Altogether we visited six villages, and incomplete as our survey was, we found on an average four times as many lepers as the number given in the census. In one hamlet of only 250 people, 14 cases were brought to our notice, but that was of course exceptional.

Up to that point I was interested, but not convinced that any obligation rested on me to pursue the matter further. But since no treatment was anywhere available except at Raniganj, it was obvious that something ought to be done. The responsibility for that rested with the District Board, but after making an enquiry from one or two officials it was clear that nothing was likely to be started. Meanwhile the disease would be increasing its hold on cases which were very suitable for treatment. Our Leper Home has a large proportion of cases too far gone for treatment, and the idea of promising cases going untended was bad for our peace of mind. Dr. Ghose and I talked the matter over, and decided that though we had no money for the purpose, and though it was impossible to do any preparatory propaganda, we would give these folk a chance. Personally, I felt uncertain whether we should attract patients, my fear being that they

would dislike the publicity, in which respect I made a big miscalculation.

We started with 30 patients on the opening day, and attendances increased steadily thereafter. Each week I felt sure we had reached the limit, and on several occasions we had to give smaller doses than were required because supplies were running out. When we topped 200 I thought the number would surely drop, but after we had passed 300 I grew fatalistic. The actual high-water mark was 374, but in due course the number attending settled down at about 250. What had commenced in a tentative and experimental fashion had to be tackled seriously, mobilising all the resources possible.

Where did the crowd come from? Generally speaking, they came from places up to 10 or 12 miles from our centre, but some made much longer journeys. Our village is close to the railway, and patients began to arrive from stations all along the line. One group has been attending regularly from a distance of 70 miles, meeting a man who travels 45 miles from the other direction! For the most part we have an area about half the size of an average English county. Thousands of little villages are distributed over the fertile plains of Bengal, and after a time we found that we had 187 of them represented. What should be borne in mind is, that in the district as a whole, as distinct from this corner of it, it would probably be possible to get similar attendances at half-a-dozen centres if they could be opened.

The first thing was to arrange the work so as to cope with the invasion. Various adjustments and modifications were made, and the eventual method adopted was as follows.

On arrival, patients make for our crude oil department. They have great hopes of the injections, but they also believe strongly in the efficacy of chaulmoogra oil for external application. We sell it to them at a loss, and when I look at the queue waiting I think of the man who said: "I sell this article below cost. The reason I am able to do so is because I sell so much of it." Every customer at our "shop" is an expense, but there is no doubt that it does induce people to come more regularly for treatment.

The work is done under a large open thatched shed, about which there is nothing imposing or terrifying. It is the sort of thing they are accustomed to, and they feel at home. After getting supplied with oil, the patient makes for the railed-off space where Dr. Ghose sits with an up-to-date Kardex file in front of him. The patient calls out his name and village, his record is looked up in an instant, and,

after a few questions, he gets his treatment written on a slip of paper, and moves off to the other end of the shed. There he gets patches painted with trichloracetic acid or receives an issue of ointment and a bandage for ulcers, or both. Then he squats down at the end of the line, waiting for injections. We have three people engaged on that work, and they certainly do earn their pay. After receiving the injection he is free to go, unless he holds a separate ticket entitling him to something from the dispensary, which is a separate establishment further down the road. The routine with regard to new patients is much the same, except that they get a handbill printed in the vernacular, telling them what is expected of them if they want to get the best results from the treatment. If they can't read, they are told to take the paper to someone who can read it to them.

The dispensary increased our expenses considerably, but it is really essential for good work. It commenced with issuing things like Volkmann's solution for scabies, and cough and tonic mixtures, but was gradually enlarged to include all the things usually required. Outsiders have been attracted to that, of course, but they are charged a sum sufficient to cover the cost, while lepers are treated free.

After a while I considered the idea of charging something for the injections, and decided to try the following experiment. Anyone who paid an anna would get his treatment written on a red ticket, which would entitle him to immediate attention. The ordinary tickets are white. I was agreeably surprised to find how many people thought their time was worth an anna. A man might have to wait some time, and quite a number of our patients were really glad of the opportunity thus provided. Others evidently regard treatment day as a social occasion, when time is of little consequence, and they stay chatting and watching the work after their own injection has been given. Later on, our colour scheme was further improved with blue tickets. These are given free to patients in whose progress we take special interest. They are entitled to attention after the red ticket holders are dealt with, and the arrangement is very satisfactory to them. In some cases owing to irregular attendance they have forfeited the privilege for a time.

We had one very critical time when a number of abscesses developed, evidently due to faulty oil. When they first began to appear I put it down to incomplete sterilisation of needles, but that was proved to be wrong. Obviously the next thing to query was the oil. We administer hydnocarpus oil with 4 per cent. creosote. I got in a fresh stock from another

supplier, but still fresh abscesses occurred. In desperation I ordered another supply from yet another source, and immediately the trouble began to diminish. Some of the worst cases we had to remove temporarily to Raniganj. There was some falling off in numbers, but it was proof of the confidence that had been engendered that the number of injections given each week remained very high.

All along we have had to put up with an undercurrent of opposition from the people in the village where our centre is located, and they have twice petitioned the District Health Officer to close the clinic or get it removed elsewhere. They do not like the weekly influx of lepers. Considering that cases among their neighbours are improving under treatment, their attitude is not very reasonable. But, generally speaking, there is not enough feeling against leprosy in the area. People are not ostracised as they are in some places. I have again and again tried to persuade people to go to Raniganj, but very few of them do. They feel quite happy where they are. If they got the same treatment as was meted to lepers in England when churches were built with leper windows, it would be a different story.

For instance, the last two or three weeks our numbers have been less because many marriages are taking place in India in anticipation of the Child Marriage Act coming into force. One would suppose that it would be rather difficult to arrange a wedding where there is leprosy in the family. It may be difficult, but it is evidently by no means impossible. I do not object to a little opposition in so far as it indicates a conviction that leprosy is bad, but the local method of expressing that conviction is not one to be commended.

The real objection to our work is not touched on by anyone. That is, we cannot separate infectious from non-infectious cases. They crowd round the barrier, rubbing against one another in a way I do not like at all. To obviate that would mean appointing an additional medical officer, and putting up another shed, which is not practicable. The centre is open only one day a week, hence the crowd. If it could be open, say, three days a week, the problem would not arise.

After managing the work for a year, I have come to the conclusion that it is thoroughly worth while, but there are obvious drawbacks. The chief is that regular attendance cannot be enforced. Some of our cases never fail month after month, others make no progress because they do not come regularly. It is rather a lot to expect that people who have their living to earn will be able to subordinate every-

thing to this one matter, especially when they live at a distance. On the whole, it is surprising that attendances are no worse. We cannot compel people to come, but we can make them feel that we are interested in them, and that their progress is a matter of concern to us. A bit of good-humoured scolding here and a joke there, unfailing good humour and cheerfulness are things which help to make a bond between patients and staff.

Allied with this is the disadvantage that we cannot do follow-up work in the homes. People cease to attend, disheartened perhaps by slowness of results or by reaction, and personal visits of advice and encouragement would probably induce them to continue. Where a full-time man can be appointed with adequate travelling facilities, this would be a normal part of his work. Also many cases in the early stages would be discovered.

So far as the clearing up of patches is concerned, we have undoubtedly made a reputation, but ulcers are more obstinate things, even in a leper home, where they are dressed daily. After a year's work, results are everywhere visible, and what we have to concentrate on now is to inculcate perseverance, and not let people think that they can use their own judgment and stop coming because they think they are cured.

I had hoped that the clinic would have had some effect in arousing the interest of responsible people, official and otherwise. Whether it is due to apathy or whether fear of infection enters into the question I cannot say, but the fact remains that for purposes of demonstration the centre has not had the value which I anticipated. If the need for extending the work is to be realised, people will have to come and see for themselves. I know of one man at least who thinks that it is safest to give it a wide berth.

In the midst of other claims I must confess that I have sometimes felt this work to be in the nature of a burden, but it has also given a sense of great satisfaction. A year ago I could have given reasons why it was impossible to undertake it, but at present I am planning and hoping for an extension of it.

Puncture of the Lymphatic Glands for the Diagnosis of Leprosy.

N. PAVLOFF.

AS far as I know, the question of the method of early diagnosis of leprosy and initial manifestations has not as yet been fully decided, and it is necessary to pay attention to the investigation of the lymphatic glands of persons who have been in long contact with lepers.

Being of the same opinion as Marchoux of the importance of the puncture of the lymphatic glands of people suspected of leprosy, I have, since 1923, made punctures in persons suffering from leprosy, and out of 98 cases 3 per cent. of tubercular and mixed leprosy, leper bacilli were discovered.

At the same time I also investigated secretion of the lymphatic glands of apparently healthy children (20 cases), who were born of leper parents, and who had lived with them for a number of years. Negative results were obtained.

In one case I found leper bacilli in an apparently healthy woman, the wife of a leper. The history of this case is as follows :

The woman's husband had suffered from tubercular leprosy from the age of 13. His mother had leprosy, but his father, three brothers and two sisters were healthy. The patient, in his opinion, was infected with leprosy by his mother, who nursed him. Leprosy first showed itself after catarrh. A sore appeared on the left leg, which remained uncured after more than a year's treatment. At the end of the year the eyebrows fell off, and nodules appeared on the face, and then on the wrists and elbows, horny growths. The patient voluntarily came to the colony, and was treated for three years with Gynocardate oil by the mouth. Leprosy manifestations disappeared, and the patient was discharged as cured.

The illness re-appeared after eleven years following a serious accident. Two years after, the patient was apparently cured, and he got married (1913). Three children were born, the last one being born after some spots had already appeared in the abdomen of the father, and after the eyes were affected.

In 1923 the patient, now with mixed leprosy, once more joined the Leper Colony, and all his family came with him, in spite of the advice of the medical personnel that they should remain at home.

The investigation of the skin, sensitiveness, destruction

of the nerves, and changes in the mucous membrane of the nose and mouth of the children, gave negative results. The puncture of lymphatic glands, which were slightly enlarged on the groin, neck and arm-pit of the 10-year and 7-year-old children, was negative. No abnormalities were observed in the 5-year-old child. As regards the wife, on the investigation of the outside surface of the skin in 1925, no symptoms were observed. On the investigation of the sensitiveness of the skin, no abnormalities were found. The mucous membrane of the mouth was normal, but the mucous membrane of the nose, on the left, was slightly swollen. No leper bacilli were found in the mucous membrane of the nose. The lymphatic glands by touch were found to be slightly enlarged in the left arm-pit and the right groin. A very small quantity of leper bacilli were found on the puncture of the right groin gland, and, besides, the bacilli were sharply granular, and many of them were similar to diphtheroid forms. They took the staining very well.

On account of the discovery of leper bacilli by puncture, I considered this case as one of latent leprosy, and as the woman continued to live among lepers, and would not agree to undergo treatment, she was put under medical observation.

After six and a half months a red spot appeared on the lower part of the leg. On investigation of the sensitiveness it was shown that temperature, pain and tactile sensation were absent, and as leper bacilli had already been found in the patient, the case was diagnosed as one of maculo-anæsthetic leprosy. This diagnosis was confirmed by histological examination of a piece of the skin.

Thus we may meet with cases without any changes of the skin, when the examination by puncturing the lymphatic glands gives positive results and shows the presence of a latent infection. This fact is very important for the early diagnosis and the successful treatment of the initial forms of leprosy.

In our case no treatment was commenced until the appearance of the spot. With more developed methods of examination and morphological differentiation of the acid-fast bacilli, the question arises should treatment be commenced if mycobacteria lepræ are found in the lymphatic glands, even though there are no other clinical manifestations of the disease.

Professor V. Kedroffsky advises, in order to establish the diagnosis in such cases, that a histological examination of the lymphatic gland should be made. In my further work I did not meet with any case similar to that described in the article.