MEMORANDUM ON THE PRESENT POSITION OF PROPHYLAXIS AGAINST LEPROSY IN RELATION TO RECENT IMPROVEMENT IN TREATMENT*

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Fifteen years ago, in the absence of any effective treatment even of early cases of leprosy, compulsory segregation was the only prophylactic measure in common use. The whole position requires to be reviewed in the light of the established fact that now most early cases of leprosy can be cleared of all symptoms and infectivity and prevented from going on to the more highly infectious stages; for as compulsory segregation inevitably leads to many of the more amenable early cases being hidden until they have reached a much more advanced and incurable stage, and have also had prolonged opportunities of infecting others before they are themselves isolated, the question must fairly be faced as to whether unmodified and generally applied compulsory segregation may not do more harm than good at the present day, and consequently whether it ought to be modified to ensure that it does not result in hiding of the amenable early cases. The last fifteen years of my life have been devoted mainly to investigations on the treatment of leprosy by injections of soluble products of chaulmoogra and hydnocarpus oils, to a study of the literature of the subject for some sixty years back, the main results of which are embodied in the epidemiological sections of the book on leprosy by Muir and myself and to making abstracts of the recent literature for the Bulletin of Hygiene and Tropical Medicine, and this note, which is written specially for the Manila Conference with the approval of Mr. Perry Burgess, Secretary

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of the Leonard Wood Memorial Fund, and of Dr. H. W. Wade is based on that experience. No one recognizes more fully than I do that leprosy prophylaxis must vary to a considerable extent with the local conditions, but I think the time has come when the general principles on which it should be based can be laid down in the light of our present knowledge, and that is the important task I am attempting in this note. Limitations of space will only allow of somewhat general statements, and reference will be made to some of my previous writings which amplify and furnish evidence regarding them.

The Failure of Compulsory Segregation to Stamp Out or Materially to Reduce the Prevalence of Leprosy Among Backward Races Within a Reasonable time.

As a result of prolonged studies of the leprosy question I have come to the following general conclusions regarding the prophylactic value of compulsory segregation, which I think will meet with very general acceptance. The humane Norway system of segregation, in which compulsion was only applied to a few indigent cases during the first thirty years, and only very modified compulsion used subsequently, has undoubtedly in the course of the last seventy-five years reduced leprosy to a very small proportion of the numbers in 1856, and the same system has proved of value in Sweden and Iceland under European conditions. On the other hand, among backward or uncivilised races in warm and tropical countries no such good results have yet been obtained even after several decades of effort. Thus in Hawaii where compulsion was for long the sport of politics, but has been more strictly enforced for several decades under American rule, recent reports throw grave doubt on its value, and the disease is still very prevalent. In the Philippines the great Culion experiment succeeded in removing advanced cases of leprosy from the streets of the towns, but no material reduction in the number of annual admissions has been obtained, and rigid compulsory segregation has now been modified by building leper hospitals for the treatment of the more amenable cases near important towns, and recently the adoption of the Indian system of treating early cases as out-patients at ‘skin clinics’ has been introduced. In the West Indies census, figures I published in "Leprosy" appeared to indicate some success of the rigid compulsory segregation there enforced, but it has since been brought to my notice that the decline was mainly due to the repatriation
of considerable numbers of Indian lepers; so here too there is no clear evidence of the success of the plan.

Even under much more favourable conditions in South Africa and in Australia compulsory segregation has proved very disappointing in practice. Thus in the Cape Colony of South Africa compulsory segregation was first enforced in the Caledon valley as early as 1817, and at Robben Island since 1845, and the data from 1891 to 1907 showed a steady increase in the numbers isolated owing to the discovery of new cases. Recently more efficient segregation has been enforced, and some decrease in the number of European lepers appears to have taken place, but none apparently among the native races, such as the Basutoes, for example, where the latest report shows an increase in the numbers isolated at very great cost. It is only fair to state that owing to paucity of medical officers and difficulties of communication the problem is very difficult in Basutoland, although not more so than in tropical African Colonies such as Nigeria, but the fact remains that the very severe tax on the revenues entailed by the compulsory measures has not yet been justified in Basutoland by any definite diminution of the disease. In New South Wales, where over £2,000 per head is spent annually on each segregated leper, or sufficient to allow of 1,600 lepers to be treated for a year with the efficient form of sodium hydnoacarpate known as 'Alepol,' some reduction in the number of Europeans infected appears to have been obtained according to Dr. Cook, but the same authority states that the compulsory methods have failed to reduce leprosy in the neighbouring state of Queensland.

Hiding of the Early Leprosy Cases Until They Have Infected Others Before Themselves Being Discovered and Isolated the Cause of the Very General Failure of Compulsory Segregation.

This point is so well recognised at the present day that it is unnecessary to labour it. Thus, in the earlier period of the great Culion experiment the average duration of the disease among the admissions was eight years, during which the more infectious types had unlimited opportunities of infecting others, who thus kept up indefinitely the annual crop of advanced cases admitted to the colony. As recently as the 1927 report on leprosy in South Africa it was recorded that:

The discouraging fact, however, is that nearly all the new admissions are advanced cases of four, six and more years duration, some of which
were already past the more infectious stage of the disease, and most of
them unpromising for treatment.

In the 1928 report on leprosy in South Africa the same
authority, the Medical Secretary to the Union of South Africa
Government wrote:

Until we can devise some system or method of securing early discovery
and the early institution of precautions, we cannot hope effectively to limit
the spread. I am satisfied we shall never achieve this by methods of
compulsion.

Comment is unnecessary and only the best method of
modifying rigid compulsory segregation to prevent it doing more
harm than good requires to be considered under this heading.

**Compulsory Segregation Impracticable for 99% of the Worlds
Lepers.**

If compulsory segregation had proved to be an effective
method of stamping out leprosy it would still be of very little
use in solving the leprosy problem as a whole, for the simple
reason that it is quite impossible to carry it out for adminis-
trative and financial reasons in the areas of the greatest number
of lepers in India, China and tropical Africa. Over two decades
ago Dr. Heiser estimated the world’s lepers at 2,300,000 at a
time when the wide prevalence in Africa was not known. More
recently, as the result of three years study of the literature,
I estimated them as not less than 3,000,000. Since then the
leprosy surveys of Dr. Muir in India, recently confirmed in
British Guiana by Dr. Rose, showed that for each typical
advanced case, such as alone are enumerated under the compul-
sory segregation system, there are anything from two to ten
carly cases in existence, so the world’s lepers may very easily
number 10,000,000. For the sake of argument I will place the
number at the very conservative estimate of 5,000,000.

I have made out a table of the number of lepers recorded
as being segregated at the present time in the principal countries
where that measure is in force, including the data in the
valuable 1930 Report of the Secretary of the League of Nations
Leprosy Commission; the number comes in round numbers to
35,000. To this may be added nearly 8,000 isolated in Indian
Leper Asylums under a voluntary system apart from a very
few indigents, although many of them are old uninfected
crippled nerve cases, whose isolation is only of humanitarian
value, and does nothing to reduce leprosy infections, which will bring the number up to 43,000. The fullest allowance for small numbers isolated in other countries with comparatively few lepers could not make the total segregations under the old system over 50,000—just 1 per cent of the world’s lepers; a mere flea bite at the problem as a whole.

**The Modern Method of Prophylaxis by Attracting Lepers to Clinics and Colonies for the Sake of Obtaining the Improved Treatment.**

Compulsory segregation having proved a broken reed, with the grave disadvantage at the present day of leading the early amenable cases of leprosy to hide themselves until they have reached a largely incurable stage and also being inapplicable to more than one per cent of the world’s lepers; we must look for a more effective, humane and generally applicable method of prophylaxis. This must be based on the power to attract the early cases of the disease to come forward voluntarily to obtain the benefits of the improved treatment now available, the present position and limitations of which must next be summarised.

**History and Present Position of Improved Treatment of Leprosy by Injections of Preparations of Chaulmoogra and Hydnocarpus Oils.**

I dealt fully with the recent advances in the treatment of leprosy in my Cameron Prize Lecture before the Edinburgh University, about a year ago (*Edinburgh Medical Journal*, January 1930), so only a brief account need be given here, as it must be well known to all the members of the Conference. It may be safely said that prior to 1915 no considerable number of cases of leprosy had been cleared up by any then known treatment, although the work of Ralph Hopkins had confirmed the Indian view that chaulmoogra oil orally had some power of retarding the progress of the disease in those who could take sufficient of this nauseating drug. I had for some years been convinced that the lower melting point fatty acids of chaulmoogra oil, known as Gynocardic acid were more efficient orally than the whole oil, and when in 1915 I was urged by Dr. Victor G. Heiser to take up further work on the treatment of leprosy I renewed former attempts to obtain the active principle of the oil in a soluble form suitable for injection, and in the following year recorded the value of 3% solutions of sodium gynocardate.
and sodium hydnocarpate subcutaneously and intravenously, and also showed that local reactions occurred with breaking up of the lepra bacilli in the lesions, which made me very hopeful that an important advance had accrued. In 1917 I recorded two years observations on 26 cases treated by this method for three months or more, with 50% of those of not more than three years duration cleared up, but only 25% of more advanced cases. This showed at an early date the necessity of obtaining the comparatively early cases found in hospital outpatient departments if success was to be obtained, for advanced leper asylums cases yielded poor results, and I believe this to be the key to the solution of the leprosy problem at the present day. In 1919 Dean and Hollmann, after confirming my work, made an important advance in using the ethyl esters of the-oils on a large scale in Hawaii, and this preparation has since been used still more extensively in the Philippines, largely owing to the difficulties attending the intravenous injection of sodium hydnocarpate with frequent thrombosis of the veins. This difficulty has since been overcome through the use of sodium hydnocarpate in the purer form of 'Alepol' made for me by Burroughs, Wellcome & Co., over a million doses of which were used with good results intramuscularly and subcutaneously in British African Colonies alone last year, and it has the advantage of being many times less costly than the ethyl esters which could not have been supplied on such a large scale for Africa on that account. Muir's creosoted pure Hydnocarpus oil intramuscularly is a still cheaper effective preparation, so there is now no lack of good methods of treatment.

**Results of Modern Treatment.**

It is now very generally agreed that the modern treatment is far more effective than former ones, and also that not more than 10 to 20 per cent of the advanced cases, which form the vast proportion of cases in leper asylums under the compulsory system, can be apparently cleared up by prolonged treatment as at the Culion colony, and it is still doubtful as to how many of them relapse. Dr. Wayson has recently come to the conclusion that the last of the leprosy bacilli are rarely if ever eliminated from the system by the treatment in the advanced cases met with in the Hawaii leper institutions under the compulsory system. The same is true of tuberculosis, but the sanitorium treatment
of early cases is not on that account considered to be useless. Under the same system in South Africa only two years ago the asylum medical authorities were very sceptical regarding the value of the treatment, but the latest reports record 10 to 20 per cent of apparent recoveries.

The results in early cases are very different as shown in a table I published in 1927 (Proc. Royal Soc. Med. Vol. XX. April) with apparent recovery in 31% of my Calcutta Clinic cases, and 31% in Muir's continuation of my work there. At the Honolulu Hospital among 486 cases treated during five years and reported on by H. M. Neil only 8% of advanced cases, but 38% of moderately advanced ones, and no less than 64% of 45 early ones were discharged on parole as apparently recovered. Other figures might be quoted, but these will suffice to establish the generally admitted fact that good results in a large proportion of cases are only to be expected when they are discovered and treated efficiently in an early stage of the disease, and the treatment in the class of cases met with under the compulsory segregation system is not sufficiently good at present to enable their treatment alone to solve the leprosy problem. The problem, therefore, will only be solved under some system which enables the great majority of the cases to be discovered and treated regularly in quite an early stage of the disease, and I agree with that experienced leprologist, the Medical Secretary of the Union of South Africa Government, that "we shall never achieve this by methods of compulsion."

The Leprosy Clinic Method in India Aided by Propaganda and Surveys.

I was fortunate enough to obtain the services of Dr. E. Muir to continue my researches on the treatment of comparatively early hospital out-patient cases of leprosy in the Calcutta School of Tropical Medicine I founded and under a fund I raised, since supplemented by a much larger one obtained by the Indian Branch of the British Empire Leprosy Relief Association. In Dr. Muir's capable hands this has now developed into the Propaganda-Treatment-Survey, (P.T.S.) system well described in the Leprosy Commission Report above mentioned. About 100 medical men are trained yearly in India in the modern treatment of leprosy, surveys are carried out in areas where leprosy is most prevalent, and dispensaries opened for their treatment, to
each of which usually 200 to 300 patients come from a wide circle. Propaganda work precedes the surveys, and in these ways a very large total of the early most amenable cases of leprosy are being treated all over India, which must prevent many of them going on to the infectious stage, and thus in time bring about a material reduction in the incidence of the disease. The cost per case is very small compared with compulsory segregation. The adoption of 'skin clinics' in the Philippines for the out-patient treatment of early lepers is an important extension of the Indian system.

Voluntary Colonies for the Isolation and Treatment of Lepers in British Tropical Possessions.

It is only during the last decade or two that it has become evident that vast areas of Tropical Africa have leprosy rates of several times that of India. This constitutes the most serious and difficult leprosy problem in the world to the solution of which the British Empire Leprosy Relief Association is devoting most of its limited funds. Already there are scores of clinics and small leper colonies treating very many cases with the help of numerous missionary medical men and women in the British African Colonies; several of the most important of these now have whole time leprosy Officers organising the work. How impossible compulsion is in tropical Africa, quite apart from the prohibitive cost, will be evident from the experience in the French Cameroons, where an attempt compulsorily to segregate the lepers by sending gendarmes through the villages to collect them signally failed because the cases were hidden. Yet when Dr. Robineau sent out lepers who had improved greatly under the modern treatment they brought back numerous new voluntary patients.

Something more than clinics was found to be necessary in these areas owing to the very limited number of medical men available to staff leper dispensaries, but fortunately fertile land is usually obtainable for leper colonies, where the patients are largely self-supporting through growing their own food, and the leper colony founded by Dr. Macdonald in South Nigeria alone has about 1000 lepers under treatment, with the added advantage of isolation under a voluntary and very economical plan. How successful this work has proved may be illustrated by the 1929 report of Dr. Mayer, the Nigeria leper expert, who records that
there are now nearly 6,000 lepers under treatment in leper colonies and clinics under a purely economical voluntary system. Thus within about five years the number of lepers now being dealt with in Nigeria alone is not far short of the total number in leper asylums the result of over fifty years work in India with at least sixteen times the population of Nigeria. This success is entirely the result of the attraction of the improved treatment, and is a good illustration of the immense advance in the possibilities of leprosy prophylaxis at the present time, as compared with the ancient compulsory segregation system alone available only about one decade ago. I am, therefore, absolutely against the introduction of compulsory segregation in any backward areas, in which it will inevitably lead to the early more amenable cases being hidden, with resulting throwing away of the advantages now available through improved treatment.

Where Compulsory Segregation Already Exists it Should be Modified to Allow Early Bacteriologically Negative Cases to be Treated without Compulsory Isolation.

My views on this point have been clearly stated in several publications during the last few years, of which the following extract from my paper in *The Practitioner* of April, 1928, will suffice as an illustration:

Relaxation of Compulsory Isolation in the case of early uninfective lepers in countries where much money has been expended in segregating lepers compulsorily. I do not advise that this plan should be abandoned for the present, but that it should be modified in the following manner to prevent it doing great harm by preventing the patients coming forward for treatment in the earliest stages.

It is well to emphasise this point as within the last year the Medical Secretary of South Africa stated in his annual report that I had advised that compulsory segregation “should be abolished and replaced by a purely voluntary system.” What I do advocate is that early uninfective cases should be permitted to be treated by their medical men or at dispensaries and hospitals without being forcibly shut up with the advanced and often repulsive cases in leper asylums; for I know from personal experience that South African patients have come all the way to England for treatment of uninfective stages of leprosy because they dare not go to a doctor in South Africa for fear of imprisonment in a leper asylum. That I regard as the greatest opprobrium of modern medicine which is unjustifiable at the
present day. I am aware that it is claimed that there are not enough free lepers in South Africa to warrant dispensary treatment, but until accurate surveys have been made that is an unjustifiable assumption.

This simple modification of compulsory laws has already been adopted in several British Colonies, such as Mauritius, and it is now being introduced into British Guiana, where the first leper dispensary will shortly be built at the expense of our Association as the result of the revelations of a survey proving that it is urgently required.

The Periodical Examination of All Contacts of Infective Lepers, and the Effective Treatment of the Early Cases Thus Discovered, is the Only Method of Reducing Leprosy Incidence Rapidly, and of Rendering Compulsory Segregation Obsolete and Unnecessary Within a Few Decades.

I now come to my last and most important point. The rapid extension of leprosy clinics and colonies on a voluntary basis is a great step in advance of the prophylactic measures available only a decade ago, but it will require many decades of unremitting work thus to reduce leprosy to small proportions. For some years past I have, therefore, advocated a further step, which is based on two important conclusions I came to as the result of my three years study of the former literature on leprosy. These are, firstly, about 80 per cent of new infections are derived through living in the same house with another leper, and secondly, if the cases are detected in a fairly early stage the incubation period averages about $2\frac{1}{2}$ years, as in the children born at Culion, and in about 80 per cent of all cases it does not exceed five years. It follows that whenever a new infective leper is discovered the first step should be to examine, if possible, all his household and intimates for early cases of leprosy, and this examination should be repeated at least every six months for five years. Theoretically about 80 per cent of possible infections from any leper should thus be discovered in the earliest stage, when the great majority of them may be expected to clear up and be prevented from going on to the more infective stages under effective modern treatment. If this plan was repeated for another five year period there would be few remaining infectious lepers, for most of the advanced nodular cases die in eight to ten years or pass on into a little infective
nerve stage, so in time the necessity for isolating lepers compulsorily would nearly disappear. Where compulsion is already in force it may serve a useful purpose for a time in enabling pressure to be made on early uninfective cases to attend regularly for treatment on pain of isolation. That is why I have always advocated its being retained for a time where already in force, although I look forward to its becoming unnecessary before very long if modified in the way I have suggested.

The Plan Above Suggested Has Now Been Proved To Be Feasible And Successful in Nauru Island.

Within the last few months Dr. G. W. Bray has recorded the success of the above plan in Nauru Island in Oceania, (Proc. Roy. Soc. Med. July 1930) where, following an epidemic of influenza leaving great weakness, aggravated by deficient diet, leprosy increased so rapidly that, by 1925, 30 per cent of the entire small population of about 2,000 people were infected. I was consulted about this outbreak several years ago and advised frequent examinations of the whole population for early cases with treatment of uninfective cases as outpatients. The bacteriologically positive cases were kept on one side of the island, the negative ones remained free and were treated as outpatients, but slept apart from the healthy, and all the people were examined monthly for new cases with prompt treatment of newly discovered ones. The result has been that within three years the number of cases has been reduced by 40 per cent, and Dr. Bray informs me that not a single early treated case has gone on to an advanced highly infective stage. At this rate this appalling outbreak, the worst I know of in the literature of leprosy, will be completely under control within a single decade. My plan then has already proved successful under the very favourable conditions obtaining at Nauru, so it is clear that the nearer this method can be worked up to in other countries the more rapid will be the control and eventual elimination of leprosy, and the principles I have laid down in this memorandum furnish a reliable method of prophylaxis based on the recent advances in treatment. They may conveniently be summarised as follows:

(1) The Old Method Of Prophylaxis By Rigid Compulsory Segregation Of All Lepers As Soon As They Are Discovered.
(a) This plan, which was all we had to rely on before the discovery of an improved method of treatment, has never yet brought about a very material reduction of leprosy incidence in any warm climate and among backward races.

(b) It is totally impracticable for administrative and financial reasons in the case of about 99 per cent of the world's lepers.

(c) At the present time it is capable of doing much harm by leading early more amenable cases of leprosy to be hidden for fear of compulsory imprisonment with advanced and deformed patients until the most favourable stages for treatment are past.

(d) Where already in force it should be modified to permit early bacteriologically negative cases to be treated without isolation with inspection at regular intervals.

(e) Rigid compulsory segregation of all lepers should not be introduced into any new areas.

(2) For The Vast Majority of The World's Lepers The Most Feasible, Efficient And Economical Method Is A Voluntary System To Supply The Most Up To Date Treatment For Early Cases At Clinics, And For More Advanced Ones In Leper Colonies With Land To Cultivate To Supply Most of Their Food And Afford Exercise For The Patients.

This method has already been proved practicable in India and Africa, where compulsory segregation is quite impossible. It should be combined with Propaganda and Leprosy Surveys as in India.

(3) For The Rapid Reduction of Leprosy Incidence It Is Essential To Adopt My Plan of Examining The Households And Other Close Contacts of All Known Infective Lepers At Not Less Than Six Monthly Intervals For At Least Five Years; With Efficient Treatment of The Early Cases Thus Detected. A Reduction of 40 Per Cent of The Total Lepers Has Thus Been Obtained Within Three Years Under Favourable Conditions For Carrying Out This Plan In Nauru Island.

This plan has now proved successful, so the rapidity of the reduction of leprosy in any area will be in proportion to the degree of efficiency with which it can be carried out.
CONCLUSION

I have now dealt with the principles which I believe should guide the application of our present knowledge to the great problem of reducing and eventually stamping out leprosy from any country. In view of the great variations in the local conditions each country must decide for itself how far these principles are applicable to their own conditions, but personally I am convinced that the nearer any area can get to carrying into effect the foregoing principles the better the results will be. The immense stimulus given to research on leprosy by the discovery of an improved treatment will doubtless place in our hands still more effective methods before long, and at the present transitional period it will probably be advantageous for different countries to adopt somewhat varying methods in accordance with local conditions. Personally I should even welcome such an area as South Africa sticking to rigid compulsory methods, as such would furnish a valuable control to more modern methods in use elsewhere. I only hope that this which is at least the outcome of prolonged study of the leprosy problem, will be of help in focussing the attention of the conference on some points of great practical importance.

A LEPER COLONY
ITS MANAGEMENT AND MAINTENANCE

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Soonchun, Chosen.

This colony containing between 700 and 800 lepers is owned and supported by The Mission to Lepers. The Southern Presbyterian Mission provides the management.

In the planning for or starting a leper colony it is desirable to start on a very small scale and gradually build up; an exception might be made in the case of a Government with an abundance of funds though even here there would necessarily be a waste of good money. The reasons are as follows: First, only
about one man or doctor in a hundred is suited for leper work as it is repulsive to so many. Then it is far more economical to start on a small scale and train one's force and staff gradually to do their own work. To start with a large number of untrained men will make the institution top-heavy and liable to fall. A good foundation slowly laid is most important, not only for a building but for such an institution. The growth should be slow and gradual and such essentials added as are necessary.

As important as the plant and buildings is a working staff of lepers themselves. These cannot be trained in a day or a year but a long period of time is necessary and one's plant should grow and increase as these trained persons are added. At Soonchun we have been about twelve years in getting our carpenters, masons, tinners, medical staff and other force trained. We have never been able to retain our non-leper doctors and helpers for any great length of time so we have given every job possible to the lepers themselves, and instead of paying some forty yen or more per month we get the same work done by a leper for one yen and board. I know of a leper plant that is giving over 50% of its appropriation to the non-leper staff. Only 0.056 per cent of our costs is spent in salaries. The mental faculties of lepers are as good as the average and there is no reason why they should not be taught to do 90 per cent of the work necessary about a colony. Of course this will take some patient training. They are happier, more contented and better off for the work. This contented, happy, mental condition is an important thing in the treatment of the disease. The greater the non-leper staff the more the exposure of their families and children to the disease.

We do not pay one penny for the making of clothes, for cooking, water-bearers, house cleaning. All these little jobs keep the lepers busy and develop the home life—the busier the better.

We employ only two outside men, a doctor and secretary or local manager. The lepers employ their own pastor and these three men live just outside the gates of the colony. The chief duty of the doctor is to train lepers for laboratory and general medical work. For the past twelve years these training classes have been held and the lepers have been taught pharmacy, diagnosis, microscopic examination and the general lines of
medical work, so that today they do about 90 per cent of this work.

Again we repeat that in planning for a colony it is best to start on a small scale and gradually increase, according to one's budget and support. We started 21 years ago, one case having been brought in who was cared for until her death. Then we took up a collection from among local friends and erected a three-room cottage. A little later the Mission to Lepers came to our rescue and provided the funds and support for a plant of 45 cases, and this has gradually grown into the present colony.

It is a good plan to have an advisory committee among the lepers and put as much of the care and responsibility upon its shoulders as possible.

Enthusiasm for the treatment and carrying out of it is very marked on the part of the lepers and I only have to make a suggestion for them to carry it out. Only a big field day or the like would prevent their getting their injections, even though they are a little painful and inconvenient. One can easily glance into the faces of the lepers and recognize those who have been under treatment for a few months as the normal colour soon returns after a period of treatment.

SITE

Locating a leper colony is a very important matter and the most important thing is that sufficient land is provided for farming and industrial affairs. To be cooped up in a small walled space is a very serious mistake. Our colony is 14 miles away and while this is rather inconvenient for the manager the large peninsula on which it is situated makes it most attractive. We have over 200 acres and at least this amount is needed. Not only for farming but for flowers, trees and the growth of fuel. We try to have as many shrubs and trees along the highways as possible and then give most of the other land to farming. Certain trees such as the acacia and poplar grow very fast, make a good highway border and at the same time can provide considerable fuel from the annual trimmings.

In the selection of a site some points should be remembered. It should be within a few miles of a city where market and workers can be had. The service of Mission workers can often
be had gratis if within easy distance of their establishments; while if too remote full time salary may be necessary. A very important thing is plenty of good land for gardening. It is important that building materials like sand, stone, etc. should be available. In our case we have an abundance of sand, stone, and land, over 300 acres of the latter counting 100 acres mountain land for fuel which has recently been added.

BUILDINGS

Since the transfer and erection of our new colony 55 stone buildings have been erected entirely by the lepers with stone they cut and blasted. The church, the largest of these, is 48×80 feet with ten rooms in the basement for a school. They have erected 38 living cottages. For the erection of one of these with a porch, kitchen and two rooms we paid as reward the following: Yen 12 to masons, Yen 10 to stone cutters, Yen 35 for coolie work, Yen 35 to masons making a total of Yen 92 (G$46.00). For one year during the construction work we employed an expert Chinese mason and builder who looked after the supervision and also taught the lepers blacksmithing, etc.

Our buildings were erected by the lepers themselves of stone and concrete and are very substantial. The reason inexperienced men can quickly learn this method is due to the fact that we simply fix up a form of the building to be erected of boards and against this board form is laid the stone, while cement is filled in to all the places behind the stone. The houses are very simple and yet very solid and substantial. I shall be glad to give further particulars to any one desiring full information.

INDUSTRIAL WORK

Industrial work should be confined to articles that the lepers can use or consume. It is a mistake for a leper institution to make articles for the general market, even though many such can be well sterilized.

A healthy stimulation of competition is a good thing. A reward for the best garden or best display of vegetables creates a keen interest to improve and gets many out into the open.

Trades. The only men found among the lepers with trades were the carpenter and stone cutter and these in turn have
trained many others. For some lines of work we sent cured cases out to learn trades who then returned and taught classes. It is very important to get several lines started and then constantly keep in view the teaching of others. It was no easy matter to get a man taught to run and properly care for the gas engine. Now he does this quite well. The tin work is most important and here are made the buckets, pans, basins and such articles in common daily use. We make nothing to sell for we found that there was too great a prejudice against such.

**MANAGEMENT**

**Committees and Management.** Annually the entire leper assembly meets for the election of officers and committees. There are eleven departments of work and two men from each are elected to compose the executive or management committee. These departments are as follows:—food supplies, policing, finance, hygiene, education, animals and stock, farming, day labour, carpenters, masons, stone cutters. This committee meets about twice a month to plan for the work or consider any matter necessary. At one of the meetings the following decisions were made: buy two hundred spoons and fifty bags millet: all chickens to be kept in coops: no raising pigs by individuals: etc. At the first of each year this committee must make out a budget of expenses for the year not to total more than an average of six yen per month per individual.

**Food.** We provide rice, millet and beans, salt, kerosene for lighting and one suit clothes annually. All vegetables must be provided by each club and each room is a club. The members must work together in the preparation of garden and food, clothing, etc. Among each group are the weak so the strong must help the weak. No shoes are provided but rewards are given for some lines of special work such as nursing, building, etc., and shoes are provided from such. On the first of each month a survey is made and each club that has a neat yard, garden, etc., is given a small amount of money for meat or fish. Once a year small prizes are given to the five neatest and best kept cottages; this alike both for the men's and women's cottages.

**Medical.** Just now we have 28 lepers on the medical and nursing staff; these do all dressings, all injections, pharmacy and simple surgery including amputations, abscesses and the like.
About 700 subcutaneous injections of chaulmoogra oil are given by them twice a week. Each receives four sen (two cents gold) per day or 1 yen per month. The lepers also do their own laboratory work and annually the stool, urine and blood of each case must be examined. The Kahn test is done and checked up after treatment to note improvement.

For farming, cooking, making clothes and the ordinary affairs of the daily routine there is no pay. Some object seriously to anything like pay to the inmates but two to five cents a day could hardly be called “pay.” It is almost impossible to get the extra tasks performed without this little reward for why should a few nurse and do dressings all day or cut and haul stone when many others are free to sit about idle? I am glad for them to have a little cash for their church collections, for buying socks or shoes and the like.

A good rice mill is an economic addition. We hull our grain which gives rice, gives also the chaff for fuel, seconds or shorts as feed for the stock and fertilizer, and we can also prevent the too fine milling of the rice.

Sports and games are encouraged and they enjoy about twice a year a big field day with prizes. There are mostly relay races with some 40 upon each side. Then tennis, football and the tug-of-war are enjoyed very much.

Live stock means much to the lepers and there is nothing quite so suited as the white rabbit, for the food is easy to prepare and economical and this gives each leper something to focus his interest upon. We have about 3,000 rabbits in the place but the number changes daily. We keep a few milk cows for the weak and sick cases. A few pigs are kept to consume the waste food but these are owned by the colony and used for special occasions. Individuals raising pigs caused too much dirt and too many flies and had to be abandoned. Chickens injure the gardens and were given up. We keep three bulls for the plowing and cart work and these are kept busy. The vegetable garden and white rabbits are the two best things to get the weak crippled cases out in the sun and fresh air and we have found nothing so good.
EXPENSES

The expenses last year for an average of 727 lepers was Yen 64,664.00 making Yen 7.40 per leper per month (G$3.70) 24 sen or 12 cents a day; of this 62% for food, 14% fuel, 13% medical, .03 clothing, and .08 for postage, travel, rewards, cultivation, school and burial.

The Average for 20 months works out in detail as follows:

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>Yen 4.86</td>
</tr>
<tr>
<td>Medicine</td>
<td>.68</td>
</tr>
<tr>
<td>Clothing Sundries</td>
<td>.18</td>
</tr>
<tr>
<td>Fuel</td>
<td>.88</td>
</tr>
<tr>
<td>Travel</td>
<td>.11</td>
</tr>
<tr>
<td>Wages</td>
<td>.27</td>
</tr>
<tr>
<td>Farming</td>
<td>.04</td>
</tr>
<tr>
<td>Post, church, school, burial</td>
<td>.04</td>
</tr>
<tr>
<td>Taxes</td>
<td>.01</td>
</tr>
</tbody>
</table>

Yen 6.97 Average monthly cost of 1 leper.

Paying Cases. Anyone paying one hundred yen can enter the colony for two years. This makes fifteen month's pay and 9 months free care. It attracts some cases and makes it possible at any time for a leper to enter the place.

The Government helps to the extent of ten sen a day for each leper and this past year their gift was 26,000 yen, or about 40 per cent of the running expenses. The Empress Dowager made a donation of Yen 4,000 and a thousand annually for the next five years, a portion of this was given specially for the pleasure and entertainment of the lepers. With this money a radio, movie and entertainment hall were added.

During our 20 years not only the missionary management has been entirely gratis but the training of staff, such as the druggist, mechanic, laboratory technicians, nurses, Bible and music teachers, and various other kinds of help, has also been without cost to the colony as much of this has been done in connection with our general hospital. In this way the entire appropriation goes into the care of the leper. Our cost of running expense is 12 cts. a day as against three dollars a day.
in one plant I know. I do not believe in economy to the hurt of the patient but I believe we are getting as good results as any other institution medically and at a minimum cost, while we have as happy a group of patients as can be found anywhere.

**RELIgIOUS TRAINING**

The religious training is very important in securing the best spirit and it is almost impossible to secure the best results without pushing this side of the work. The lepers have their own pastor and session with three elders, ten deacons, 106 baptized and a usual attendance of about 700, a few cripples and advanced cases not coming out. 96 of our Sunday School teachers are now taking a month's study led by four good teachers and of course their daily Bible lessons mean much for the contentment of the people.

The comfort of religion means far more to the leper than to the ordinary person and this matter should have its full attention. Leprosy is so very much feared and dreaded that many lepers feel like driven dogs and the certainty of a blessed future will bring a joy that nothing else can.

**DISPOSAL OF THE DEAD**

Cremation is our method of disposal of the dead. It is not the common Korean custom but they seem quite willing to use the same. We have made by the leper carpenters a coffin of cheap boards, costing less than a yen, and the body is placed in this and the entire outfit burned. Over the coffin is a very neat, attractive coffin cover that is used for each occasion until arrival at the crematorium. This method is inexpensive and quite a satisfactory one for the inmates.

**MORTALITY STATISTICS SINCE 1929**

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Lepers</th>
<th>Deaths</th>
<th>Death Rate per 1000 per annum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1929</td>
<td>709</td>
<td>14</td>
<td>19.7</td>
</tr>
<tr>
<td>1930</td>
<td>730</td>
<td>15</td>
<td>20.5</td>
</tr>
<tr>
<td>1931</td>
<td>729</td>
<td>16</td>
<td>16.4</td>
</tr>
</tbody>
</table>
Wiederwolf Leper Colony

Men's dormitories, with chapel in distance

Gate House
Chapel

Built by the Lepers
Men's Cottage, Cost $500

4 Rooms, hall Kitchen and attic
One of 19 women's cottages; kitchen in centre with two end rooms for 7 women or girls in each, an attic for supplies and two porches; of gray stone covered with heavy grade galvanised iron. Cost complete G$250.
Hospital and Dispensary, 20 beds.

Built by the lepers
Carpenters and tinners
Tinners who make all buckets and pans and such used in the colony.

Many learn a trade in these shops.
Waiting for admission
A statement in an article entitled "The Curability of Leprosy" by Professor Marchoux, appearing in the July number of Leprosy Review has prompted the writing of this paper. After referring to a case of leprosy in which the disease showed apparent spontaneous cure he says: "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 demonstrate incipient tuberculosis. We should have still more astonishing surprises if we possessed for leprosy a reagent of a sensitivity as great as that of tuberculosis. Without doubt we should in leprous areas obtain proportions, if not of 98 per cent as for Koch's bacillus (for the latter is carried by very subtle means), yet certainly of unsuspected size." So far all attempts to produce such a test have proved of little use although many such tests have been put forward.

By means of it 78 per cent of nerve, 70 per cent of skin and 66 per cent of mixed cases were found positive. But if a serological test is to be of any value in the diagnosis of leprosy it should surely be positive in every case in which the diagnosis can be definitely proved either bacteriologically or clinically. We have tried out this test in Calcutta in early bacteriologically negative but clinically positive cases and found it of no practical value in making an early diagnosis.

This goes to show that we must depend for early diagnosis of leprosy on clinical rather than on serological examination. It should be of interest to Professor Marchoux and other European workers to know the high proportion of cases only clinically positive as compared with bacteriologically positive cases in a highly endemic country like India. Two examples out of many available may be given. At the clinic of the Calcutta School of Tropical Medicine there attended during last year 929 leprous patients. In only 372 or 39 per cent was it possible on careful examination to find acid-fast bacilli. In the remaining 557 cases the diagnosis was entirely dependent on clinical evidence and yet in not a single one of the these cases was there any doubt as
to the actual presence of leprosy, the symptoms being considered quite definite. Of these 557 cases 146 had acroteric lesions, showing anaesthesia, deformity, and other trophic lesions of the hands and feet. But the remaining 411 were early cases without trophic lesions.

Another still more striking example was the result of the examination of coolie labour in Calcutta, 16,889 cases were examined and out of these 159 or 0.94 per cent were found to have definite symptoms of leprosy. The incidence was probably higher as several examinees absented themselves, doubtless from fear of losing their work if found to have leprosy. Out of these cases 39 were bacteriologically positive, 6 showed acroteric lesions (A2 type) and 114 or 72 per cent were early cases diagnosed on clinical evidence. In some places in northern Bengal the incidence of leprosy has been found to be as high as 6 per cent.

All this goes to confirm the contention of Professor Marchoux that, as in the case of tuberculosis the incidence of leprosy infection is far higher than is generally supposed. The frequency with which cases of the A1 type are found among the contacts of highly infectious cases of the B2 and B3 type would lead one to believe that over and above those showing actual clinical signs there are many who are infected, but in whom the resistance is sufficient to prevent the development of the disease to an extent which can be diagnosed either clinically or bacteriologically.

Moreover in Calcutta we have abundant evidence that even the slightest infection may persist for many years with scarcely any advance. As an example may be mentioned a patient who had had two circular, anaesthetic patches on his thigh for 22 years. On examination he was found to have anaesthesia of the lobe of the ear and a very markedly thickened great auricular nerve. It is not unlikely that in many cases the infection may persist internally for an equally long period without the patient having, as he had in this case, unmistakable clinical evidence of the disease.

We have then two factors, the wide-spread infection of contacts and the long persistence of infections which are so slight that they cannot be diagnosed or can be recognised only
The Early Diagnosis of Leprosy

after very careful examination. These two factors provide the presence of the seed: the important determining factor is the resistance of the body. Any prophylactic or therapeutic measures which are taken to cope with leprosy must aim at:

(i) Examining for signs of leprosy, especially contacts with infectious cases.

(ii) Distinguishing between infectious and non-infectious cases and taking all possible means to prevent the former from spreading infection.

(iii) Providing advice and treatment to early cases with a view to preventing them from developing into infectious cases.

Since much depends upon the early clinical and bacteriological diagnosis of leprosy, the common early signs and symptoms may be mentioned here. Leprosy most commonly first appears in the form of one or more patches or macules, annular or circinate in shape. In dark skins depigmentation is one of the first signs which brings the patient for examination. One or more depigmented patches may appear anywhere on the surface of the skin. The depigmentation is not complete, but the patch is of a lighter colour than the surrounding skin. In lighter skins depigmentation is more difficult to distinguish but this is made up for by more easily distinguished erythema. Erythema and raising of the skin surface generally accompany each other and may either affect the whole patch or more commonly, only the margin. In early slow-spreading patches the epithelium is generally raised at the margin in the form of reddish papules which coalesce. As the patch spreads a few papules may often be noticed like scouts, outside the advancing margin. In other cases the raised margin may be absent or difficult to distinguish.

Parakeratosis is another marked feature of early patches. The skin surface becomes coarse and shiny in appearance. Along with this there is anhydrosis and the hairs first become coarse and then break off at the mouths of the hair follicles, leaving a black bulbous head marking the position of the follicle, inside which the hair is curled up.

There is almost always some disturbance of sensation. In the more chronic cases there is epicritic anaesthesia the patient
failing when blindfolded to respond to the touch of a feather on the patch. In more acute cases epicritic sensation is not lost, but deep analgesia is present, pricking with a pin being felt much less on the patch than on the surrounding healthy skin. In the former acid-fast bacilli cannot be found, but they can be found as a rule in the latter.

The thickened nerve branches supplying the affected skin can often be felt running under the skin before they pierce deep fascia. Such nerve thickening is characteristic of leprosy and is useful in confirming the diagnosis in otherwise doubtful cases. When the sensory nerve branches at once pierce the deep fascia on leaving the skin they cannot be felt but deep percussion on the patch or at a spot immediately proximal to it will often elicit a tingling sensation due to the thickening and consequent tenderness of the nerve.

In other chronic cases there is no definite patch at all, the disease apparently first showing itself as an infection of some nerve trunk, most commonly the ulnar. Following this there is anaesthesia of the most distal parts of the skin supplied by the affected nerve and frequently in the case of the ulnar there is flexion of the small finger due to the cutting off of the trophic supply to the small muscles of that finger and their consequent wasting and contracture.

The above mentioned signs are generally sufficient to make a clinical diagnosis of leprosy, but there are some patients who come to our clinic with signs which are suspicious but are not sufficient to make a clear diagnosis. In these cases it is our custom to correct any accompanying disease which would lower the resistance of the patient, such as malaria, pyorrhoea, dietary defects, etc., and to tell the patient to return after 3 months. In some of these cases the suspicious signs disappear, while in others the signs increase to a point at which a definite diagnosis of leprosy can be made.

The extreme importance of making an early clinical diagnosis may be judged by the fact that almost 100 per cent of cures may be expected in early cases if they are thoroughly treated. By cure is meant the disappearance of all active signs of the disease. By permanent is meant continuation over a period of years. It is impossible to say that all the leprosy
germs have been eradicated from the body, but then it is equally impossible to say that leprosy germs are absent from the body of anyone who has been in close contact with an infectious case of leprosy, even though no recognisable signs of leprosy have ever appeared. By active signs are meant:

(a) Positive bacteriological findings in skin mucosa or lymph nodes,
(b) Appearance of fresh lesions,
(c) Erythema or raised margin in original patches,
(d) Keratosis, anhydrosis or depilation in original patches,
(e) Increase or decrease of the size of a lesion either visibly or as judged by the extent of abnormal sensory signs, and
(f) Thickening or tenderness of nerves.

It must, however, be made clear that leprosy, however limited the extent of the lesions, will often leave certain permanent signs in the form of diminished sensation, anhydrosis, depilation and colour change. But when these have been reduced to a minimum and no further change is found over a period of, say six months, I consider that, generally speaking, one is justified in considering as permanent such sensory and other signs as remain. They do not indicate the presence of infection, but of irreparable destruction of nerve fibres, hair follicles, and sweat glands.

A patient in the most advanced stage of leprosy, with the most of the skin of his body thickened with the disease and containing in any cubic centimeter of its area billions of Hansen's bacilli, can still remain in apparently good health and daily carry on work implying an immense amount of physical exertion. This goes far to indicate that the toxicity of leprosy is very low as compared with tuberculosis, and it is therefore not surprising that a reliable test which would correspond with tuberculin test in tuberculosis, is not available.

Clinically, however, early leprosy can be diagnosed with much more ease and certainty than can tuberculosis of a corresponding stage of advancement; it has been through overlooking early clinical signs that the frequency of leprosy in endemic areas has not been recognised and that the method here advocated of dealing with leprosy by treating such early cases has so long been neglected.
THE APPLICATION OF GOUIN'S "REACTION LEUCOCYTAIRE" IN THE DIAGNOSIS OF LEPROSY

Dr. F. Reiss, Asst.-Professor of Dermatology, National Central University,* Shanghai.

The exact diagnosis of Leprosy rests without doubt on the positive findings of Lepra bacilli, whether the bacilli are recovered from the nasal mucous membrane, the local lesions themselves, enlarged nerve trunks or from the lymph glands. The positive finding of Lepra bacilli always confirms the clinical diagnosis of Leprosy. There are, however, clinically typical cases of Leprosy where the most exact methods, sometimes even after provocative treatment do not reveal the bacilli. This applies especially to the nerve type of Leprosy where in a good number of cases the diagnosis cannot be proved bacteriologically.

Various means have been sought to improve our diagnostic methods. Complement fixation, agglutination, as well as cuti-reactions are reported by several authors as more or less successful. We have an analogous state of affairs in the diagnosis of Syphilis, though this naturally cannot be compared with the condition prevailing in the diagnostic field of Leprosy. However there are a good number of cases where neither the bacteriological nor a great number of serological reactions give a satisfactory answer. This is the reason also why we have such a large number of serological reactions in Syphilis, each claiming superiority above the others. This fact also led Amato to introduce according to his opinion a much more reliable reaction than the serological tests up to date. Last year Gouin published a similar reaction which also claims superiority above all previously reported reactions. At a superficial glance one gets the impression that they would diametrically oppose each other though based on the same principle, but by the careful studies of Blasio this seemingly wrong impression has been cleared up in a satisfactory manner. In order to make comprehensible my present investigations which deal exclusively with Leprosy I wish to give a short review of Amato's Reaction Haemoclasique and Gouin's Reaction Leucocytaire.

*From the Division of Dermatology of the Chinese Red Cross General Hospital and the Lester Chinese Hospital.
Luigi D'Amato reported in 1921 that very small doses of tuberculin would produce a *choc haemoclasis* in a form of leucopenia which would have a diagnostic value in tuberculosis only. As a direct consequence of his research he tried in an analogous way the same reaction in typhoid and also in patients suffering from Malta-fever. In syphilis he observed furthermore that an injection of Salvarsan, Bismuth and Mercury would produce the same effect in such a manner that he used this method for diagnosing the disease. Amato concludes that:

1. Intramuscular or intravenous injection of Salvarsan produces only in Syphilitics a reaction which is constantly manifested in the form of a Leucopenia. The *réaction haemoclasis* is supposed to be positive in the majority of cases with the exception of those treated for a certain time.

2. Healthy persons or sick from other diseases respond in the form of a leucocytosis.

3. In Syphilitics the repeated injection of soluble mercurial salts always produce this reaction in exactly the same manner. This reaction changes after a long antisypophilic treatment but not so easily as the Wassermann reaction.

4. Protein injections (milk, serum) do not produce the same reaction.

5. He considers therefore his reaction of great biological and diagnostic value, because it is produced in persons who are not artificially (previously) sensitized, a reaction which is producing crystalloid substances and which may therefore also explain the therapeutic action of autoblood injections. Under the name of *réaction leucocytaire de la syphilis*, Gouin, Bienvenu, Daoulas and M. Pérès described a similar reaction, whereby Syphilis can be diagnosed by injecting the blood of the person in question or any kind of antisyphilic medicaments. A positive reaction is given in a form of leucocytosis whereas healthy persons respond with leucopenia. According to Gouin, Bienvenu, Daoulas and M. Pérès, the *réaction leucocytaire* is more specific than the Wassermann reaction. The reaction is different from the serological reactions because: (1) the reading is by counting and not by colorimetric methods; (2) it relies on figured elements (white blood cells) and not on serum; (3) it is a reaction which is produced inside the organism and not *in vitro*.
Comparing the two, Amato's Réaction Haemoclasique with Gouin's Réaction Leucocytaire, as already mentioned, one has the impression that they are opposed to each other and consequently are contradictory.

Blasio studied both reactions and for that purpose he made various experiments. In the first series of his experiments he compared both reactions with the Wassermann and Sachs Georgi reaction. Amongst one hundred syphilitics he found that Amato's Réaction Haemoclasique showed 62% specific, 6% doubtful and 32% negatives. Gouin's Réaction Leucocytaire showed 48% specific, 10% doubtful and 42% negative tests.

He tested ten cases of chancre, twenty secondary manifestations, five syphilitic aortitis, two aneurysms, twenty latent syphilis, five congenital syphilis who had been treated badly or not at all, twenty visceral syphilis, two with syphilitic osteomyelitis and one gumma of the forehead.

Amongst these cases the Wassermann showed 74%, the Sachs Georgi 65%, the Réaction Haemoclasique 62% and Réaction Leucocytaire 42% positive tests. The Réaction Haemoclasique showed higher specificity amongst the twenty cases of visceral syphilis, amongst which it showed 19 positive, the Wassermann reaction 16 positive, the Sachs Georgi 14 positive as also the Réaction Leucocytaire. Amongst primary sores the réaction haemoclasique showed 2 positive, the reaction leucocytaire 1 positive, whereas the serological reaction was still negative. In secondary lesions the Wassermann reaction showed a comparatively much higher specificity. Generally speaking, whenever the Réaction Haemoclasique was positive, he always had a positive Réaction Leucocytaire, but the Réaction Haemoclasique showed a much higher percentage. In only two cases the réaction leucocytaire showed a positive result whereas the reaction haemoclasique was negative.

The second series deals with various other diseases like diabetes, gout, chronic eczema, varicose ulcers, lung, bone and gland tuberculosis, tumors, various valvular diseases, jaundice, and anemia. The réaction haemoclasique showed 10% positive results and the same non specific results could be seen in a far greater number with Gouin's réaction leucocytaire. The third series deals with the various phases of the autoblood injection.
In each case the observation was made that after 20 minutes a distinct leucopenia sets in, which lasts about an hour, after which time a slight increase of leucocytes starts which develops into a marked leucocytosis within two hours. The majority showed the maximum height in 4-5 hours after the injection. After 30 hours the normal condition is re-established. In a few cases there was still leucocytosis present after 24, 32, 48 and even 52 hours. The feeble leucocytosis mentioned by Amato after the first half hour and the leucopenia mentioned by Gouin after the second hour in healthy individuals is not constant, this applies especially to the leucocytosis.

As already mentioned one would believe that these two reactions are in opposition to each other, but from Blasio's, experiment one sees distinctly that it is one and the same reaction, only two different phases of the same phenomenon,—the choc haemoclasique—these are facts but not new facts, because Widal has already mentioned that every shock has a phase of leucopenia which is followed by leucocytosis, just as the accompanying hypotension may be followed by a hypertension.

Since the first publication of Gouin's article, several others have appeared, especially closely following the discussion at the French Society of Dermatology's Meeting in February, 1930, where Gouin again demonstrated a good number of congenital syphilitic and conjugal syphilitic cases where neither clinically nor bacteriologically nor serologically a proof could be given of the syphilitic nature of his cases, except for the Réaction Leucocytaire, which gave a definite information. Proof of the correctness of this was given later by the successful results of treatment.

That is one of the reasons why I decided to apply his methods in my investigations, and another reason is that he himself mentioned that he was not quite sure about the results of his reaction in cases of Leprosy.

Before I enumerate our investigations dealing with Leprosy, I would like to mention that I also investigated twenty cases of positive syphilitics and the Réaction Leucocytaire gave 80% positive results; also 30 non syphilitic cases where it gave 70% negative results.

The cases dealing with Leprosy are the following:
1. Nodular Leprosy, positive nasal smear; count before blood injection, 5.200; two hours after injection, 5.450; and four hours later, 7.400.

2. Nodular Leprosy, positive nasal smear, count before blood injection, 8.800; two hours after injection, 9.800; and four hours later, 10.400.

3. Nodular Leprosy, positive nasal smear, count before blood injection, 6.000; two hours after injection, 7.500; and four hours later, 8.000.

4. Nerve Leprosy, negative nasal smear, count before blood injection, 9.900; two hours after injection, 12.200; and four hours later, 14.800.

5. Nodular Leprosy, positive nasal smear count before blood injection, 5.600; two hours after the injection, 5.000 and four hours later, 5.600.

6. Nodular Leprosy, positive nasal smear, count before blood injection, 4.450; two hours after the injection, 4.200, four hours later, 4.750.

7. Nodular Leprosy, positive nasal smear, count before blood injection, 5.600; two hours after the injection, 7.400; and four hours later, 6.700.

8. Nodular Leprosy, positive nasal smear, count before blood injection, 5.640; two hours after injection, 5.850; and four hours later, 4.900.

9. Nodular Leprosy, positive nasal smear, count before blood injection, 9.800; two hours after injection, 12.450; and four hours later, 13.800.

10. Nodular Leprosy, positive nasal smear, count before blood injection, 7.600; two hours after the injection, 8.200; and four hours later, 8.800.

11. Nerve Leprosy, bacteriologically positive, count before injection, 6.000; two hours after injection, 8.800; and four hours later, 8.650.

12. Nodular Leprosy, positive nasal smear, count before the injection, 11.400; two hours after the injection, 14.200; and four hours later 15.200.

13. Macular Leprosy, bacteriologically positive, in the skin; count before the injection, 4.600; two hours after the injection, 5.200; and four hours later, 5.950.

14. Nodular Leprosy, positive nasal smear, count before the injection, 5.600; two hours after the blood injection, 5.650; four hours later, 5.500.

15. Nodular Leprosy, positive nasal smear, count before blood injection, 6.700; two hours after the injection, 7.440; and four hours later, 7.980.

16. Nodular Leprosy, positive nasal smear, count before the injection, 5.200; two hours after the injection, 5.450; and four hours later, 7.400.

17. Nodular Leprosy, positive nasal smear, count before the injection, 8.800; two hours after the injection, 9.800; and four hours later, 10.400.

18. Nodular Leprosy, positive nasal smear, count before the blood injection, 9.900; two hours after the injection, 12.200; and four hours later, 12.800.
19. Nodular Leprosy, positive nasal smear, count before the blood injection, 4,450; two hours after the injection, 4,200; and four hours later, 4,750.

20. Nerve Leprosy, positive nasal smear, count before the blood injection, 5,640; two hours after the injection, 5,850; and four hours later, 5,900.

21. Lepra maculo-anesthetica; negative nasal smear, count before the injection, 6,000; two hours after the injection, 7,440; and four hours later, 7,980.

In three cases the action of the injection of Antileprol was investigated and in all three cases an increase of 3,000, 2,500 and 2,000 leucocytosis respectively was noticed. This is an indication of the specific action of Antileprol on leprous lesions which has been proved with antisyphilitic remedies in an analogous way by Amato and Cerchiai in connection with antisyphilitic remedies in Syphilitics.

In every case 5 ccm of blood was taken from the cubital vein and injected intramuscularly.

All the above counting has been done on an empty stomach and the blood was very carefully taken from the finger tip. At the same time investigations have also been carried on of the changes in blood sedimentation as well of the incidence of the various blood groups in Leprosy, a report of which will be given at a later date.

From the above number of cases which gave in 80% a positive result, and in only 20% a negative one, we consider the Réaction Leucocytaire as a valuable diagnostic help in Leprosy, if Syphilis can be always ruled out.

CONCLUSION

Twenty one cases of Leprosy are reported where 80% gave a positive and 20% a negative Réaction Leucocytaire, furthermore 3 cases showed, after an Antileprol injection, a distinct leucocytosis, therefore, we consider the Réaction Leucocytaire;

1. As a valuable help in the diagnosis of Leprosy
2. As a help in the valuation of certain leprocidal remedies.
3. As a criterion by which to judge the success of a treatment in Leprosy.
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A REVIEW OF RECENT LEPROSY FINDINGS


It is hoped that before this review is printed copies of the full report of this conference will be available and the Leonard Wood Memorial is generously supplying enough copies of the report to place in the hands of all those working on leprosy in China. In order however to gain a still wider circulation for some of the findings of this Conference, extracts therefrom are printed below, and should prove of general interest in a country where almost all physicians have from time to time to deal with cases of leprosy.
THE MICROORGANISM

Nomenclature.—There is considerable variance in practice in the formal designation of the organism of leprosy. Common practice countenances the informal use of the term “bacillus” for rod-shaped organisms in general. The generic name *Mycobacterium* is now extensively used for the acid-fast group to which the organism of leprosy belongs. Therefore, while it is permissible to speak colloquially of “the leprosy bacillus,” it is recommended that it be not referred to formally as *Bacillus leprae* (*B. leprae*), but as *Mycobacterium leprae* (*M. leprae*).

"Toxins."—Attention may be drawn to the fact that “toxins” of *M. leprae*, in the sense used in bacteriology, are hypothetical. It is a striking fact that a patient with extensive and progressive cutaneous lesions containing incalculable numbers of microorganisms may show no clinical indication of any kind of toxic effect. In the condition known as “lepra reaction” toxic manifestations are seen, but there is reason to believe that these are not due to true bacterial toxins. In the present state of our knowledge it is advisable to avoid the use of this term.

DEFINITIONS

*Leprotic.*—It is suggested that the term “leprotic” be applied to those changes which present clinical or microscopic evidence of inflammatory processes, typically of granulomatous nature, which are apparently caused by *Mycobacterium leprae* in them. In such lesions the organism can usually be demonstrated by the ordinary methods of examination.

*Leproma.*—The term “leproma” is applied in a general sense to any lesion of a leprotic nature, as defined herein.

*Ulcers.*—In considering the ulcers of leprosy, distinction is not always made between those which occur in leprotic lesions and from which bacilli are usually discharged, and those which are sequelae of nerve changes. The former type, occurring in leprotic tissues, should be called “leprotic ulcers.” The latter, which usually occur in nonleprotic tissues and do not discharge bacilli, should be called “trophic ulcers.” Traumatic ulcers are particularly liable to occur in tissues affected by trophic changes.

*Infiltration.*—“Infiltration” is a term commonly applied to a diffuse thickening of leprotic nature involving the skin or mucosa
which is not of definite nodular, papular, or macular form. The term may also be applied to diffuse leprotic conditions in other organs.

_Nodule._—A nodule is a definitely thickened, rounded, circumscribed mass of leprotic nature commonly occurring in the skin, subcutaneous tissue, or mucosa.

_Papule._—A papule is a small solid elevation of the skin, of leprotic nature, not more than 5 millimeters in diameter.

_Macule._—A macule is a circumscribed area of skin showing changes in color, sometimes with slight elevation or depression. The following descriptive terms may be applied to indicate its peculiar characteristics: Hypopigmented, hyperpigmented, erythematous, circinate, marginate, zonal, raised, atrophic.

CLASSIFICATION OF TYPES OF LEPROSY

_A. MAIN TYPES_

_Neural (N)._—All cases that show evidence of actual or previous nerve involvement; i.e., alterations of sensation with or without changes in pigmentation and circulation, trophic disturbances or paralyses and their consequent results: atrophies, contractures, ulcerations. These are not accompanied by leprotic changes in the skin.

_Cutaneous (C)._—All cases showing leprotic lesions in the skin. Such cases may or may not show, at any given time, clinical manifestations of nerve involvement.

_B. SUBTYPES (INDICATING DEGREE OF SEVERITY)_

_Neural-1 (N-1)._—Slight neural: Cases with one or a few small areas of disturbed sensation, which may or may not show alterations of circulation or pigmentation, paralyses or trophic disturbances of minor degree.

_Neural-2 (N-2)._—Moderately advanced neural: Cases with extensive or numerous areas of disturbed sensation, not confined to any one part of the body; with paralyses or/and visible evidences of trophic disturbances: marked depigmentation, moderate atrophy, keratosis, bullae, etc.

_Neural-3 (N-3)._—Advanced neural: Cases with more or less extensive areas of anaesthesia and marked motor and trophic
disturbances: marked paralyses, atrophies, contractures, trophic ulcers, and mutilations.

*Cutaneous-1* (C-1).—Slight cutaneous: Cases with one to a few leprotic macules, or a few small areas of infiltration, or nodules.

*Cutaneous-2* (C-2).—Moderately advanced cutaneous: Cases with numerous leprotic macules, or fairly numerous or marked areas of infiltration, or nodules, frequently with lesions of the mucosa.

*Cutaneous-3* (C-3).—Advanced cutaneous: Numerous or very marked leprotic lesions in various stages of development or retrogression, usually with lesions in the mucosa.

In all cutaneous types there may be varying degrees of neural involvement and such cases should be recorded to indicate the degree of this involvement; as, for example, C-2, N-1.

*Secondary neural.*—Neural cases that were formerly cutaneous, but from which the active leprotic lesions have disappeared.

### METHODS OF EXAMINATION

Accuracy of diagnosis and the evaluation of improvement depend upon the methods of clinical and bacteriological examination employed and upon the care and skill with which they are applied.

*Clinical.*—The use of crude methods as well as careless practice may result in failure to detect cases of slight degree and may also lead to gross errors in estimating the progress of the case. The importance of adopting proper methods of clinical examination cannot be overemphasized.

*Bacteriological.*—The significance of the bacteriological findings cannot be considered other than more or less arbitrary. In routine practice the examination is confined to limited portions of the superficial tissues, skin, and nasal mucosa, and even repeated negative findings do not prove that *M. leprae* is absent therefrom. It can usually be assumed that in neural cases the organisms are present in the nerves at least and that in cutaneous cases they are present also in the deeper organs.
DETAILS OF EXAMINATION

(a) Clinical examination.—The whole body should be examined, in so far as is possible, in a good light and all the findings accurately recorded. While many auxiliary tests may be employed, the following methods are important:

1. Sensation to light touch.—The patient should be blindfolded. The normal skin should be repeatedly touched with some light object, such as a cotton swab, a feather, a camel's-hair brush, or a spill of paper, and the patient asked to indicate accurately with the point of the finger the place touched. When the patient is responding to these stimuli, the suspected skin areas should then be similarly tested, loss of sensation to light touch being indicated by repeated failure to respond. In this way anaesthetic areas may be gradually mapped out.

2. Sensation to pain.—The eyes being blindfolded, a suspected skin area is alternately touched with the head of a pin and pricked with the point, a corresponding normal area being similarly examined immediately afterwards. The patient is questioned as to which prick produces more pain, the touch with the head or the prick with the point. This process should be repeated several times so as to avoid error.

3. Sensation to heat and cold.—This may conveniently be tested under similar conditions by touching suspected areas with two test tubes alternately, the one containing hot (40 to 50°C.) and the other cold water (20°C. or lower), the patient being asked to distinguish between them.

4. Thickening of the skin.—The detection of slight degrees of skin thickening often requires considerable care. Inspection, with or without a magnifying glass, should be supplemented by palpation, the suspected area being rolled between the finger and thumb. Comparison should be made with the surrounding skin and with the corresponding area on the other side of the body.

5. Thickening and/or tenderness of the nerves.—The superficial nerve trunks in normal individuals are frequently palpable and firm pressure may elicit slight pain. The determination of thickening and abnormal tenderness should depend on careful comparison with the nerve, if unaffected, on the other side of the body or with the corresponding nerve in a healthy
person of similar build. The superficial nerve trunks most commonly affected are the ulnar, the superficial peroneal, and the great auricular. Sensory branches supplying macules are sometimes tender and palpably thickened.

6. Mucous membranes.—In examining the nasal mucosa it is advisable to use a speculum, and the field should be well illuminated.

(b) Bacteriological examination.—Particular stress is to be laid on the need of examining smears from several sites and of making repeated examinations. Organisms may be demonstrable in one lesion or in only one part of it, while in another lesion they cannot be detected. In the early progressing cutaneous case the organisms in a lesion may be few and scattered, later becoming more numerous and generalized, while the converse may be true in the case as it improves.

Smears should contain as little diluting material (blood, lymph) as possible, but the specimen should be so taken as to contain cellular material from the deeper layer in which the organisms are normally to be found.

1. Skin examination.—There are two principal methods of procuring material for examination; namely, the "scraping" and the "snip." By the former a very small cut, about 2 millimeters deep, is made with the scalpel well into the dermis, and material is scraped from the depth of this and smeared on a slide. By the latter method a small portion of the dermis, at least 2 millimeters thick, is snipped off with a sharp pair of scissors, curved on the flat. The raw surface of the tissue so obtained is applied to a slide and firm pressure is exerted so as to express as much as possible of the cellular elements.

2. Nasal examination.—With the use of a nasal speculum the interior of both nares is carefully examined for infiltrations, nodules, and ulcers. If any of these is found, material should be removed therefrom with a blunt narrow-bladed scalpel, or a similar instrument, by scraping deep enough to cause slight bleeding. Even when there is no visible lesion, a scraping should be taken from the septum. Mycobacterium leprae may be found on the septum, the inferior and middle turbinates, or the floor of the nose. The material so obtained should be smeared on a slide.
3. **Staining.**—After drying, and fixing over a flame, smears are stained for at least ten minutes at room temperature or heated three minutes till steam rises, in a solution of carbol fuchsin. This is prepared by mixing one part of a 10 per cent solution of basic fuchsin in 90 per cent alcohol with nine parts of a 5 per cent solution of carbolic acid crystals in distilled water. This solution should be prepared at frequent intervals and be discarded when there is any trace of precipitate.

The slide is decolorized with sulphuric acid (10 per cent) or nitric acid (10 to 20 per cent) in water, and counterstained with methylene blue.

**Standardization and appraisal of treatment.**—It is impracticable at this time to establish a standard method of treatment. However, a method that has proved satisfactory is the intradermal injection of preparations of the hydnocarpus (chaulmoogra) group of oils, preferably combined with intramuscular injections.

**METHOD OF TREATMENT BY INTRADERMAL INJECTION**

A scheme of treatment in use at some of the largest centers is as follows:

The ethyl esters of hydnocarpus oil are preferred, but a stable uniform preparation of the sodium soaps of the fatty acids of the oils of this group may be used.

The injections may be given at weekly intervals. Not more than 5 cubic centimeters are given to a patient at any one time, and not more than 0.1 cubic centimeter is injected at any one point in a lesion. Whenever feasible, the lesion to be injected is completely infiltrated by producing coalescing “injection wheals.” If the lesions are so small or so few that 5 cubic centimeters cannot be injected into them, the balance is given intramuscularly. The combination of the intramuscular and intradermal administration in each patient seems desirable. The frequency of injections of any one lesion is limited by the local inflammatory reaction.

It must be recognized that the course of leprosy is often of great chronicity, and final conclusions concerning the therapeutic
value of a drug or method cannot be reached until after its use for one to several years. Further, it must be appreciated that there is no accurate method of measuring such therapeutic value. Both clinical estimates and microscopic examinations are subject to many errors. Skill, care, and adequate staff are necessary to carry out these examinations accurately.

TREATMENT OF LEPRO REACTION

The following methods have been used in controlling lepra reaction.

(a) The patient should be put at rest, and if there is no contraindication, a sharp purgative is given, means being taken thereafter to keep the bowels well regulated.

(b) A light but well-balanced, nutritious diet should be given.

(c) Accompanying diseases should be searched for and treated. The presence of such diseases, though often obscure, may stimulate a lepra reaction.

(d) Potassium antimony tartrate given every second day intravenously in doses of 0.02 to 0.04 gram has been found useful.

(e) Calcium chloride (20 cubic centimeters of a 5 per cent solution) may be given intravenously.

(f) Calcium lactate, 1 to 2 grams daily in divided doses, and sufficient sodium bicarbonate may be given to make and maintain an alkaline reaction in the urine.

(g) Lepra reaction may be accompanied by a very painful neuritis, which may lead to rapid atrophic changes in the parts supplied by the affected nerves. Rapid relief of pain may be afforded by the intramuscular injection of adrenaline (0.3 cubic centimeter of a 1,000 solution) diluted in saline, or by the administration orally of 0.05 gram of ephedrine sulphate. The effect of the latter drug is more lasting than that of the former. Instantaneous relief has also been obtained by the injection around a subcutaneous nerve trunk of 10 cubic centimeters of 0.05 gram of ephedrine sulphate dissolved in saline.

In giving special antileprosy treatment care should be taken not to exceed the tolerance of the patient, otherwise lepra reaction may result. Such special treatment should always be
discontinued during lepra reaction and until the patient has completely recovered therefrom.

EVALUATION OF PROGRESS

In the evaluation of progress it is necessary to use terms to define the stage to which the patient has progressed. Such terms are indicated below. Cases may be classified with regard to the course of the disease as active, quiescent, and arrested.

Active cases.—"Active" cases are those in which there are clinical or microscopic evidences of progressive or of recessive changes in lesions, with or without accompanying systemic disturbances.

These evidences include the following: Positive bacteriological findings in skin or mucous membrane determined by the usual methods; the presence of raised or erythematous lesions; increase or diminution of lesions in size or number; tenderness of nerves, with or without thickening.

Quiescent cases.—"Quiescent" cases are those in which there is no longer clinical or microscopic evidence of activity as defined above.

For the purpose of attaining uniformity of method, the classification "quiescent" should be applied to cases from which the signs of activity have been absent for a period of at least three months. This absence of activity should be determined by at least one examination a month during this period. This examination should include a clinical examination, and also microscopic examinations of the nasal mucosa at more than one site, and of lesions of the skin at more than two sites.

Arrested cases.—"Arrested" cases are those that have remained quiescent for a period of at least two years.

Cure; relative cure; negative.—Use of the term "cure" in relation to the results of the treatment of leprosy is open to misunderstanding; and it is, therefore, recommended that this term should not be employed in the terminology of leprosy. Since the term "negative" is often misinterpreted and the term "quiescent" is more descriptive of progress than "negative," it is recommended that the term "negative" as applied to patients likewise be discontinued. It is further recommended that the
term "relatively cured" be not used, since it includes the word "cure;' and that the condition to which it is applied be described by the term "arrested."

Interrupted and relapsed.—Cases that have been classed as quiescent may later be found to be active; this condition may be called "interrupted." The term "relapsed" may be applied to an "arrested" case that has later become "active."

NOTES ON LEPROSY IN THE THREE EASTERN PROVINCES

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History

Until the present year, the literature written about leprosy in China contained very little reference to leprosy in Manchuria. The problem was dismissed in a sentence or two. Such competent observers as Manson, Jefferys and Maxwell, Fowler, Arlington, and Matthews had little to say about it. In the Special Leprosy Number of the China Medical Journal, however, which was issued in August 1930, J. L. Maxwell urged that this attitude be reconsidered in consideration of "...the enormous influx from the highly infected Shantung which must have brought many lepers to Manchuria." And he has now pushed the matter further in two articles specially dealing with leprosy in Manchuria, which appeared this year in March, in the Leper Quarterly.

It is very largely because of visits paid by him and by Dr. Wade of Culion that we have tried to put together the local material available.

Beginning with Moukden Mission Hospital, which dates back to 1882, we were able to ascertain from one of Dr. Christie's early assistants who has continued in active practice until the present that, even in those early days, they occasionally treated
cases of leprosy who came from Shantung. And that is the tradition carried down through the oldest members of the present staff, namely, that practically every year one or two lepers come to the out-patient department—men who had come from Shantung province.

The Skin Diseases Clinic became separate from the Medical Out-patient Clinic in 1924. From the statistics of the Skin Diseases Clinic and from answers received from all three provinces, as well as from personal interviews, we have been able to make up one or two tables, which, while far from perfect, illustrate to some extent what is happening in Manchuria.

We are fortunate in getting Dr. S. Kitamura's permission to publish the figures he has collected in the Skin Diseases Clinic of the South Manchurian Railway Hospital in Moukden. The Japanese operate a chain of twenty-five hospitals which stretch for about 600 miles from Dairen in a northerly direction to Changchun, and from Moukden southeast to Antung. For seventeen years they have had excellent facilities for observing the incidence of the disease amongst their own nationals and, to a certain extent, amongst the floating Chinese population in the railway zone.

Statistical

TABLE No. 1.

The Number of Lepers Seen Annually

Moukden Hospital Skin Diseases Clinic

<table>
<thead>
<tr>
<th>Year</th>
<th>Total No. New Patients</th>
<th>Total No. of Lepers</th>
<th>Percentage of Lepers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1923 (M.O.P.D.)</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>1924 (10 months)</td>
<td>1302</td>
<td>2</td>
<td>0.16</td>
</tr>
<tr>
<td>1925</td>
<td>1951</td>
<td>5</td>
<td>0.26</td>
</tr>
<tr>
<td>1926</td>
<td>Records Mislaid</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>1927</td>
<td>1210</td>
<td>4</td>
<td>0.33</td>
</tr>
<tr>
<td>1928</td>
<td>Records Mislaid</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>1929</td>
<td>1704</td>
<td>2</td>
<td>0.12</td>
</tr>
<tr>
<td>1930</td>
<td>2838</td>
<td>6</td>
<td>0.21</td>
</tr>
<tr>
<td>1931 (to 15th May)</td>
<td>858</td>
<td>6</td>
<td>0.69</td>
</tr>
</tbody>
</table>

Total number of lepers seen in 6 years 4 months ...... 29
Average percentage in 5 years 2 months .............. 0.253
1. The percentage figure, 0.69, for less than five months in the present year, cannot be regarded as such an accurate index of the incidence of leprosy as the annual percentage. In comparison with the statistics of former years it is likely to prove to be too high. But, if it should maintain this height or go on increasing, it may be regarded as an indication that the Mass Immigration of Shantungese in the years 1927-1929 brought over a number of quiescent or even active lepers, sufficiently large to make a considerable difference to the attendances recorded at the hospitals in 1931. See also the comment made on Table No. 5.

2. The average percentage of Chinese lepers attending the Skin Diseases Clinic of our Mission Hospital approximates the average percentage of Japanese lepers in Manchuria attending Japanese Hospitals.

**Table No. 2.**

*The Number of Lepers Seen in Seventeen Years*

South Manchurian Railway Hospital, Mukden. Skin Diseases Clinic

<table>
<thead>
<tr>
<th>Years</th>
<th>Nationality</th>
<th>Total No. New Patients</th>
<th>Total No. of Lepers</th>
<th>Percentage of Lepers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1914-31</td>
<td>Chinese</td>
<td>9471</td>
<td>9</td>
<td>0.095</td>
</tr>
<tr>
<td>1918-31</td>
<td>Koreans</td>
<td>243</td>
<td>3</td>
<td>1.23</td>
</tr>
<tr>
<td>1914-31</td>
<td>Japanese</td>
<td>21,349</td>
<td>19</td>
<td>0.08</td>
</tr>
</tbody>
</table>

Total number of Chinese lepers seen in seventeen years . . . 9
Average percentage for Chinese .................... 0.095

**Table No. 3.**

*The Number of Lepers Seen in the Skin Diseases Clinics*

South Manchurian Railway Annual Report of Twenty Five Hospitals

<table>
<thead>
<tr>
<th>Years</th>
<th>Nationality</th>
<th>Total No. of Lepers</th>
<th>Population Rail. Area</th>
<th>Percentage Lepers Skin Clinic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1914-30</td>
<td>Chinese</td>
<td>181</td>
<td>Over 100,000</td>
<td>0.17</td>
</tr>
<tr>
<td>1914-30</td>
<td>Koreans</td>
<td>19</td>
<td>10,267</td>
<td>1.07</td>
</tr>
<tr>
<td>1914-30</td>
<td>Japanese</td>
<td>354</td>
<td>184,807</td>
<td>0.217</td>
</tr>
</tbody>
</table>

**Compared with Two Large Skin Diseases Clinics in Japan**

<table>
<thead>
<tr>
<th>Period of years</th>
<th>Name of Hospital</th>
<th>Total No. Lepers</th>
<th>Total No. New Patients</th>
<th>Percentage Lepers</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>Tokyo</td>
<td>6108</td>
<td>199,417</td>
<td>3.06</td>
</tr>
<tr>
<td>20</td>
<td>Kyushyu</td>
<td>3487</td>
<td>89,574</td>
<td>3.90</td>
</tr>
</tbody>
</table>
TABLE NO. 3A.

Leprosy and Immigration. Statistics from Dairen, the Principal Port of Entry (1921-30)

<table>
<thead>
<tr>
<th>Immigrants</th>
<th>1921</th>
<th>1922</th>
<th>1923</th>
<th>1924</th>
<th>1925</th>
</tr>
</thead>
<tbody>
<tr>
<td>From Shantung Ports</td>
<td>140,591</td>
<td>142,581</td>
<td>154,773</td>
<td>137,912</td>
<td>154,718</td>
</tr>
<tr>
<td>From other Ports</td>
<td>16,946</td>
<td>22,176</td>
<td>17,241</td>
<td>29,294</td>
<td>42,674</td>
</tr>
<tr>
<td>From Shantung Ports</td>
<td>227,347</td>
<td>529,271</td>
<td>441,836</td>
<td>439,769</td>
<td>321,824</td>
</tr>
<tr>
<td>From other Ports</td>
<td>39,715</td>
<td>65,181</td>
<td>64,720</td>
<td>73,178</td>
<td>56,222</td>
</tr>
</tbody>
</table>

Totals for Ten Years 1921-30 from Shantung Ports ...... 2,690,622
Totals for Ten Years 1921-30 from Other Ports ........... 430,347

Number of Lepers Seen in the Kuantung Leased Territory Hospitals, Dairen, Port Arthur, etc. (1921-30)

<table>
<thead>
<tr>
<th>Nationality</th>
<th>1921</th>
<th>1922</th>
<th>1923</th>
<th>1924</th>
<th>1925</th>
<th>1926</th>
<th>1927</th>
<th>1928</th>
<th>1929</th>
<th>1930</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese</td>
<td>32</td>
<td>42</td>
<td>40</td>
<td>22</td>
<td>37</td>
<td>30</td>
<td>38</td>
<td>35</td>
<td>19</td>
<td>16</td>
<td>311</td>
</tr>
<tr>
<td>Japanese &amp; Korean</td>
<td>29</td>
<td>29</td>
<td>10</td>
<td>8</td>
<td>33</td>
<td>4</td>
<td>12</td>
<td>4</td>
<td>9</td>
<td>3</td>
<td>140</td>
</tr>
</tbody>
</table>

Comments.—1. Very few immigrants enter by Port Arthur. 2. About ten per cent of the immigrants 'from other ports' are Shantungese. This swells the 1921-30 total of Shantung immigrants to 2,733,656. 3. The yearly increase and decrease of immigrants does not closely correspond with the yearly increase and decrease of lepers seen. Thus, 42 and 40 lepers were seen in the years 1922 and 1923 as against 35 and 19 in the heavy immigration years 1928 and 1929. 4. During the last few years a marked diminution has occurred in the numbers of Japanese and Korean lepers entering by Dairen. 5. Every year during the last ten years the Dairen hospitals have handled several scores of lepers.

In answer to our direct enquiry, Dr. S. Kamai (Dairen) states that they have no record of lepers born in Manchuria, but that they have not paid particular attention to this point.

1. The figures given for the Koreans suggest that, in proportion to their numbers, they are four or five times a greater menace than either the Japanese or Chinese.

2. The incidence of leprosy amongst the Japanese in Manchuria is more than ten times less than the incidence of the disease amongst their fellow countrymen in Japan. If these percentages can be taken at their "face value," then this fact is of very great importance. But we would like to see these figures properly evaluated before drawing any conclusions.
3. An addendum to Table No. 3.—Dr. Kitamura was emphatic in stating that *Not a Single Japanese Leper in Manchuria was Born in Manchuria*. It is a striking fact, he said, that they all came from Japan.

4. Language and financial difficulties undoubtedly prevent a large number of Chinese from availing themselves of the facilities offered by the Japanese hospitals, hence the much lower figures for Chinese new patients, as compared with Japanese new patients.

**TABLE NO. 4.**

(Replies received mainly from Hospitals)

_Provinces or Countries from which Manchurian Lepers Originally Came_

1. **LEPERS IN LIAONING**

<table>
<thead>
<tr>
<th>Hospital Statistics</th>
<th>Years</th>
<th>Manchuria</th>
<th>Ho-pei</th>
<th>Shantung</th>
<th>Kiang-su</th>
<th>Korea</th>
<th>Japan</th>
<th>Tot.</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.M.R. Moukden</td>
<td>1914-31</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>—</td>
<td>—</td>
<td>3</td>
<td>19</td>
</tr>
<tr>
<td>Moukden</td>
<td>1924-31</td>
<td>2</td>
<td>2</td>
<td>16</td>
<td>3</td>
<td>2</td>
<td>—</td>
<td>25</td>
</tr>
<tr>
<td>Antung</td>
<td>1930</td>
<td>—</td>
<td>—</td>
<td>5</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>5</td>
</tr>
<tr>
<td>Newchuang</td>
<td>1928-30</td>
<td>—</td>
<td>—</td>
<td>2</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>2</td>
</tr>
<tr>
<td>S.M.R. Dairen (not yet received)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liaoyang</td>
<td>1928-29</td>
<td>—</td>
<td>—</td>
<td>3</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>3</td>
</tr>
<tr>
<td>Sinpin</td>
<td>1930</td>
<td>—</td>
<td>—</td>
<td>1</td>
<td>—</td>
<td>1</td>
<td>—</td>
<td>2</td>
</tr>
<tr>
<td>Siuyen</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>1</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>1</td>
</tr>
</tbody>
</table>

2. **LEPERS IN KIRIN**

_Changchun:_ The Kirin Changchun Railway Hospital. 1930. No Lepers seen.

_Changchun:_ Military Hospital. 1928-31. One leper seen—a Shantungese.

_Harbin:_ Mission Hospital. Lepers seen, few and all Shantungese.

_Harbin:_ Pin-Chiang Hospital. "Only a few lepers in ten years. All Shantungese."

_Lung Ching Town:_ Mission Hospital. 1930. No Lepers seen.

_Kirin:_ General Practice. 1930. 3 Lepers seen. All Shantungese.
3. LEPERS IN HEILUNGCHIANG

Suikua: Mission Hospital. Lepers not seen in 1929 and 1930.
Hailun: General Practice. Lepers not seen 1927-1930.
Paichuan: General Practice. Lepers not seen 1926-1930.

1. Lepers from Shantung shew a marked preponderance over lepers from the other provinces.

2. The statistics for Kirin and for Heilungchiang are very inadequate, but to collect adequate figures would certainly mean the making of special arrangements with the hospitals available.

**TABLE No. 5.**

*Details Taken from the History Sheets of Lepers Seen Since 1925*

Moukden Hospital Skin Diseases Clinic

<table>
<thead>
<tr>
<th>Name</th>
<th>Hosp. No.</th>
<th>Year</th>
<th>Sex</th>
<th>Age</th>
<th>Province of Birth</th>
<th>Years in Manchuria</th>
<th>Duration Leprosy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mrs. Chou</td>
<td>—</td>
<td>1925</td>
<td>F.</td>
<td>36</td>
<td>Shantung</td>
<td>—</td>
<td>2 years.</td>
</tr>
<tr>
<td>Yuan Feng Shan</td>
<td>—</td>
<td>1925</td>
<td>M.</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Chiang Yen Ping</td>
<td>—</td>
<td>1925</td>
<td>M.</td>
<td>10</td>
<td>Shantung</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Chiang Hsiao Shun</td>
<td>1925</td>
<td>M. 17</td>
<td>Shantung</td>
<td>—</td>
<td>—</td>
<td>4 years.</td>
<td></td>
</tr>
<tr>
<td>An Feng Shan</td>
<td>1925</td>
<td>M. 36</td>
<td>Shantung</td>
<td>—</td>
<td>—</td>
<td>1 month.</td>
<td></td>
</tr>
<tr>
<td>Ma Shan Pao</td>
<td>4352</td>
<td>1927</td>
<td>M. 31</td>
<td>Kansu</td>
<td>A few days</td>
<td>—</td>
<td>3 years.</td>
</tr>
<tr>
<td>Ma Erh.</td>
<td>4953</td>
<td>1927</td>
<td>M. 31</td>
<td>Kansu</td>
<td>do.</td>
<td>—</td>
<td>4 years.</td>
</tr>
<tr>
<td>Chang Sheng Hsiang</td>
<td>1380</td>
<td>1927</td>
<td>M. 29</td>
<td>Shantung</td>
<td>3 years.</td>
<td>—</td>
<td>3 months.</td>
</tr>
<tr>
<td>Nameless</td>
<td>1927</td>
<td>M. 10</td>
<td>Liaoning</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

(This boy did not return, and we have not been able to trace him.)

<table>
<thead>
<tr>
<th>Name</th>
<th>Hosp. No.</th>
<th>Year</th>
<th>Sex</th>
<th>Age</th>
<th>Province of Birth</th>
<th>Years in Manchuria</th>
<th>Duration Leprosy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mrs. Jen.</td>
<td>20349</td>
<td>1929</td>
<td>F.</td>
<td>29</td>
<td>Shantung</td>
<td>3 years.</td>
<td>—</td>
</tr>
<tr>
<td>Wang Te Sheng</td>
<td>16278</td>
<td>1929</td>
<td>M. 44</td>
<td>Shantung</td>
<td>1½ years</td>
<td>—</td>
<td>10 months.</td>
</tr>
<tr>
<td>Chu Ch'ou Shih</td>
<td>2219</td>
<td>1930</td>
<td>F.</td>
<td>38</td>
<td>Shantung</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Pei Ch'in Ch'uan</td>
<td>6961</td>
<td>1930</td>
<td>M. 20</td>
<td>Kiangsu</td>
<td>—</td>
<td>1½ years.</td>
<td></td>
</tr>
<tr>
<td>Chu Yu T'ien</td>
<td>3991</td>
<td>1930</td>
<td>M. 22</td>
<td>Shantung</td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Lu Jui Ch'ou</td>
<td>4850</td>
<td>1930</td>
<td>M. 26</td>
<td>Kiangsu</td>
<td>2 years.</td>
<td>12 years.</td>
<td></td>
</tr>
<tr>
<td>Chang Huan Wen</td>
<td>8977</td>
<td>1930</td>
<td>M. 19</td>
<td>Kiangsu</td>
<td>1 year.</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Wu Yu Fa</td>
<td>12670</td>
<td>1930</td>
<td>M. 16</td>
<td>Shantung</td>
<td>3 years.</td>
<td>4 years.</td>
<td></td>
</tr>
<tr>
<td>Yu Wan Ch'ang</td>
<td>4056</td>
<td>1931</td>
<td>M. 29</td>
<td>Shantung</td>
<td>3 years.</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Wei Ching Fa</td>
<td>2520</td>
<td>1931</td>
<td>M. 43</td>
<td>Shantung</td>
<td>10 years.</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Li Feng Lin</td>
<td>5209</td>
<td>1931</td>
<td>M. 32</td>
<td>Hopei</td>
<td>3 years.</td>
<td>1 month.</td>
<td></td>
</tr>
<tr>
<td>Hao Ping</td>
<td>3330</td>
<td>1931</td>
<td>M. 44</td>
<td>Shantung</td>
<td>3 years.</td>
<td>1 year.</td>
<td></td>
</tr>
<tr>
<td>Shao Yen Ch'ou</td>
<td>4426</td>
<td>1931</td>
<td>M. 20</td>
<td>Liaoning</td>
<td>20 years.</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>
Cases Submitted to Bacteriological or Other Tests

<table>
<thead>
<tr>
<th>Name</th>
<th>Year</th>
<th>Nasal Smear L. Leprae</th>
<th>Blood Smear from skin</th>
<th>Biopsy Exam</th>
<th>Kahn Test</th>
<th>Type Leprosy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pei Ch'in Ch'uan</td>
<td>do.</td>
<td>Pos.</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>Maculo-anaesthetic.</td>
</tr>
<tr>
<td>Chang Huan Wen</td>
<td>do.</td>
<td>Pos.</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>do.</td>
</tr>
<tr>
<td>Wu Yu Fa</td>
<td>do.</td>
<td>Pos.</td>
<td>Pos.</td>
<td>Pos.</td>
<td>2 plus</td>
<td>do.</td>
</tr>
<tr>
<td>Yu Wan Ch'ang</td>
<td>1931</td>
<td>Doubtful</td>
<td>Neg.</td>
<td>Pos.</td>
<td>4 plus</td>
<td>Mixed.</td>
</tr>
<tr>
<td>Li Feng Lin</td>
<td>do.</td>
<td>Neg.</td>
<td>—</td>
<td>—</td>
<td>3 plus</td>
<td>do.</td>
</tr>
</tbody>
</table>

1. The age limits are ten and forty four.

2. A change is suggested by the figures given for 1931 for the relation between the two columns, “Years in Manchuria” and “Duration of Leprosy.” If the period of residence of the lepers in Manchuria continues, in the great majority of cases, to be longer than the period of duration of the disease, it may mean either that leprosy has become indigenous or, to our mind the more likely explanation, that the quiescent cases brought in by the Mass Immigrations a few years ago are now active and progressing.

3. Of the four cases which were positive for the Kahn Test, two had a history of venereal disease.

4. The anaesthetic type is commoner than the nodular, a fact of considerable importance in relation to infectivity.

Note:—This attempt to compile statistics about leprosy in Manchuria is obviously imperfect, but, in the future, we hope to collect fuller information.

A Case of Leprosy Illustrative of what is Happening in Manchuria

Shao Yen Ch'en 邵延臣 Hospital No. 4625; year 1931; male; age 20; married; had one baby which died a few days after birth; no other children. He was born in Tung Feng
Hsien, a district about 100 miles east of Moukden. His parents were from Shantung. The father died in 1929 in Manchuria as the result of a gunshot wound. The mother is alive and healthy;—present age 51.

Two more boys were born in Tung Feng and they, along with an elder sister who came with the family from Shantung, are evidently free from leprosy.

Shao Yen Ch'en was born in 1911, and in that year an elder brother, age 8, joined the family by coming from the ancestral home in Shantung. Two years later this boy shewed signs of leprosy and seven years afterwards died in Tung Feng of the disease, at the age of seventeen. Yen Ch'en was then nine years of age, and had therefore been living in contact with a leper for seven years.

At the age of ten he was taken to see his grandmother in Shantung. The deceased grandfather had had numbness of the feet and legs "up to the knees" for forty years. After three months Yen Ch'en returned to Tung Feng, and, at the age of fifteen, married a girl who was not a Shantungese. Her health to date has been good. He has had frequent extramarital intercourse, but has not contracted venereal disease.

He dates his leprosy as having begun when he was sixteen, but at the age of twelve or thirteen he had numbness of the right ear and of the right side of the lower part of the face. At sixteen he was suffering from excessive lacrimation, and his eyebrows became so itchy that he "scratched them bare." Erythematous patches of various sizes appeared on the legs. He visited the Mission Hospital in Hailung and was given an intramuscular injection in the gluteal region. This proved so painful that he left the hospital.

At the age of seventeen his body became all swollen and felt numb, but no nodules of any kind appeared. At eighteen he noticed yellowish blebs on the outer aspect of the left leg, which healed up in about fifteen days. A little later these blebs broke out in the scapular regions. At the age of nineteen nodules about the size of peas appeared on the skin of the arms and forearms and affected the extensor surfaces more than the flexor surfaces. One or two nodules appeared also on the lower extremities. He felt the whole body numb, but noticed that the
numbness was more marked in the hands, forearms, feet and legs, than in the arms and thighs. For the past eighteen months he has had occasional attacks of epistaxis and frequently bleeds on blowing his nose.

He appeared at the Skin Diseases Clinic on 15th May. Both the nasal smears and the blood serum taken from the skin lesion were positive for the bacillus leprae. The Kahn test was negative.

The Shantung Immigration Question

Hosie,8 in his book on "Manchuria," says that during the Ming Dynasty, (1368-1643), "the greater part of the southern province of Feng-tien was already under Chinese jurisdiction. .........In the seventeenth century, South Manchuria was on the same footing, in regard to cultivation, as China proper." This cultivation, he points out, was due to the more industrious Chinese pushing into Manchuria and ousting the hunting, fishing, and fighting Manchus.

It is practically certain that Shantung with its teeming millions, even in those days, played an important part in populating southern Manchuria. Around Newchuang and between the coast and Moukden there are large areas almost exclusively peopled by the descendants of early Shantung settlers, who will tell you they came from Shantung a hundred or two hundred years ago.

Writing in 1904, Hosie states that "from Chefoo alone more than twenty thousand Chinese labourers come to Newchuang every spring by steamer, and distribute themselves all over Manchuria and Eastern Mongolia; and that number represents but a part of the annual influx. .........It may be roughly calculated that Shantung annually supplies Manchuria with agricultural labour to the extent of thirty thousand men." He also estimates that about five thousand petty traders from Shantung winter in Manchuria every year.

We may safely assume that this Tidal Migration of able bodied farmers and labourers, with its spring flow and autumn ebb, has gone on for several scores of years and possibly for several hundreds of years. It has certainly left a large deposit of settlers in Manchuria.
The China Medical Journal

During the last ten years an unprecedented Mass Immigration movement has taken place, which reached its peak in the years 1927-1929. This has resulted in an increase of at least three or four million people in the population of Manchuria. These recent colonists have come mainly from Shantung and northern Kiangsu, and have been sent north to fill the undeveloped tracts of land in Kirin and Heilungchiang.

Heimburger and Young have recently stated that probably 0.1% of the Shantung population are lepers. If this is true, then, taking both quiescent and active leprosy into consideration, we are faced with the fact that several thousands of infected people have entered Manchuria during the past few years.

The immigrants enter the province mainly at Dairen, New-chuang and Antung. After they have settled down, a few lepers sooner or later detach themselves from the scattered colonies and present themselves at the nearest hospital for treatment. They do not, however, seem to travel great distances to secure treatment, for all of our cases have come either from the city of Moukden or from districts near us with railway facilities. Probably they cannot afford to travel long distances.

IS LEPROSY INDIGENOUS?

1. This is a vexed question. On the one hand, we have not sufficient material on hand to say definitely that it is not indigenous, and, on the other hand, of the lepers reported as having been born in Manchuria we have been able to trace the history of only one, Shao Yen Ch’en. His case is prejudiced by the visit to Shantung.

2. This criticism, Dr. Kitamura thinks, is also true of the records which the Japanese hold relative to the Chinese lepers who have come to their clinics, namely that the histories of lepers have not been taken sufficiently fully and with the indigenous point of view in mind.

3. There are comparatively few beggars in Manchuria. The ones seen at temple fairs and by the roadsides do not shew signs of leprosy. We have seen only one such in ten years.

4. Of the 354 Japanese lepers, not one was born in Manchuria.
5. Of the 29 Chinese lepers treated by us, two were born in Manchuria, but one had returned to Shantung for a visit and the history of the other is unknown.

6. No hospital is known to us which receives a persistent trickle of lepers year by year from a given district, such as occurs in the case of Kala Azar.

7. A small area near the Korean border is said to contain indigenous leprosy.

IS LEPROSY A MENACE? THE EVIDENCE FOR AND AGAINST

For: 1. During the past ten years a few million poverty stricken colonists have almost certainly brought with them a few thousands of lepers. This is a new situation. For, apart from the rapid increase in the number of acquired lepers, the settling on the land of huge hordes of their kinsmen means the continuation for a longer period than usual of the conditions of living favourable to the dissemination of the disease.

2. Shao Yen Ch'en is probably typical of numerous cases of intermarriage between infected Shantung stock and the native stock.

3. The Manchurians allow lepers to mix freely with them in business, in the inns, and in their homes. There is no fear of leprosy amongst the ordinary people. This makes it all the easier for leprosy to gain a footing.

4. Many Shantungese shew no sign of leprosy when they arrive in Manchuria, but later they die of it.

5. It is practically certain that many lepers live and die in Manchuria without the medical or other authorities knowing anything about them.

Against: 1. It is suggestive that the areas in Manchuria nearest Shantung, which have been thickly populated with the descendants of Shantung settlers for scores and hundreds of years, are not known to have indigenous leprosy. These areas, however, have not been systematically surveyed.

2. The percentage leprosy rate amongst the Japanese in Manchuria is very much lower than the percentage leprosy rate
amongst the Japanese in Japan. The same conditions which have brought this about amongst the Japanese, whether climatic, economic, or social, etc. may also operate amongst the Chinese colonists in the same way.

3. It is the anaesthetic type of leprosy which is most often seen in Manchuria and this is the least infectious of the types, being much less infectious than the nodular type.

4. The standard of living in Manchuria is higher than in Shantung, a point in favour of the disappearance of abject poverty and therefore indirectly of leprosy.

Suggestions: We wholeheartedly agree to the proposal made by J. L. Maxwell that a survey should be made. We feel we cannot reach sure ground until this is done. We propose, as a first step, that the suspect indigenous area near the Korean border be investigated and that a number of known areas of both recent and old Shantung settlers be carefully gone over.

We propose for ourselves to keep a list of the addresses of the lepers known and accessible to us, with a view to making yearly or half yearly inspections of their homes, to see whether the children born in these homes are becoming lepers or not. Both women and children should be examined, for poverty too often excludes them from all hospitals.

As a means of arousing public opinion about leprosy we are very much in favour of thoroughly airing the idea of establishing quarantine stations for lepers, and if the principle of the scheme is accepted now by the authorities, the necessary action could be taken later on, after the survey is made.

Conclusions: 1. For many years, and more especially during the last twenty years, Chinese, Japanese, and Koreans have been carrying leprosy into the Three Eastern Provinces. Of these, the Chinese, by reason of their large numbers from the province of Shantung, are by far the most important factor.

2. The distribution and numbers of lepers point to the fact that leprosy, as a problem, is due to recent immigrations and not to earlier immigrations.

3. This partial survey of the situation has failed to find a single case of leprosy which can be called truly indigenous.
4. The present generation of Manchurians should be protected against the actual and potential danger in their midst caused by the presence and intermarriage of many lepers. As a first step, a thorough survey should be made by a competent person, and this should be done as soon as possible.

REFERENCES

LEPROSY IN YUNNAN

C. M. GALT, M.D.

The Kiulungkiang leper colony is steadily growing in numbers and to date two hundred and thirty patients have been admitted. Of this number one hundred forty are in the colony now, and the rest have either died or gone away. There are four Chinese, one hundred and thirty Tai and the rest members of different tribes seemingly not related to either Chinese or Tai. The usual proportion of about two men to one woman is found in this colony.

Of these one hundred and forty, sixty four have relative in the colony. Of these sixty four, there are fourteen husbands, fourteen wives, sixteen brothers, six sisters, four mothers, three daughters, two sons, one father, two nephews, one uncle and one aunt.
We are keenly disappointed in our efforts to interest the local people in helping to support the colony. The local Chinese Magistrate has given about twenty dollars Mex., the chief Tai official not a cent, and without their cooperation we cannot go to the people in general for anything. We do get an occasional bit of help from relatives but it is very little and is hard to get. The only progressive action we have seen was last fall when Muang Hai, two days from here rounded up some fifteen of their worst cases and sent them to us with a purse of one hundred dollars. If we could get a start like that in every district it might be worked into something bigger.

The lepers continue to do all they can to help out in the conduct of their village. They are just now getting ready to plant a large rice field. Most of them have a garden and keep chickens. Some cut firewood and they all work as they are able. During the last year the lepers have planned and built a new chapel, three new dormitories housing forty five patients, and are now about half finished with a small hospital building and new house for their superintendent. For these last two buildings they have made over 10,000 mud bricks and have burned some three thousand more. The only foreign money that goes into these buildings is a little for roofs. To be sure there is nothing elegant about these buildings but they are as good, and in some cases better than their non tainted brethren have on the outside.

Our parole rate has not been very large yet, but we are considering several cases. Two of those already paroled are working and studying in the hospital here at home and are doing fine work. They keep up their injections regularly.

The experiment reported last year in a self supporting branch was collapsed by the local Magistrate just as it was getting under way. Then we were considering making another married couple's branch with the proposal that we give the two as much support as one single person. We thought to encourage self support and at the same time not encourage marriage among those not able to help in their own support. But the Magistrate heard about the proposal and promptly handed us a "Law" saying that if he heard of any lepers marrying he would have them shot. We are a little discouraged about new schemes just now, but since magistrates are mortal, we may yet accomplish something.
LEPROSY IN THE SWATOW DISTRICT

E. H. Scott

This last week-end has been distinctive by reason of the visit of Dr. H. W. Wade, Medical Director of the Leonard Wood Memorial (of America) for Research work in Leprosy and also Chief Pathologist at the Culion Leper Colony, Philippines. His visit was made in course of a very wide tour to examine the possibilities for the extension of Research work and to become acquainted with work already in operation among lepers in various parts of China and other countries of the world.

Previous reports have mentioned the fact that attached to the Mission Hospitals is a Clinic at which Leper patients can attend for treatment on two days a week. In addition to this provision by the Mission, there is a small Island Colony, about nine miles up the harbour, which is under the auspices of the Swatow Municipality.

Drs. Wade, Fraser, Worth, Miss Martin, a Hospital assistant and myself visited this Colony in company of the Public Health Officer for Swatow and the doctor in charge of the work there. This Colony has accommodation for 60 patients but there are 113 people in residence at the present time—24 women and girls and 89 men and boys—whilst other Lepers are anxious to be taken in. The rooms are dark and dingy and the general accommodation very limited. The position of the women is particularly unfortunate. They are housed ‘six in a room’ and beyond walking on to the verandah, which is protected by barbed wire, they do not move from their rooms for any purpose. Washing, eating, sleeping and every function of the body is performed in this confined space. The women have no occupation. The men and boys have had a little more freedom during recent months. A small area behind the Compound has been opened up for the cultivation of vegetables. The male inmates occupy part of their time by attention to this garden. The patients include sufferers in all stages of the disease. Some of them are in the very early stages and are probably not contagious, whilst others are a pitiable sight by their sufferings from an acute and apparently incurable condition of disease. Many of the inmates appear to be in varying degrees of mental deficiency and the general condition of all, especially among the men is one of
The China Medical Journal

extreme despondency—almost hopelessness. The kitchen and sanitary arrangements are very poor.

The doctor attends twice a week to give treatment. An armed guard of six men is stationed at the Colony. With the exception of occasional visits by Chinese Christians, who take books to read to and teach the inmates to read, there is no contact with the outer world. Apart from the very modified gardening activity referred to, the whole Colony is Non-Occupational. The virtues of the Colony are that it does constitute an effort on the part of the Municipality to deal with the problem of Leprosy in the district and that its present control does show a marked advance on the conditions existing there a year or two ago.

The return from the Island was followed up by a Cine-film demonstration, by Dr. Wade, of the Culion Leper Colony and of other aspects of work done in various places among Lepers. Two long discussions ensued between the Mayor and his staff and Drs. Wade, Fraser and Worth (with myself ‘listening in.’)

The object of the discussions was to explore the avenues of approach to an extension of the Leprosy work under the direction of the Municipality. The excellent films shewn by Dr. Wade had distinct value by the picture they presented of the multifarious activities of the Lepers in the Culion Colony.

Dr. Wade was very emphatic in his insistence upon the value of Occupational Colonies and also stressed the importance of the occupational organization and the Medical treatment being co-related by the control of both being vested in one man or Committee. Division of control, i.e. The general administration of the Colony by, say, a Municipality and the Medical treatment of the disease by an appointed doctor, without authority in other matters, does not work well in practice. Care is necessary in the choice of the doctor and the staff who must have the aptitude for the direction and organization of the general activities as well as a thorough knowledge of Leprosy in all its branches and stages.

These views and the exposition of their practicability (by the films) made an obvious impression on the Mayor and his staff. Tentative sketch plans for future development were then discussed. The Mayor explained that he fully realised the
inadequacy of the present provision but that more rapid development had been hampered by lack of funds and by the fact that all the land on the Island where the present Colony was situated was not yet the property of the Municipality. Steps were already in process to acquire it and the Colony would then be extended to allow more facilities for the inhabitants. It was also intended to bring the present Isolation Hospital (now unoccupied) into use as a Residential Leper Institution. The type of work now being done at the Mission Hospital (i.e. weekly treatment to Out-patients) would be copied in strategic centres throughout the area around Swatow by the opening of Out-patient Dispensaries. With these three types of treatment centres—Dispensaries, Hospital and Island Colony—the work of the future would fall into categories.

(A) The treatment at the Dispensaries of Out-patients. An important feature of the work at these stations would be the examination of and classification of sufferers into two main grades:

1. Those who are not carrying live bacteria.
   (i.e. Those who are not at present contagious).

2. Those who are carrying live bacteria.
   (i.e. Those who are contagious).

The sufferers under heading (1) would be treated week by week, residing meanwhile in their own homes. The patients under classification (2) would be urged to accept segregation in either the Residential Institution or at the Island Colony.

(B) The Residential Institution would accept those patients whose condition is contagious but shows reasonable prospect of complete recovery.

(C) The Island Colony would accept those patients in a contagious state but who are also in a rather advanced or bad condition and whose prospect of recovery would be very slow, problematical or unlikely.

This comprehensive scheme will, it is hoped, be a method of grappling with this affliction of the people that provides reasonable prospect of arresting its spread. The non-contagious cases will be prevented from development into 'carrying' cases by the regular weekly or bi-weekly treatment. The segregation of the slight but hopeful cases, although contagious, will be treated
without the psychological handicap of association with very bad cases. The advanced and difficult cases will have their sufferings relieved and their lives made tolerable. In both these latter categories it is intended to develop the Segregation accommodation as Occupational centres.

Towards this end and at the suggestion of Dr. Wade, the Mayor is proposing to send a deputation—with Dr. Fraser in an advisory capacity—to Sheklung—near Canton—where there is a Leper Colony, which although it does not provide Medical treatment has an excellent Occupational scheme in practical operation. The suggestion of sending a deputation to Culion is also under consideration.

It is essential to any successful attack on Leprosy that the men in charge of the Out-patient Dispensaries should be competent, both in knowledge of the necessary treatment and in ability to diagnose the conditions of the patients into the accurate classifications. At present there are no men available with these qualifications.

The Out-patient Clinic of the Mission Hospital is the only place in the district, at present, where this type of treatment is being given, which makes it the obvious 'key' centre for the training of men who could, when proficient, be sent to the outlying Dispensaries as and when they are opened. One assistant at the Hospital has been working for some time in the Leper Clinic with Dr. Fraser and is shewing distinct aptitude for the work. It is probable that the Mission Hospital Clinic will develop so that it serves the dual purpose of a Dispensary for regular treatment and a training centre for men who will eventually work in the district dispensaries. As there would not be sufficient work at the Mission Clinic for the efficient and complete training of these men, the Clinic would work in cooperation with the Residential Institution for this purpose. The accompanying chart shews the plan for the whole of the work.

The secret of the success or failure to arrest the spread of Leprosy in any district resides in the ability or failure to inspire hope in the sufferers that they can obtain relief from both their disease and from their sense of isolation from their fellow men and women.

Hence the tremendous importance of making all Institutional and Island centres places of Occupational Therapy so that the
stimulus of a normal life may have its full scope as part of the treatment and what is still more important that the knowledge that such centres exist may encourage sufferers in the early stages of the disease to attend voluntarily, so that if possible they may be saved from becoming contagious, or, if they have already reached that stage they may find a happy life in one of the segregation centres. This fact was very fully appreciated by the Mayor and his staff and was 'driven home' to them, as it was to all the witnesses, by the films shewing a remarkably happy and apparently normal community at Culion.

Dr. Wade was decidedly encouraged by his visit. He was impressed by the earnestness of the officials at Swatow to get to grips with the problem and by their willingness—nay, almost eagerness—to receive advice and ideas as to the best methods of approach. He and we of the Mission Hospital came to the end of the conferences (held in the doctor's houses) feeling stimulated with the sense that the future of the work in this area had entered upon a new and a more promising stage.

There should be no illusion about the magnitude of the task and the consequent slowness of progress. Estimates of the ravages of Leprosy are hard to establish but it is computed that there are about 30,000 cases in the district of Swatow whilst the whole province of Kwangtung is known to be the worst in China. No reliable figure is available but the number of cases must run into several hundreds of thousands. The expense of catering for such huge numbers is colossal, far beyond the means of the Government at present, if not for ever. The cost of the work outlined in the foregoing will probably be shared by the Government and Charitable organizations. The latter will probably take the direct charge of the work.

The hope for the future lies in arresting the upward movement of the numerical chart, for, as the general concensus of opinion is that Leprosy is Contagious but not Congenital, a stationary chart would tend to become a downward curve. The measures planned should effect this desideratum.

From the Mission's point of view, we can only express our pride and gratitude that the work done in the past should find its fruit in the confidence reposed in us by the Municipal authorities and by Dr. Wade, and accept gladly our responsibility as advisers and cooperators to the limit of our ability.
Suggested Plan of Organization for Leprosy
Work in Swatow Area

(1) O. P. Disp.

FUNCTIONS OF EACH PROVISION

1. Out-patient Dispensaries: Weekly treatment and Diagnosis. Drafting of Contagious cases to Swatow Mission Hospital Clinic for selection to appropriate Segregation Centre.

2. Swatow Mission Hospital Clinic: Weekly treatment and Diagnosis as at (1). Selection of all cases for Segregation in either Residential Institution or the Island Colony. The training of men to work in the O.P. Dispensaries—in conjunction with the Residential Institution.


4. Island Colony: Reception of advanced and bad cases. Occupational and Medical treatment.
NOTES ON THE INCIDENCE OF LEPROSY
IN THE LESS KNOWN AREAS

James L. Maxwell, M.D.
Field Research Department, Henry Lester Institute

In the Special Leprosy Number of the Journal of August, 1930, an attempt was made to get reports on leprosy from the different provinces of China. It can hardly be claimed that any great success attended this effort nor will it be possible to get anything more than a general idea of the situation until conditions in the rural districts, where leprosy is most prevalent, are such as to make surveys possible. Even the limited information that it was then possible to give omitted or scarcely touched on certain important areas. During the past year we have, through the kindness of individual doctors, acquired a little more knowledge of conditions in some of these districts and we propose here to give briefly a summary of such information as we have received.

MANCHURIA

The position in Manchuria is ably dealt with in a paper by Drs. Yu and Taylor which we print in this issue. This paper corrects some mistaken impressions of our own and gives a view of the present situation as far as it can be obtained.

HOPEI, SHANSI AND SHENSI

The result of enquiries in these provinces all goes to confirm the opinion previously expressed that leprosy in this area is either absent or present in such small amount that the disease may be considered negligible. This is almost certainly true of Hopei and Shansi; until however more information is forthcoming and modern medicine is more widespread than it is at present in the province of Shensi it would be well to suspend judgement about the position in that province.

KANSU

We have had the privilege recently of talking over the position in Kansu with Dr. A. G. Taylor of Lanchow who has been responsible for a small leprosarium there for the past few years. Dr. Taylor informs us that leprosy appears to be widespread in Kansu and that in some areas there would seem to
be a fairly high incidence of infection. It was formerly sup-
posed that the Thibetans were the principal sufferers but this
now seems to be incorrect and it is probable that the Chinese
inhabitants of the province are equally affected.

SZECHUAN

Our knowledge of the disease in this province has been very
limited in the past and beyond a few cases round Chungking it
was generally thought that the bulk of those suffering from
leprosy were immigrants or travellers from the province of
Yunnan. It is clear now that this is not the case and though
our knowledge is still very incomplete, it is evident that the
infection is much more widespread than was formerly believed.*
It would seem that the heaviest incidence is to be found in the
aboriginal tribes in the west of Szechuan.

Dr. R. L. Crook of Yachow writes us as follows:

"I noticed that there were no reports from Szechwan [in the last
Leprosy Number of the Journal] though there are lepers in this province.
I have only had three come to Yachow but at a small place called Len
Chi, about one hundred miles to the south of us, there are a number of
lepers, and two of nine came from this area. The Catholic sisters and the
Seventh Day Hospital at Tachienlhu treat lepers off and on. Just now the
French Catholics are building a leprosarium at Moshi, to the south and
east of Tachienlhu. This is among the Lolo aboriginies. I understand that
leprosy is relatively common among this tribe, though I have never had
occasion to visit this region, and they are too distant for us to reach them.
These few details may be of interest to you."

KWEICHOW

We have had the opportunity recently of discussing the
leprosy situation in Kweichow with Dr. E. S. Fish of Kweiyang.
Dr. Fish has spent many years in this province working at
different centres both among the Chinese and the aborigines.
He reports that the disease is common among both races though
the impression that he received was that it was not extremely
frequent among the Chinese. It would seem, however, that the
aboriginal tribes are more severely affected and this would not
be surprising in view of the state of poverty and lack of hygenic
conditions in which they live. We suggest that when regular
work for lepers is started in this province the incidence of the
disease may prove to be more heavy than is at present realised.

*This was written before we received the paper by Drs. Anderson &
Canright, see page 880.—Ed.
NOTE ON THE WORK OF THE LEPROSY COMMISSION

League of Nations Health Organisation Leprosy Commission

At the 17th session of the Health Committee (May 4th-8th, 1931) the Chairman of the session of the Leprosy Commission held at Bangkok (from December 8th-12th, 1930) and the Secretary of the Commission gave an account of the work accomplished and presented a report on the work of the Leprosy Conference of the Leonard Wood Memorial for the Eradication of Leprosy (Manila, January 8th-23rd, 1931).

The Health Committee expressed its satisfaction with the results achieved. It paid tribute to the support given to the Commission by the 8th Congress of the Far Eastern Association of Tropical Medicine and by its two distinguished secretaries, Dr. Phya Damrong Baedyagun and Dr. O. Deggeler; to the Commission's unremitting efforts, and to the valuable and zealous cooperation of its new members, Drs. Mitchell, Muir, Wade and Wayson.

The Health Committee learned with satisfaction the outcome of the Leprosy Conference of the Leonard Wood Memorial. It was glad to receive the resolutions of the Manila Conference relative to the conclusions of the Bangkok Conference on the prophylaxis of leprosy, on the standardisation of administrative and statistical documents, and on the preparation of a Leprosy Digest or Annuaire and on the coordination of scientific research.

The Health Committee adopted the following resolution:

"The Health Committee;

"Accepts the report of the Leprosy Commission on the 'Principles of the Prophylaxis of Leprosy' (Document C. H. 970);

"Approves the programme of work described in the Medical Director's report (Chapter IVa, Paragraph III); and

"Emphasizes the particular interest of researches on the chemotherapy, early diagnosis and decrease of leprosy in certain countries, including existing foci in Europe."
The programme of the Leprosy Commission now comprises two branches of work:

I. MEANS OF PROMOTING RELATIONS BETWEEN LEPROLOGISTS AND UNIFORMITY IN THE STUDY AND TREATMENT OF LEPROSY

1. *Leprosy Digest* or *Annuaire*, which the Manila Conference asked the Health Committee to undertake. In order to obtain the necessary information a questionnaire will shortly be sent to the heads of health departments, associations for the combating of leprosy, and missions.

The Leprosy Commission will be grateful if members of the Bangkok Conference and of the Leonard Wood Memorial Conference will draw their colleagues' attention to the importance of this enquiry.

It is proposed to publish the results in the International Health Yearbook and as an independent publication.

2. Uniformity of documents. Health departments and institutions dealing with leprosy are asked at the same time to forward copies in triplicate of their clinical observation sheets, case records, reports and charts.

A comparison of these documents will enable standard types to be established which will be examined by experts and recommended for universal adoption.

3. Later, the Commission proposes to undertake the study of chaulmoogra oils and their derivatives from the various points of view of origin, preparation, preservation and inoculation, to ascertain the best conditions for purity and efficacity.

II. INTERCHANGES OF STAFF. CLINICAL EXPERIMENTS AND RESEARCH

1. International study centres. Professor Nocht, who has been good enough to promise his assistance to the Health Committee as an international expert, will visit Rio de Janeiro in July to study the organisation of the International Study Centre which was set up as the result of an agreement between the League of Nations and the Brazilian Government.

The Commission is considering, together with the Japanese Government, a project for an international study centre at Tokio.
2. **Interchanges of staff.** A Japanese leprologist is about to be appointed to study leprosy in the above mentioned institutions with a grant from the League of Nations.

A European leprologist will be appointed to study leprosy outside Europe, particularly in Japan.

In accordance with a resolution of the Bangkok Conference, the Health Committee has deemed it advisable that those appointed to work in the new centres should spend a certain time in the institutions in Calcutta, Culion and Honolulu.

To these centres should be added the institutions dealing with leprosy in Europe.

The programme of work of these grant-holders will be submitted for approval to the Leprosy Commission.

3. **Scientific questions.** The Leprosy Commission devotes its attention particularly to those questions of greatest importance from the point of view of treatment and the most urgent.

Seeing that the Conference of the Leonard Wood Memorial, by several resolutions, has associated itself with the programme of the Leprosy Commission and that the Bangkok and Manila Conferences have actually begun to carry out its programme the Commission desires strongly to recommend the same questions to the other study centres including Calcutta, Culion and Honolulu.

It proposes to collect and compare the results with the assistance of international experts.

(a) **Comparative experiments.** The Commission is inclined to put in the forefront the demonstration of the efficacy of treatment by chaulmoogra oil and its derivatives.

The conclusive experiment, which consists in comparing two equivalent groups of subjects under exactly the same conditions, one receiving and the other not receiving the special chaulmoogra treatment, gives rise to difficulties. It has been pointed out that it is difficult in any one sanatorium to deprive a certain number of lepers of treatment in order that they may serve as a basis of comparison with treated subjects. However, as it is possible that conditions may exist in which this conclusive
experiment would be practicable, the Commission desires to recommend it.

It further recommends comparative experiments consisting in a comparison of the principal forms of special treatment by oil, esters and soaps and the principal forms of inoculation: subcutaneous and, (where the remedy permits), intracutaneous.

(b) Early diagnosis. The Commission desires to recommend the continuation of researches on a reaction for serological diagnosis.

These are the questions which the Leprosy Commission indicates as being the most urgent, without however, wishing to discourage researchers from studying any that may be suggested to them by their personal views or by the particular resources at their disposal.

Members of the two Conferences now have before them the research programme incorporated in the report of the Manila Conference, a programme in which they have all collaborated.

They will certainly desire to take into consideration the recommendations of the Health Committee on these subjects: decrease of leprosy in certain countries, including the foci still existing in Europe, and chemotherapy.

A PRELIMINARY NOTE ON LEPROSY IN SZECHUAN

CYRIL CANRIGHT M.D., Department of Dermatology,
H. G. ANDERSON M.B., B.S., M.R.C.P., Department of Internal Medicine
West China Union University Medical Dental College.

In the absence of any special facilities for their treatment, cases of Leprosy have not been frequently met with in the past in our clinics in Chengtu. Hitherto the presence of Leprosy here has been an impression rather than an ascertained fact; trophic ulcers for example have not received the investigation they merited. What has probably put us all more on our mettle has been a succession of cases of Diabetes Mellitus and Locomotor Ataxia which has brought home the necessity of Laboratory aids
to the differential diagnosis of such cases. During the same period a succession of cases of Nodulo-Anaesthetic Leprosy has come our way. In fact we have no doubt now that the disease is endemic in this province.

For the most part these cases do not come from the fertile Chengtu Plain, but from hilly districts where the food supply is more precarious. In most cases they have never been out of this province. While most of them come from the coolie class two of our cases are students. In two cases the case-histories have been mislaid, one of these reported that a friend of his also had the disease, but speaking generally the eight cases which we have recently treated say that they know of no other cases in their families or amongst their friends. Lepra bacilli have been found in three cases, all of Nodulo-Anaesthetic type, and in a fourth unreported case in which they were also found the patient attended the Nose and Throat Clinic for his nasal condition.

It should be mentioned that the cases reported occurred in an Out-patient attendance of some 50,000 during the past six months, but that other obvious cases have been met with on the streets.

Illustrative cases:—

1. Girl aged 12, student. Nodulo-anaesthetic. 2 years duration.
   Home Chengtu (has lived in Yachow.)
   Distribution Face and extremities. Lepra B. present.
   Greatly improved with subcutaneous infiltration with Moogrol and Intravenous Chaulmoogra Esters during last three months.

2. Man aged 52, farmer. Anaesthetic. 20 years duration.
   Home Tzeiluching
   Distribution Face and extremities. Hands show atrophy and perforating ulcers on knuckles. Lepra B. present.
   No improvement in short period of treatment with intravenous Chaulmoogra Esters.

   Home Chungkingschow
   Distribution Face and extremities, conjunctival thickening. Lepra B. not found.
   Left without any adequate treatment.
   Home Nanpu (near Paoning)
   Distribution Face, Extremities, Neck (cervical glands enlarged). One eye blind. No Lepra B. found.
   A few intravenous Chaulmoogra Ester injections before he left hospital. No clinically discernible improvement.

5. Man aged 19, student. Anaesthetic. ? 1 years duration.
   Home Kiating
   Distribution Leonine facies, hands. No Lepra B. found.
   Did not attend for treatment.

6. Man, aged 21, student. Anaesthetic. 1 months duration.
   Home Tungchuan
   Distribution Extremities and Face with large butterfly erythema and swelling on both malar prominences.
   Anaesthesia and erythema has cleared up under six intravenous injections of Chaulmoogra Esters.

   Home Jenshow
   Distribution Face and Lower extremities with trophic ulcers of feet. Lepra. B. found.
   Did not attend for treatment.

   Home ? Chongpa
   Distribution Face.
   Incompletely investigated and inadequately treated.

In all of the above cases loss of eyebrows was present in some degree. Two of our graduates have reported seeing cases of Nodulo-Anaesthetic Leprosy, in several markets in the hills within fifteen miles of Mienchuhsien, at Kienchow, at Kwangmien, Lifan, Mowchow, and Sungpan, the latter places all in what is known as the Tribes-country lying to the North-west of Chengtu. All of these cases reported were in patients of a low economic status. It should also be stated that the Roman Catholics have organised a Leper colony near Tachienlu though as far as we can ascertain no specific treatment is being given.

We can hardly conclude this brief note without adding to an apology for its brevity the statement that the handicaps of pioneer work in medicine and medical education must be experienced to be believed. We would with admiration salute the earlier pioneers, as we enter into the results of their labours.
PROGRESS IN KOREA

The following extracts from the report of the Fusan Leper Settlement just to hand tell of the progress being made in the fight against leprosy in that country. They are most encouraging as showing the gradual awakening to the needs of the lepers and we are therefore reproducing them here. We look to the time when before long a similar interest will be shown in the cause in China. The Fusan Settlement houses between five and six hundred lepers.—Editor. C. M. J.

FUSAN LEPER REPORT—June 1931

The most gratifying feature of the Leper situation is that the highest authorities of the Empire are now giving very special attention to the problem, and proposals are being made to pass special legislation and to form a policy by which the Empire might be free of the disease in 20 or 30 years. It is urged that millions of money be used to build hospitals and asylums in which all known lepers would be compulsorily segregated.

Propaganda to this end should be made in the public press and by lectures in schools, especially in districts where the disease is endemic so as to induce those who have suspicious symptoms to submit themselves for medical examination.

In Japan proper, accommodation can even now be found by the police for the compulsory segregation of all vagrant lepers; but in Korea the available accommodation is so inadequate that several hundreds of voluntary applicants for admission into our leper institutions have to be turned away every year for lack of room.

At the moment of writing this report there are over 70 vagrant lepers in all stages of the disease living and sleeping in the open in sight of the superintendent's house in Fusan, all of whom have been refused admission solely for want of room.

The available accommodation now in the one Government and three Mission institutions is less than 2,500 and until the Government provides accommodation for thousands more the propaganda above referred to cannot be instituted, while in the
meantime, the disease is naturally spreading among the healthy community.

If only there were sufficient accommodation to allow compulsory segregation of all vagrant lepers and those already hopelessly deformed and too far gone to be cured, then other institutions could take in less infectious and curable cases and the ordinary medical practitioners could treat the early non-infectious cases in their dispensaries.

Alas, the general community is so much afraid of the disease even in the earliest stages that a doctor known to be treating leprosy in his dispensary would be shunned by ordinary patients.

The authorities have shown in many ways their appreciation of what the Missions have been doing. On November 1st the superintendents were invited by the Empress Dowager to come to her palace in Tokyo to receive gifts of money for the work. A silver vase and a certificate of merit were also presented by her, and the Home Minister gave a dinner to about 30 leper workers throughout the Empire at which we also met other members of the cabinet. Her Gracious Majesty is giving Y.1,000 a year to each of our institutions in Korea and we continue to receive the Emperor's special gift of Y.500 yearly.

Last year, the Government General gave a subsidy to our Fusan Home of Y.20,220 which owing to the decrease in the price of foodstuffs covered half the year's cost of maintenance. The local authorities reckon that there are 400 vagrant lepers still about the city of Fusan and the Chief of the Health Department of the Province has asked if we would be willing to add 12 more cottages such as we have recently been building to accommodate 300 more, provided the Government will grant the money for the extra buildings and the extra maintenance. He indicated that if the central government could not provide the money, efforts would be made to raise it within the Province. A public meeting in the City Hall is announced to be held in a few days to call attention to the need and to ask for public subscriptions.

Lately, also, a doctor's license has been granted to the Superintendent by the Government General after a written
examination. This has already raised the standard of our hospital work in the eyes of the public.

We have been extending our treatment of leprosy to those outside our own Home. A leper village about a mile away is provided with injections for about 250. These are given under the direction of our hospital assistants by some in that village who themselves learned the art while in our hospital as patients acting as nurses. Lately, I discovered that a fine dispensary building was being built in that village by the inhabitants. I found that they had been collecting money for it for two years. The subscribers numbered more than 900 and more than half of those gave less than sixpence each. This is a clear proof of how much the leper treatment is valued by the lepers themselves.

A hospital assistant also visits four places in the country where there are small leper villages. We are thus giving regular treatment to over 900 in all, while providing maintenance for only the 520 in our Home. Of the latter we expect to discharge about 40 in a few days whose places will be taken immediately by some of the worst cases waiting at our gates for admission. 91 were discharged during the year of whom 41 were voluntary exchanges where inmates presented brothers or sisters or other relations whom they wished to take their places that they might get the benefits they themselves had received. This method of discharge is much to be preferred as, in most cases, we are assured that such have some kind of home to go to and even if their cure may not be complete they have become non-infectious and they have learned enough to be able to complete their own cure.

During the year 1930 our death rate was only slightly over 2 per cent. though a large portion of our patients were far gone in the disease on admission. This is a clear proof of the efficacy of the treatment given, for, before Chaulmoogra oil injections were begun the death rate was invariably over 25 per cent annually.

J. Noble Mackenzie, Superintendent.
THE SYSTEMATIC TREATMENT OF LEPROSY.—
IN-PATIENTS

L. F. Heimburger, M.D. Medical Director, Tsinan Leper Hospital,
Tsinan, Shantung.

In formulating a systematic treatment for lepro patients
confined to a Hospital, it is difficult to state a definite plan which
will be applicable to all cases and to all countries. There are
several routine treatments used in various hospitals with
uniformly good results in various parts of the world by leading
leprologists. Some of these methods differ radically from others
both in the remedies used and the technique employed in their
use; others are merely modified techniques in the use of a
specific remedy.

The most universally used specific remedy is chaulmoogra
oil or one of its derivatives. This ancient medicine is still given
orally with good therapeutic results but is usually supplemented
by injections of either the pure oil or a mixture containing other
drugs in addition to the pure oil. More commonly the
derivatives have replaced the pure oil, especially the ethyl esters
which are being used orally in certain places, but usually by
intramuscular, subdermal or interdermal injections.

The Plancha or infiltration method has been used exten-
sively in the Philippine Islands with remarkable results. This
method constitutes the intradermal injection into lepra lesions
of iodized esters of hydnocarpus wightiana in addition to intra-
muscular injections of the same product. But in Tsinan because
of the type of lesions, atrophic anesthetic plaques, which
predominate among our cases, this method is impracticable.

Among other methods, bacteriotherapy—Hasson’s method—or Sicard’s method—is used with good results. Reports of the
use of calcium chloride intravenously with fair results, potassium
iodide both orally and intravenously, various preparations of
gold, copper, etc. are found in the large amount of literature on
the modern treatment of leprosy. These all signify the growing
interest of the medical profession in the treatment of leprosy
and no doubt through research efforts a reliable remedy will soon
be found.

In Tsinan we have attempted to formulate a scheme of
treatment which has now been brought to a place where we
believe it is worth trying in other parts of China. But, as a
recent renowned visitor remarked.* "The type of leprosy you
have here in your Hospital (Tsinan) is different from anything
I have yet seen in the Philippines, Japan or Korea so you must
work out your own therapeutic methods." We cannot guarantee
this method as a panacea. It has worked well in our hands in
the cases we have treated and we hope that the reader, realizing
that in leprosy as in syphilis, each case must be treated
individually, will receive some benefit from our experience.

Concomitant Disease. The first rule in the treatment of
leprosy is the eradication or alleviation of any and all disease
or pathological conditions which may be the cause of lowering
the resistance of the patient thereby favoring the growth of
the lepra bacilli. We have found that practically 100% of all
patients admitted to the Hospital harbor intestinal parasites,
the majority infected with ascaris lumbricoides; one or two have
had hookworm, and other parasites have been found. Through
proper medication these can be removed.

A few patients have latent syphilis, found through the use
of a routine Wassermann test; one case of Kala-azar was dis­
covered. Appropriate treatment of these conditions has invari­ably led to a rapid improvement in the symptoms of leprosy when
both diseases have been attacked.

A general physical and laboratory examination is therefore
the first essential in handling the patients admitted to the
Hospital.

Specific Treatment. For the past two and a half years a
mixture of pure Hydnocarpus oil (Wightiana) with 4% double
distilled creosote has been used with very good results. This is
injected subcutaneously by infiltrating the subcutaneous tissue
radiating from one point of injection so that the skin is under­
mined with the oil. The initial dose is 1 cc. This is gradually
increased until the tolerance of the patient is reached, usually
at 8 cc. but in some of the more robust patients 10 cc. have been
given. The site of injection seems to make no difference, but
for comfort the extensor surfaces of the thighs or upper arms,
and the buttocks are injected in rotation. Injections are also

*Dr. H. W. Wade in a personal talk in May 1931.
given through and under lesions whenever possible. Until six months ago two injections were given each week but because of the slow absorption of the oil resulting in "lumps" at the site of injection lasting a week or two, at present only one injection is given each week with a more rapid increase in the dosage. This, apparently, seems to work just as well and is more comfortable for the patient. After injection the patient massages the injected area so as to help in the absorption of the drug.

The lack of severe pain after injection, the comparative absence of febrile reactions and the rapidity with which clinical symptoms improve have led us to adopt this method as a routine after trying many other preparations recommended in the treatment of leprosy.

As an alternative to the oil injections, sodium hydnocarpate is used intravenously in a 1% solution to which .5% of phenol is added. The initial dose is 0.5 to 1 cc. depending upon the state of health of the individual. This is gradually increased until 5 cc. is given once a week. To prevent fibrosis in the vein, enough blood is drawn up into the syringe to equal two or three times the amount of fluid contained in the syringe, the syringe rotated on it's long axis in order to mix the blood and solution, then this mixture of blood and solution is slowly injected. In using this technique "blocked veins" are prevented so that the same vein may be used over and over again for injections.

Some patients become hypersensitive to pain after continued injections of the oil so the intravenous treatment is a pleasant change and rest, but it is not used in preference to the subcutaneous method.

Potassium Iodide is given routinely to all cases except those having post-injection reactions or neuritis. One large dose is given once a week instead of small doses daily in order not to derange the patient's stomach. One gram is given at first and this is gradually increased until 10 to 15 grams are given at a single dose.

When general reactions of any sort are encountered, as fever, anorexia, neuritis, etc., treatment is withheld until the patient returns to normal health. The injections are then again started in decreased doses according to the previous record of the patient.
Diet. One of the vital factors in the treatment of leprosy is food. In addition to the regular In-patients we have a score of patients who come to the Hospital irregularly for injections. Practically all of these are cases, which because of their advanced stage are not acceptable in-patients. There are a few, nevertheless who would be acceptable, if the space were available in the Hospital, which can be used as control cases. Although they receive the same medicinal treatment as the In-patients their improvement has been very much slower. This we attribute to poor diet and poor environment.

Vitamins are essential to the treatment of leprosy, some authorities believe it is a deficiency disease. Therefore we stress foods which contain vitamins. Mainly because the type of patient we have is a vegetarian, meat is given only once a week. Cereals, as millet, corn, and rice are given daily. Vegetables, especially the leafy type as spinach, cabbage, T'ai t'sai, etc. are given in large amount. Then the products of the soy bean and small green bean, frequently used in the normal Chinese diet of North China are given ad lib. Steamed wheat bread made of whole wheat flour is given at each meal. In some cases cod liver oil is also given to increase the vitamin intake.

Industrial therapy. Leprosy is known as a “lazy disease” in that it takes away the desire for any type of physical exertion. In order to off-set this factor and also as a psychological as well as physical agent in giving exercise to wasting muscles, some method of industrial work must be employed. We have several methods in constant use in the Hospital. All routine work about the wards, dining room, and workshop is done by the lepers. The patients are divided in groups with a patient acting as “head” to oversee the work. These groups work in a sort of rotating service in the Hospital, fields, and workshop. The fields are under cultivation with wheat, beans, millet, sweet potatoes, etc. In the workshop there are two hand-and-foot power looms which weave all the cloth needed for clothing and bed linen and also prepare muslin from which the bandages are made for the University Hospital. One loom will employ ten men half a day in washing the thread, winding it on spindles, and weaving. Thereby twenty patients are occupied for half a day in this manner. Classes in calisthenics, basket ball, and volley ball are also used in the treatment.
Besides these activities, classes are held in which reading, writing and arithmetic are taught. These are all voluntary and are well attended by the patients. Once a week lectures are given by various members of the University staff, mainly with lantern slides. On Sundays the religious services are also conducted by members of the University and Theological College staffs.

All of these factors, specific treatment, industrial work, educational activities, and opportunities for mental and spiritual development we consider vital in the treatment of leprosy. One alone is insufficient and it is difficult to state emphatically which is the main factor in the success attained in so many of our cases. We believe that they are all so dovetailed into the general plan of treatment that removal of one will seriously affect all, so until we find a better and more practical plan for handling these cases we intend to proceed along the methods we are now using.

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THE SYSTEMATIC TREATMENT OF LEPROSY.—OUT-PATIENTS

An Account of an Out-Patient Clinic for Patients Suffering from Leprosy. Attached to a General Hospital

N. D. Fraser, M.B., Ch.B., D.T.M. & H.

For many years efforts have been made by the Swatow Mission hospital to provide effective treatment for patients suffering from leprosy.

At one time a small 'leper hospital' was opened, but before long it was being used as a doss house by pauper lepers in an
advanced stage of the disease only, and as it was impossible to control them or to hope for any results, it was closed down.

Some years ago the Swatow Municipal authorities established a colony on an island in the harbour, and in this the pauper lepers were congregated—for isolation not for treatment.

The problem still remained, however, and the Swatow Mission Hospital carried on an out-patient clinic for some years, chiefly for patients suffering from the less advanced stages of the disease. A routine treatment was established—intramuscular injections of Ethyl Esters of Chaulmoogra Oil with Olive Oil and Creosote, and arsenic pills as a tonic. Even with this somewhat rough and ready treatment improvement was noted in many cases, and the attendance of the patients was surprisingly regular, and could only be put down to the fact that the patients themselves were aware of the value of the treatment, and that new patients heard of and saw the improvement in those who had been attending regularly over a period of months.

The encouragement we had from this clinic, and the realisation of the extensive infection of the population of the district with hookworm disease, led us to reorganise the clinic and develop it as far as we were able.

We have now set aside two rooms for the leper clinic. One as a waiting room, the second as consulting room, dispensary and injection room.

The cases are usually diagnosed in the general O. P. D. (held daily at 9 a.m.) and are referred to the Leper Clinics (Women on Wed. 2 p.m. Men on Fri. 2 p.m.)

Here a chart is made of the nature and extent of the lesions and arrangements are made for the necessary laboratory examinations—examinations of nasal scrapings or skin clippings for M. leprae; Kahn tests in cases giving a history of syphilis, or showing signs of a syphilitic infection; examination of faeces for hookworm and roundworm infection.

Subsequently the treatment of concomitant infections is carried out, and the importance of such treatment cannot be too strongly emphasised.
The leprosy treatment is begun right away. We now give intradermal, intravenous and/or intramuscular injections, and for a few cases unable to attend regularly at weekly intervals pills for internal administration.

INTRAMUSCULAR INJECTIONS

The majority of our patients get intramuscular injections of Moogrol, beginning with $\frac{1}{2}$ c.c. and increasing up to 6 or 8 c.c. Moogrol causes more pain and general reaction than the Ethyl Esters and has been the cause of a number of cases ceasing to come up for a time. After the reaction settled down however the patients noted a marked improvement in their lesions, and returned for further treatment, willing to put up with the pain so long as the treatment was effective. Injections are given either low down in the back, into the buttocks or into the deltoid muscles.

INTRANEOUS INJECTIONS

We have been using Alepol in some cases for intravenous treatment and are satisfied that it has proved of value.

INTRADERMAL TREATMENT

Through the courtesy of the Culion Leper Colony we have been supplied with Iodised Ethyl Esters for intramuscular and intradermal injection. We are using this preparation on a number of nodular cases. This treatment has met with marked success at Culion, but as we have only recently begun to use it we cannot as yet report our own experience of its value.

The evaluation of the results of the treatment of leprosy patients in an O. P. Clinic is beset with difficulties, there being many factors over which the doctor has little or no control. Diet, exercise and living conditions are all important and it is more than likely that the patients will do nothing about following the doctor's advice in these matters.

The following examples, however, show what can be done in some of the cases:—

Large nodule right cheek, and ear. Nodules on buttocks and thigh (left). Areas of depigmentation and anaesthesia on back of thigh (right).
Before and After Out-Patient Treatment
The Systematic Treatment of Leprosy

Treatment. Oct. 1929 to Aug. 1930 Ethyl Esters—maximum dose, 10 c.c. for last 4 months. Some improvement noted. Sept. to Nov. Moogrol, increasing from 2 to 7 c.c. Nov. to June 1931 Alepol 4% intramuscularly, increasing from 3 to 5 c.c. During the Alepol treatment the nodules first changed colour from red to bronze, and then gradually faded away. There is now no sign of the nodules, save for a brown pigmentation of the skin. The ear was 'trimmed' in June 1930.

No. 131. male. age 15. First seen in 1928.
Nodular leprosy on the face. Neural leprosy of the right leg. Treatment. 1928 to May 1930 Ethyl Esters—maximum dose 10 c.c. The patient then failed to come for treatment till Sept. 1930 and treatment was restarted with Moogrol 3 c.c. Dose gradually increased to 6 c.c.; May 1931 all signs of the nodular condition had disappeared, and there was marked improvement in the leg, anaesthesia decreasing and strength returning.

Extensive nodular condition of the face. Advanced neural condition of the hands, paralyses and contractures present. Treatment. Sept. 1926 to Aug. 1930 Ethyl Esters, maximum dose 11 c.c. All sign of nodules disappeared, and the patient was able to use her hands far more than before. The nodules showed signs of recurring at one time, but the patient attends regularly for treatment, and the marked improvement has been maintained.

The value of the out-patient clinic can be summed up as follows:

1. It is a rough index of the number of people suffering from leprosy in the district.

2. It provides means of getting early cases under treatment at a stage when there is a strong hope that O. P. treatment will be effective in arresting the condition.

3. It is a sound first step in the process of establishing a wider organisation, which should include

   (1) An O. P. Clinic and diagnostic centre.

   (2) A hospital for 'open' cases in which there is still a chance of arresting the disease.

   (3) An isolation hospital for advanced cases in which alleviation is all that can be hoped for.
4. It can demonstrate the fact that leprosy is not an incurable disease, and can help to enlighten the ignorance and disperse the hysterical superstition that is so prevalent. When Public Health Authorities concentrate their attention on the isolation of all cases of leprosy (an action which only makes the situation worse by driving the early cases to hide their symptoms as long as possible) and do nothing about the much more urgent and dangerous problem of tuberculosis there is a tremendous need for such enlightenment.

The following details may be of value in showing that the organisation of a Leper. O. P. Clinic need not be a big undertaking.

**Staff.**
- Doctor and/or Chinese assistant.
- Dispenser.
- Technician.
- Doorkeeper.

**Accommodation.**
- Waiting room.
- Consulting & Treatment Room, and Dispensary.

**Equipment.**
- Consulting desk.
- Dispensary cupboard containing stock mixtures of tonics, laxatives, anthelmintics, lotions etc. Dispensing bench. Table for preparation of injections. Table or stool for patients to rest on during injection.
- Drugs, syringes, needles, small sterilizer, cotton wool pledgets, adhesive plaster.

**Records.**
Each patient retains a tally only—a card numbered according to his file. The file consists of 1. a prescription sheet on which tonics, laxatives etc., are ordered. 2. a form (supplied by the Mission to Lepers) on which a record of the injection is made. 3. A chart (also supplied by the Mission to Lepers) on which is noted the extent and nature of the lesions, and also the presence of any complicating factors—Syphilis. Hookworm. Scabies. etc.

The file is passed by the doctor to the dispenser who works immediately alongside him, so that handling of the sheets by the patient is avoided. The amount of drug to be injected is recorded on a slip of paper which the patient takes with him to the injection table. This slip is destroyed. Recently we have used small brass
tallies with the amount of the drug stamped on them for all routine treatment, and these can easily be sterilized.

In the reorganisation of this Clinic at Swatow much credit is due to Dr. Hun Tso Liang and to the technician. Both men were trained in laboratory work by the Institute of Hospital Technology, and their careful systematic work in this clinic has shown the value of such training.

We are greatly indebted to the Mission to Lepers for the supplies of drugs and for the support they have given us. The present situation makes it impossible for us to extend the work we are doing, but we hope that in time we shall be in a position to build a small treatment hospital.
PROPHYLAXIS IN LEPROSY

Perhaps the greatest advance in the war against leprosy is that associated with the undermining of the old superstitions on the segregation of lepers, and we are very grateful to Sir Leonard Rogers for giving us the opportunity of printing his paper, which deals largely with this subject, in the Leprosy number of the China Medical Journal.

The question of the relation of segregation to the stamping out of leprosy in Europe has long been a matter of dispute but it can hardly be questioned that modern efforts to solve the problem in this way have been almost entire failures, except where communities of very limited size have been involved in these measures. On the contrary it seems evident that any attempts at rigid segregation in recent times have been followed by an increase rather than a decrease of leprosy wherever this measure has been attempted among large populations.

Further in the countries where leprosy is most prevalent any proposals for segregation are doomed to failure in advance for it is just these countries where the enormous financial outlays that such a policy would involve cannot be met.

In New South Wales, Sir Leonard Rogers tells us, £2,000 per head is spent annually on each segregated leper and the best that can be said of the result is that “some reduction in the number of Europeans affected appears to have been obtained" and even this limited measure of success has not been attained in the neighbouring state of Queensland. Compulsory segregation is always an expensive method. Voluntary institutions may succeed in this country in housing and maintaining lepers at Mex.$10 a head per month or even under this. It is certain that a compulsory Government institution would cost $20 or more. This brings us to a minimum figure for segregation of the lepers in China of $240,000,000 a year taking the lowest probable estimate of the number of lepers in the country. This solution
of the problem may fairly be described as the *reductio ad absurdum*.

The greater part of Sir Leonard Roger's paper is devoted to showing how the problem can be practically dealt with and there is no doubt that here in China if all the gathering forces were united in aiming at this ideal great progress might be made even in the next few years.

Unfortunately while no one here dares to come out with a scheme for the universal segregation of lepers in China yet too many of the local authorities like to play with the problem with the idea that they can make the impossible possible in their own little local areas.

What is needed is a national policy based on proposals such as are given in this paper and we hope that before long the Government of China may see its way to give a lead in the formation of such a policy.

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**WANTED!—A NEW TERM**

The word *cure* as applied to leprosy is greeted with contempt or enthusiasm according as to whether the listener is a bacteriologist or a clinician and with varied feelings by the ordinary physician in proportion to his bent in one or other of these two directions. There is in consequence a danger of even the name, chaulmoogra oil, becoming a veritable *bête-noir* in certain circles.

This is not the first time that a drug of proved value has had its reputation endangered. We well remember bright young things coming home from the war especially from the Eastern front to tell the world that Quinine was a fraud especially in its supposed value as a prophylactic, that they had found it out and were sounding its death knell. Quinine it need hardly be said has survived with a practically untarnished reputation, and we hope its detractors have adopted soberer views.
The facts of the case were that as regards prophylaxis it never could have accomplished what they were expecting from it in the face of the overwhelming infection that unseasoned troops had to meet, and as regards treatment some of the cases that later reached us in war hospitals at home suggested a primary ignorance of how quinine should be administered.

The case of chaulmoogra oil is of course not on all fours with the illustration just given but there is no doubt that men with little knowledge of its use in leper communities in the East have been expecting it to perform miracles in the West which it never will and never can do. We are dealing with series of fresh and often at least moderately early cases, they with old and advanced cases and in which other factors come in that have not been sufficiently considered. It is hardly likely that the drug under these circumstances will prove of any striking benefit and it is a pity that this lack of success should be allowed to warp the judgement of physicians in the West.

We do not claim that either quinine or chaulmoogra are the last words, and there are at least suggestions that synthetic preparations may eventually displace both of them, but of their present value there can be little reasonable doubt.

Let us try and state fairly the case for chaulmoogra: From Culion we have the following figures which cannot be disputed. From 1907 to 1922 before the chaulmoogra treatment was instituted out of 15,000 cases of leprosy 88 were released. Since 1922 when chaulmoogra treatment was begun over 2,000 patients have been released.

From a small leprosarium in the South Seas we have the personal report from the physician in charge that he has released 190 patients since 1916 and that though these cases have been carefully followed up only 19 have shown any signs of recurrence.

The work in Korea is most remarkable. While in the two largest settlements only advanced cases are usually admitted, yet except when one comes across a case of old deformities and mutilations it is hard to realise that one is in a leprosarium. The progress that the patients are making requires no specialist knowledge to appreciate. The death rate in these places is much lower than among the general population.
Editorials

Even here in China with the work only in its infancy and much of it out patient work at that, the progress of many cases is quite remarkable.

As we write we have before us the account of a recent discussion on leprosy at the Royal Society of Tropical Medicine and Hygiene in London and a statement in it by Dr. G. W. Bray is so apropos to this subject that we quote it here in full:

Dr. G. W. Bray said he would like to mention an outbreak of leprosy in one of the islands of the Pacific which very nearly approximates to experimental conditions. At Nauru in the Central Pacific leprosy was unknown before 1911, when it came to the island, being brought by several Chinese labourers and native labourers from other islands, particularly Tahiti. From 1911 to 1920, only four cases of leprosy were noticed, but in 1920 there was a large influenza outbreak which affected the whole island; one-fifth of the population died, and the remainder gave evidence of great morbidity. In the next year there were over a hundred cases of leprosy, and by another five years there were 365 cases in all.

After the leprosy began to spread they had a special investigation, and it was found that probably the influenza epidemic was one factor in the spread, as well as the deficient dietary which was shown. By three measures they had reduced the incidence by 40 per cent. within three years—the clinically and bacteriologically positive cases were segregated; the clinical cases in which no bacilli were found were treated as out-patients, and allowed to go about their ordinary duties; and the whole native population of the island was inspected each month to get the early cases. As a result of these measures the numbers had greatly fallen off.

It was chiefly children who were infected. In the cases which came under treatment early the lesions rapidly became pigmented again, and bacteria could not be found. They tried all the treatments recommended by the books, and found the most successful was the infiltration method of Muir, giving 3 or 4 c.cm. of ethyl ester of *Hydnocarpus wightiana* under the lesions daily for months. It was remarkable how quickly the lesions became pigmented again and the bacilli disappeared, and last year he found that they had reduced the number from the 365 which existed in 1925 to somewhere about 100. In nearly 300 cases the lesions had become pigmented again, and were bacteriologically negative. They did not know yet if that represented a cure, but certainly the cases have been improved so far as their clinical aspect was concerned.

We have stated the case for chaulmoogra but of course this is not the full story and it would be quite unfair to throw too much stress on the drug treatment to the exclusion of other elements that in greater or less part contribute to the cure. All we wish to insist on here is that the drug treatment does certainly appear to be one of the essential elements. The facts
given above are all of them quite beyond dispute but we have now to confess that success in treatment is not equal in all places and some explanation of this is very desirable though not at present forthcoming. It has been suggested that the type of lesion and racial proclivities may have much to do with the different measure of success in different countries. This is a question urgently calling for investigation.

We have however wandered rather far from the subject with which we began this editorial, the different receptions given to the word cure, and these differences are quite irreconcilable. The bacteriologist, quite rightly from his point of view, requires complete proof of the absence of organisms before he will acknowledge a cure. The clinician regards a person as cured who is restored to perfect health and able to take his full place in the social system.

The same divergence of opinion is to be found in the problem of tuberculosis and we are realising more and more the close resemblance between the two diseases tuberculosis and leprosy.

In the days when the writer was a student most bodies coming to autopsy showed some evidence, possible only very slight, of former tuberculous infection. In the large majority of cases this had advanced no further. There is reason to believe that, in some areas at least, practically the whole population is similarly infected with leprosy, the disease only definitely developing in a small fraction of the population. It is easy to argue that in many of these undeveloped cases of tuberculosis encysted bacilli are still present and given the right combination of depressing circumstances the disease may be reactivated. Yet the ordinary physician would refer to all these cases as cases of spontaneous cure. Apart from these undeveloped lesions there are others where definite clinical symptoms have developed and have later receded leaving the victim in a state of normal health. The writer has a relation who suffered from a tuberculous lesion of a joint over forty years ago but has since lived a normal and very active life without any return of the trouble. It seems to him absurd not to regard the person as cured even while acknowledging that the disease might conceivably be reactivated even after this long period of years.
Yet strictly speaking the bacteriologist is right and the clinician wrong. What is really required is a new term. We cannot help thinking that the word *cure* is so time honoured as implying a complete restoration of function that the clinicians deserve to retain it and it should be up to the bacteriologists to invent a word which can be applied solely to the individual who is bacteria-free, through we fear that if this is strictly interpreted the word will die from inanition as applied to those who have been affected with leprosy.

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**LEPROSY IN MANCHURIA**

From time to time we have called attention to the danger arising from the immigration of lepers probably in considerable numbers from Shantung into Manchuria. More recently a paper entitled the Menace of Leprosy in Manchuria by the writer of this editorial appeared in the *Leprosy Review*. We have now to confess that that paper was written under a misapprehension owing to a mistake in some figures of cases of leprosy supplied to us.

While we apologise for having been led unwittingly to exaggerate the probable danger to Manchuria of the entry of lepers from other provinces, we have at least the satisfaction of knowing that the interest aroused has led to a much fuller investigation of the subject and this we publish in this issue under the title of “Notes on Leprosy in the Three Eastern Provinces” by Drs. Yü and Taylor of Mukden. We congratulate the authors on their very valuable contribution. It is everywhere difficult to get reliable statistics on leprosy owing to the scattered and rural nature of the disease, the stigma that applies to the affection and the fact that *M. leprae* failing to produce symptoms attributable to a toxin, causes, in the absence of ulceration or paralysis, no illness sufficient to induce the patient to seek treatment. Only thorough survey work can possibly give the information we require and in most areas this is impossible at the present time. Though handicapped by the lack of this the authors of this paper have given us a fine
example of what can be done to bring the question of leprosy in a given area beyond the point of mere surmise.

We trust that their further investigations and an official survey when this is possible and the official mind can be convinced of its necessity will clear up the whole problem of leprosy in Manchuria.

LEPROSY AND AVITAMINOSIS

There is little that can be done in China at present in the line of leprosy research, as, with only one exception, the leper centres are totally unequipped for such work. There is one line of investigation however that might well be followed out here and which may prove of more importance than is at present realised.

In its recommendations with regard to research work adopted by the Manila Conference, the following was included:

*Diet:* Differences have been noted in the incidence of leprosy in the people of various regions in India, Korea, China, and other countries, which suggest that intensive studies of the diet of the people is desirable. These studies should include the foods in use, the methods of preparation, the degree of preservation (freshness, decomposition), the quantity (famines), and the quality (vitamins, inorganic salts). The effect of diet in general therapy is also of importance.

At the meetings, Surgeon General Graham drew attention to the different incidence among the wheat eating and rice eating peoples of India, pointing out that the disease was hardly found among the former but was common among the latter. Generally speaking this is true also of China. With the exception of Shantung leprosy is largely confined to the rice eating part of this country and its incidence is very low in the grain eating districts. In Shantung, we understand, grain is the principal article of diet though rice is consumed in some of the southern districts. It would be very interesting to know how leprosy is distributed in that province in respect to the staple diet.
It would be a mistake however to suppose that there is in any likelihood any essential difference between the grain eaters and the rice eaters as such. More probably there is a vitamin deficiency in the rice eating districts as compared with the grain eating districts not directly associated with either of these two main foods.

There are reasons to believe that a certain liability to infection with *M. leprae* is associated with a lack of vitamin intake and this is a matter which should not be very difficult to find out. We suggest investigations along this line wherever leprosy is commonly met and this is an item in the Research programme in the investigation of which all our centres might take a part. We commend this idea to the workers in leprosy in China.

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**LEPROSY POSTERS**

Through the kindness of the Chinese Mission to Lepers we have received copies of a series of 15 educational posters on leprosy. These are excellently conceived and well executed in colours. A full title in Chinese and a short one in English is printed on each poster.

This is the first serious attempt at popular education on this important health subject and our congratulations are due to the Chinese Mission to Lepers for this fine piece of constructive work. We shall be pleased to send a set of posters to any doctor who will undertake to display these in his leprosy clinic. The printing of these in colour is however an expensive matter and we would ask that only those who can display these posters to advantage would apply for them.

Extra copies can be obtained from the Chinese Mission to Lepers at $3 a set.
The author points out that a statement of six years ago, that with few exceptions a leper sent to Culion never returned, is not now true, and he gives data to show that the recoveries are as numerous among the advanced Culion cases as in the newer regional treatment stations, and they should be still better under the present modified system of segregation. Since 1921 about 80 per cent. of 8,520 Culion cases have been treated intensively, chiefly with iodized ethyl esters. In recent years a better diet has improved the nutrition of the patients and helped treatment, and the routine injections are now given by nurses, which saves the time of the physicians. Between 1922 and 1929 1,355 patients have been paroled or discharged as negative bacteriologically for from 6 to 24 months, or 19.6 per cent. of all the treated cases, while 480 more negative cases were awaiting their discharge, making a total of 27.1 per cent. of the whole number, or 30 per cent. if all cases found to be negative once are included. Yet from 1906 to 1921 only 47 negative cases were released under former treatments, 46 of these having been under the Mercado method. The available records of the San Lazaro Hospital, Manila, shows 19 per cent. paroled and 25.8 per cent. negative at least once out of 1,576 treated, and Haseltine's data on Hawaii cases from 1918 to 1921 would represent 19.7 per cent. paroled, while Wilson in Korea has reported 21 per cent. paroled and 30 per cent. apparent cures among 1,109 lepers. Among 70 fairly early Culion cases in children 67.5 per cent. have become negative, and of fairly advanced ones 54 per cent. Released patients could not be followed up to ascertain the number of relapses, but in Hawaii 12.8 per cent. of 242 paroled patients have relapsed, but such cases clear up again quickly with further treatment. Considering the advanced nature of the great majority of Culion patients these results are very satisfactory.

PROBLEMS OF THE NEGATIVE LEPERS
SULPICIO CHIYUTO

As the result of the remarkable progress in the treatment of leprosy the increasing number of recovered lepers who are discharged yearly has raised serious problems in relation to them, especially now that in the Philippines lepers are released when they have remained negative bacteriologically for six months, but are expected to attend centres for eighteen months' further treatment. In the Cebu division 50 per cent. of these were found and 36 per cent. were reporting more or less regularly for treatment. Many of the negative cases elect to remain on at Culion owing to difficulties in obtaining employment if released, and to family ties in the settlement. The majority are desirous of work, but others get accustomed to being supported in idleness at Culion, while the unfounded fear of the public of discharged lepers creates difficulties for them. “The present segregation system was no doubt justifiable two decades ago when segregated lepers were never expected to get cured or returned to normal life,” but now that “lepers under scientific and proper medical care and treatment are able-bodied men capable of performing mental and manual work,” the segregation law should be amended by making able-bodied lepers work while confined in a leprosarium, and recovered lepers should earn their living as agriculturists.


LEPROSY IN ICELAND
SAM BJARNHJEDINSSON

During the years 1898-1904 the same experiments in treatment, as were being carried out elsewhere, were used at the hospital, namely the use of salicylates, mercury, arsenic, but the results were not good. The patient became worse and generally died as a result of some complication, e.g., sepsis or amyloid degeneration, tuberculosis, pneumonia, etc.
Some of the chief leprologists about the year 1902 spoke favourably of the old eastern remedy for leprosy, chaulmoogra oil, and I decided to try it, and have used some derivative or other of the oil since 1907, e.g., oil by mouth, ethyl esters, hydnocarpates, etc. The improvement in the condition of the patients was enormous, and their whole aspect towards treatment changed and this resulted in a checking of the virulence of the disease, fresh eruptions and reactions were less frequent, leprous nodules cleared up, and diffuse infiltration diminished, and often disappeared totally. The torpid ulcers of long duration became clean and healed, though the complete healing took a considerably longer time, and changes could be detected after a few months of treatment. These changes were especially noticeable in nodular lepers and mixed cases, but I never noticed any improvement in the pure anaesthetic form of the disease.

*Leprosy Review, January 1931.*

**EFFECT OF INTRAVENOUS INJECTIONS OF ETHYL ESTERS OF CHAULMOOGRA OIL ON THE PULMONARY TISSUES OF THE RABBIT**

C. N. Frazier and Fong-Kong Chen

The intravenous administration of the ethyl esters of chaulmoogra and hydnocarpus oils has been employed in the treatment of leprosy with a view to eliminating or lessening the painful and incapacitating local reactions which so frequently follow intramuscular injection. The authors are of the opinion, however, that intravenous injection of the esters of the former oil is not without danger to the patient. The most important single factor underlying the pathological changes produced in the lungs by this method appears to be the mechanical blocking of the smaller blood-vessels. Intravenous injections into rabbits in single doses of 0.2 and 0.3 c.c. per kg. of body weight produced, by embolic obstruction, extensive pulmonary infarcts with subsequent abscess formation, resulting in the death of the animal. The serial administration of therapeutic doses of the
Current Medical Literature 907

drug comparable to those given intravenously to man in the treatment of leprosy produced generalized pulmonary fibrosis with wide-spread destruction of parenchymal tissue. Whether or not intravenous injections of corresponding amounts of the ethyl esters are capable of producing identical or similar pathological changes in the lungs of man is problematical. It is of interest to note, however, that fibrosis of the alveolar walls and changes in the alveolar epithelium almost identical to those described in the experimental animals has been observed by a previous investigator in cases of oil aspiration in infants. It would seem, therefore, that the accidental injection of the ethyl esters into a blood-vessel during treatment might very easily produce disastrous results due to extensive pulmonary embolism.


UNITED STATES PUBLIC HEALTH SERVICE

A summary of the records of sixty-five cases of recoveries from leprosy

A report recently issued by the Public Health Service gives an interesting summary of the value of medical treatment for leprosy at the National Leprosarium which is conducted by the Public Health Service at Carville, La. More than 300 lepers, men, women and children, are under treatment there.

During the past ten years, 65 lepers have been discharged from this hospital as apparently recovered from leprosy and no longer a menace to the public health. The average period of hospital care varied from 5 to 9 years. The shortest period of treatment was 1½ years and the longest was 17 years. Fifty-five of these patients received crude chaulmoogra oil by mouth, and sixteen of this group received no other medicine. Twelve received benzocaine-chaulmoogra oil by intramuscular injection, and four of these received no other medical treatment. Twenty-one received the ethyl esters of chaulmoogra oil by intramuscular injection, and eight of these received no other medicine.
The basic treatment of leprosy is similar to that for tuberculosis, and all lepers at the National Leprosarium, no matter what medicines are given, follow a sanatorium regimen of food, fresh air and rest, almost identical with that prevailing in a tuberculosis hospital.

*Health News, November 8, 1930.*

## LEPROSY AND MALIGNANT GROWTHS

J. J. Puente and M. I. Quiroga illustrate the rarity of the coexistence of leprosy and cancer by the following statistics. Among 2,337 deaths in the Norwegian leper hospitals there were only 19 cases of cancer, in Rejkjavik 2 among 105, in the Philippines 5 among 300, and in Portugal only 1 among 2,000. Puente and Quiroga now record 4 cases of cancer which occurred among 700 cases of leprosy, a proportion of 5.6 per 1,000. The first patient was a man aged 62, suffering from the purely nervous form of leprosy, who had an epithelioma of the cheek. The second was a man, aged 37, with the mixed form of leprosy and a destructive epithelioma of the nose. The third was a man, aged 60, who had the mixed form of leprosy; epithelioma of the gall-bladder was found at the necropsy. The fourth patient was a woman, aged 23, with macular leprosy and scirrhous cancer of the breast.

*B. M. J., August 23, 1930.*

## HOW TO MAINTAIN ATTENDANCE

A Treatment Centre Problem

F. W. Ross

The primary reason why patients get discouraged is, of course, the slowness of results. At the present stage of knowledge, treatment is a lengthy business, demanding a fair degree of pertinacity on the part of the affected person. If the centre
is a long way off, entailing an absence from home of several hours each treatment day, then more than ordinary perseverance will be required, especially as patients generally have work of their own to see to.

The urgent need is obviously to find a remedy which is quicker than any in use at present. The problem would then become very much simpler, but even now a great deal may be done, and is done, if only people can be induced to keep on attending. The question is, what methods will produce that result? There is no short cut to success in that direction, but there are some elementary things which should constantly be borne in mind.

First of all, great importance should be attached to establishing a cordial relationship. Let it be quite clear that those who come are welcome. Cheerfulness and friendship cost nothing, but they make all the difference to the atmosphere of a place. Other things being equal, the medical officer who has a pleasant manner and a sense of humour will get better attendance than the man who ignores the personal factor. Village people especially are very informal, and like to be treated informally. The official manner is nowhere popular. We have one patient who travels regularly from a place 70 miles distant, and there are others who came from a town more than 30 miles away. These people could get private treatment from local practitioners for the same expenditure of money, and with very much less trouble. That they come to us is due, I think, to the personal factor.

We sell crude oil, for external application, at less than cost price, and this is a great attraction. I should recommend it where possible. The medical value is slight, but the mental effect is more than slight. I do not grudge the amount this costs us annually, because I know that it has a real effect in inducing people to come.

A small dispensary with stock mixtures is not expensive to run, and medicines may be given free. Since stress is laid on general physical condition in connection with leprosy treatment, it is obvious that such an arrangement should be made wherever possible. Leaving aside the consideration that results will be better, it cannot but improve attendance.
A treatment centre should be a propaganda centre. If it is not feasible to utilise the bioscope, or if no magic lantern is available, still other resources are open. Even the illiterate eagerly accept a copy of any leaflet which may be issued, and bear it off to someone who will read it to them. There are the excellent productions of the B.E.L.R.A., and since printing in India is cheap, it is possible to issue something specially adapted to the locality from time to time. A keen man will find plenty of opportunities of using the special set of posters, to great advantage. Activity of this sort gives a good impression, and has a stimulating effect on those who have commenced treatment.

A method of our own for encouraging people to attend is as follows. Every dose of 7 c.c. or more (we use hydnocroceol), is written on a slip of blue paper. This entitles the recipient to immediate attention whether he arrives early or late. Where the crowd is considerable a man may have to wait some time, but the possession of a special ticket exempts him from that. This is a privilege which is much appreciated by our people, but there is no particular point in applying it at a centre where the number is small and the work quickly finished.

Naturally every effort should be made to study the convenience of patients, both as regards hours of work, and also for their comfort. If adequate provision is not made for shelter from sun and rain a good attendance can hardly be expected. During the hot weather our practice is to make arrangements for drinking water and we also give away a handful of batasha to everyone. That is a small point, but it is appreciated by the man who has a total journey of ten miles on foot.

Where possible, patients who have ceased to attend should be looked up and the reason enquired into. It may be that they have allowed other interests to oust this special matter, or they may have become alarmed because of reaction, or an inflamed arm. It must be urged with sympathy as well as firmness that in this respect a man has to consider the danger to which he is exposing other inmates of his house, so long as he remain infectious.

_Leprosy Review, Jan. 1931._
THE TREATMENT OF THE NASAL PASSAGES AND THE EYES WITH CHAULMOOGRA OIL IN LEPROSY

T. J. Dimitry

Up to the present there seems to have been little or no literature concerning the care of the leper's eyes. In this paper the author discusses the administration of the oil and its derivatives to the eye and to the nasal cavities by atomization. Since the nasal cavities commonly and constantly harbour the leper bacilli, and this focus of infection apparently supplies the organism that readily finds its way to the eye and other parts of the body, it is desired to emphasize the treatment of the nose as a means of bettering the eye. In spite of the disappearance of the skin condition of the eyebrows and eyelids following medicinal treatment other than that advocated by the writer, it seemed that the nasal condition was responsible for conditions including chronic coryza, ozaena, epistaxis, lepromata in the nasal mucus and the presence of the bacilli. Thus a careful investigation of the nasal passages and sinuses is of importance from a curative standpoint, because these cavities harbour the agent that probably accounts for the repeated attacks of inflammation in the eyes, and which can equally well explain the long duration of the general bodily condition. In this relation the writer has found the most efficient form of medication to be the atomization of the oil or its derivatives into the nasal cavities along with the oral or hypodermic method now in general use.

Journal of Tropical Medicine and Hygiene,
March 16, 1931.

KRABAO IN SIAM
A. Kerr.

The seeds of species of Hydnocarpus (including Taraktogenos) have been used in the treatment of leprosy in India and China for some hundreds of years.

India obtained her supply of these seeds from Assam. The history of this supply, and its derivation from Hydnocarpus
(Taraktogenos) kurzii, is well known. The origin of China's supply is, however, not so well known, though the chief facts have now been ascertained.

It is true that it has long been known that Siam supplied China with these seeds, the Chinese designation for which is ta-feng-tzu, but it was not known from what species they were derived. Daniel Hanbury had some seeds sent to him, and he figures them in his "Notes on Chinese Materia Medica" (1862), where, after stating that the seeds were imported from Siam, he remarks that "the plant affording these seeds is not well ascertained." He goes on to point out their resemblance to those of chaulmoogra odorata, but decides that they belonged to a different species. Later writers on the subject were not always so circumspect. B. E. Read, however, has since demonstrated (China Medical Journal, 1922) that the seeds imported into China are those of hydnocarpus anthelminthica.

The word "krabao" is used in the title of this article, rather than "chaulmoogra," in order to avoid confusion with the true chaulmoogra, Hydnocarpus (Taraktogenos) kurzii. Krabao is a name applied, both in Siam and Cambodia, to hydnocarpus anthelminthica, as well as other species of hydnocarpus. The seeds of krabao are known in Siam as luk krabao; in China as ta-feng-tzu or ta-fung-chi.

So many forms of, and combinations including the word krabao have been used that it will be well to consider a few of these before going further. One of the first references to the seeds of karbao is in the best known of the Chinese pharmacopoeias, the Pen t'sao kan mu, completed in 1578, whose author mentions that they come from Siam, and gives a Siamese name for them, which has been rendered lu-brako. Other variants of the name that have appeared in various works are, lucrabau, lukrabao, lukraban and cukraban. Another name, used by some authors is mai krabao. The word mai means tree, so the term mai krabao is simply the krabao tree.

Hydnocarpus anthelminthica is widely distributed in Siam and extends eastwards to Cambodia, Laos and Annam. Recently it has been reported from Myitkyina in Upper Burma. In Siam it is found here and there all over the country, except in the extreme south, its southern limit being about Lat. 8°, 50 N. The species is most plentiful in central and eastern Siam. Its
favourite habitat is the immediate vicinity of rivers and creeks running through level, low lying country. These situations are liable to be flooded at intervals during the rains, while in the dry season the river may shrink to a sluggish, nearly stagnant stream, or a series of unconnected water-holes. The soil in such situations is practically always a sandy loam. Occasionally the tree is found in another, and very different habitat, on mountain slopes and valleys, but in such places it is not so abundant as along water-courses in the plains. About January seems to be the general flowering time, but it is not at all uncommon to find trees in flower at other seasons. The rather small pale green flowers are sweetly scented, emitting a refreshing fragrance which pervades the atmosphere in the neighbourhood of flowering trees. The flowering stage of the tree has a special name "ka long," or "the infatuated crow." presumably meaning that the fragrance will even appeal to a crow. The male and female flowers are distinct, but both are produced on the same tree, the male in far greater abundance than the female. The fruit ripens about August and September.

In a good year the trees may bear quite heavy crops of fruit. Some years ago the crop on a medium sized tree was carefully picked and found to contain 648 fruit. Such a crop should yield seven or eight litres of ethyl esters, sufficient to treat 50 lepers for one year. It would, however, be unsafe to regard this as an average crop for a single tree. In any one year there are always to be seen some trees which have not fruited at all; while in certain years, particularly when the rainfall is deficient, the whole crop is poor. The mature fruit is more or less globular and measures up to about 47 cm. in circumference. It contains on an average 60 seeds, embedded in a mealy pulp.

Though *hydnocarpus anthelminthica* is so widely spread in Siam, only a comparatively small area has been tapped for the export of seeds. If the demand increases the crop can be obtained from a much wider area. The trees in these areas are so plentiful that there is no temptation to pick other seeds as adulterants, nor are there any other seeds at all resembling them in such localities. The danger to be guarded against is old seeds; if the market is not good the seed merchants are apt to keep the seeds over till the next year, when many of them will have their kernels discoloured and rancid. In Bangkok, the
Siam Medicinal Oil Works, of which Mr. H. Olesen is the proprietor, expresses the oil, with modern machinery, from carefully selected seed. The most convenient way, no doubt, is to buy the oil rather than the seed, and save weight on useless shell. The oil, too, keeps in good condition much longer than seeds will.

Though "Luk krabao" have been exported from Bangkok for centuries, it is for only comparatively recent years that figures of the amount exported are available. The first year for which returns have been seen is that of 1899, when 251 piculs of seed were exported to China. A picul is approximately .06 ton, or 60 kilogrammes, so that 251 piculs represents about 15 tons. The estimated value of this was Ticals 300. The early exports recorded remained below 1,000 piculs a year, till the year 1907-1908, when the export was 1,320 piculs. Since then the annual export of seeds, though fluctuating considerably, has only dropped below the 1,000 picul mark on four occasions, and, in 1819-1920, has reached as high as 8,965 piculs, or about 533 tons valued at Ticals 38,031. In the five years ending March 31st, 1930, the average annual export of seeds from Bangkok was 3,777 piculs, valued at Ticals 16,971; this represents about 219 tons valued at £1,520, taking the tical at its present rate, ls.9½d. The estimated value per picul of the seeds fluctuates within wide limits; in the past five years it has varied from Tcs. 2.70 to Tcs. 6.52; though within that period the value of the tical, which is now on a gold exchange basis has remained steady.

The bulk of the export of these seeds goes to Hongkong, and other Chinese ports, a small amount occasionally going to Singapore; but in recent years there has been a small export to other countries, such as the British Malay States, India, Philippines, Union of South Africa and Portuguese South-east Africa. Though Japan rarely appears in the custom's returns as getting shipments of Krabao seeds, it is known that she does get her seeds from Siam, but indirectly through China ports. Possibly other countries get indirect shipments in a similar way.

While in China the seeds are chiefly used in the treatment of leprosy and skin diseases, this does not seem to have been the case in Siam, at any rate in olden times. In looking through several old collections of Siamese prescriptions it was rare to find luk krabao mentioned in connection with either
leprosy or skin diseases; though they are frequently mentioned in prescriptions for other diseases.

Various other parts of the tree are also used as drugs. A modern work on Siamese medicine gives the medicinal uses of the different parts of the tree as follows:

- **Leaves** for incised and penetrating wounds.
- **Flowers** for skin diseases.
- **Seeds** for leprosy and ulcerations.
- **Bark** for mucous discharges.
- **Heartwood** for nasal discharges.
- **Root** for foetid mucous discharges.

The different parts of the tree given above may be used internally, chiefly as decoctions and pills, or externally, as ointments and lotions. The prescriptions for these always contain a large number of other ingredients besides krabao.

The name *anthelminthica* would suggest that some part of the plant is used as an anthelmintic; but no such use of it has been heard of in Siam.

Fish eating the fruit that fall into the water are said to be poisoned, and when so poisoned, they are not fit for food. A similar property is recorded for the seeds of *hydnocarpus venenata* in India.

The pulp of the fruit is edible, but rather dry and tasteless. When eaten with coco-nut milk and sugar it is considered quite palatable. On occasion, it is said, outlaws and persons lost in the forest, have been able to subsist for several days on this pulp. Only the pulp of quite ripe fruit can be eaten. The pulp of unripe fruit, when freshly opened, has a distinct smell of prussic acid.

Several other species of *hydnocarpus* are found in Siam, but, with one exception, they need not be considered here, as they are not at present of commercial importance.

The exception is the true chaulmoogra, or *hydnocarpus (taraktogenos) kurzii*. It has been found in several provinces in the north of Siam and also in a few places in the Peninsula. Unfortunately, most of the places where it grows are rather inaccessible, and it is usually not in great abundance in these
localities. One of the best forests for it is near where the southern boundaries of the provinces of Lampang and Prê meet. In this forest it is estimated that there are some 5,000 mature trees, which might yield a crop of 100 piculs, or six tons, of seeds in a year. This tree is also called krabao in Siamese, but sometimes the word dong (virgin forest) is added to distinguish it from *hydnocarpus anthelminthica*.

In conclusion it may be said that the annual crop of seeds yielded by trees of *hydnocarpus anthelminthica* in Siam is sufficient to treat a very large proportion of the lepers in the world; that the seeds are easily obtained, and that there is at present no fear of adulteration. It would, however, be more economical to have the seeds pressed in Bangkok, and only the oil shipped.

*Leprosy Review, January, 1931.*

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**THE USE OF FIBROLYSIN IN LEPROSY**

**Otto Krause Sen., M.D., Blomfontain.**

It has long been recognised that old cases of leprosy generally resist treatment whereas those of one or two years standing usually yield to administration of chaulmoogra or hydnocarpus oil. I have found that the following method is capable of rendering these old cases as accessible to the lepricide as those diagnosed in the early stages of the disease.

I worked upon the following hypothesis. Through the action of the lepra bacilli fibrous tissue is formed which owing to deficient circulation affords a splendid shelter for the microorganisms and makes it extremely difficult for the therapeutic agent employed to reach the affected part and destroy the causative agent lurking within which continually produces toxins and poisons the whole system.

I therefore looked for a preparation which was capable of dissolving the cicatricial tissue and thus expose the germ-laden
cells to the action of the lepricide. Such an agent I found in Fibrolysin (E. Merck, Darmstadt), for it effectively disseminates scar tissue. The technique I employed is quite simple. I injected Fibrolysin intramuscularly twice a week for 4—6 weeks, when treatment was suspended for a fortnight to be resumed until the desired effect was produced. The oil was administered concurrently either orally or intramuscularly. It was found that massage facilitated and hastened progress.

The results I have obtained by this method have been extremely encouraging, but as I had a limited number of private cases only, I should like to see the method applied in institutions in order to obtain confirmation. Nervous cases responded particularly well. I am of the opinion that the bacilli do not so much destroy the nerve itself but rather the nerve sheaths. Through formation of fibrous tissue shrinking of the sheath occurs and the nerve is killed by pressure.

Remarkable results were observed in cases in which the nerve was still alive, its action being fully restored. Drooping eye lids became normal. No cases of ulceration were noticed.

It is regrettable that most of my photograph have been lost. The accompanying pair [not reproduced here] illustrates the effect produced in an old-standing (3-4 years) case of the nodular type. I injected Fibrolysin along with chaulmoogra oil. After five months of treatment the patient was sent to Robben Island where treatment with the oil was continued. Within a few years she was discharged as a cured leper.

E. Merck’s Annual Report.

This timely summary of the work of the Leprosy Commission of the League of Nations has evidently been composed with the findings of the Bangkok and Manila meetings before it and draws largely from the results of these two conferences.

The Report itself is divided under two main headings. The Principle of Prophylaxis and Technical suggestions. We are not quite clear that the title of the report is satisfactory as it does not, and in the nature of things could not, confine its findings to matters of prophylaxis but trespasses on questions of terminology and treatment. We must however add that in doing this it greatly enhances the value of the report.

The paper is so much a summary of the present position that it becomes difficult to do any justice to it in a review, and in place of this we give the summary and conclusions of the first part of the report which will receive the hearty support of most leprologists. It is given as follows:—

1. Prophylaxis of leprosy is not a problem that admits of solution by the application of any one measure, since the means of dealing with it obviously vary with geographical, economic, administrative, financial and social conditions and with the incidence of the disease.

2. There is no reliable system of prophylaxis without treatment, and it is generally accepted that the earlier the treatment is instituted the better will be the results.

3. Leprosy resembles tuberculosis in being, in certain stages, a contagious but curable disease: curable at least in the sense that bacteriological examination becomes negative and other active signs disappear and remain absent permanently or for an undetermined period.

4. The prophylaxis of leprosy may be achieved by a system of medical, educative and legislative measures. It should provide for the isolation and treatment of infectious lepers and particularly for the treatment of early cases in clinics and dispensaries: also for the periodical examination of suspects. Special measures should be adopted for dealing with the children of lepers and for patients who have recovered either after treatment or spontaneously.
5. It is desirable that each country where leprosy exists to an important degree should have at least one centre for the study of the disease, with research laboratories and special courses for the medical profession and their assistants. Where this is not practicable, men should be sent to some foreign centre for training.

6. Arrangements should be made to include instruction in leprosy in the curriculum of all medical schools and colleges.

7. It is necessary to educate the public in regard to leprosy by modern methods of popular teaching and propaganda.

8. Isolation of infectious lepers is a necessary measure in a comprehensive campaign against leprosy, but it cannot be regarded *per se* as the sole means of prophylaxis. Its drawbacks can be mitigated by other measures applied concurrently. Isolation should be applied only to cases that are considered infectious.

9. Any form of treatment in order to give satisfactory results requires to be combined with suitable dietetic and general hygienic conditions.

10. For special treatment, oils of the chaulmoogra group and their esters and soaps are recommended.

11. The system of prophylaxis must be animated by the spirit of preventive medicine and social hygiene.

Through the kindness of Dr. Burnet, copies of this report have been made available for all engaging in active work for lepers in China. Copies can be obtained from Dr. James L. Maxwell.

J. L. M.
Obituary

Hilda Margaret Byles, M.B., B.S.

By the passing at Hankow, on July 25th, 1931 of Dr. Hilda M. Byles the London Mission has lost one of its best loved and most active members, whose place it will be hard to fill.

After graduating M.B., B.S., of London University, she sailed for China in January 1907, and thus at the time of her death she had been in the service of the Mission for some twenty-four and a half years and was within five weeks of her fifty-second birthday. She was not long in getting a working knowledge of the Chinese language, and in after years was one of our most fluent speakers. She took over the charge of the Margaret Hospital, which at the time was housed in a small building next to the Men's Hospital on the Tai-ping Road. In a few years time that site was sold and a godown on Faucheong Road was placed at her disposal. How uncomplainingly and with what zest did she set to work to adapt the godown to its new purpose! There she worked for a few years and then the godown was condemned and she had to move once more; this time it was to one of our chapels in the native city,—the Tu-tang. That and some buildings behind were converted, temporarily, into a hospital and she herself lived there for one and a half years, leaving her own comfortable home in the Concession so that she might be available for night calls and other emergencies. Through all these changes she was bright and brave and met them with a smiling face. Meanwhile, the new hospital for which she had planned and waited for eighteen years, and for which she had raised the larger part of the funds, was being built, and she moved into it in 1924. What a joy it was to her! How she rejoiced at the better provision for the needs of her patients!

She co-operated with the Matron of the Hospital in training nurses, both for the regular work of the hospital and in midwifery. An important obstetric work, far-reaching in its influence, has been done among the women, both among the better-class and among dwellers in the mat sheds, in city and in country, hundreds of cases being attended to each year.

Another feature of Dr. Byles' work was her deep pity and strenuous, self-sacrificing efforts, in many cases successful, for the rescue of girls from a life of shame and servitude. Her own life was more than once in danger from the infuriated owners who kept the girls in thrall.

She loved to preach the Gospel in Hospital, Chapel, or in the homes of the people. She was on the committee of the Tu-tang Church, and took her turn at the services; but the work most dear to her there was her Bible class and her share in a Prayer Group.
Obituary

She passed on as the day was breaking on July 25th, in Hankow, and her body was laid to rest in the International Cemetery. The simultaneous funeral services held in Hankow and Kuling were a striking tribute to the influence of her life. Though the flood in Hankow was rapidly rising, and the street in front of the Hua-lou church was knee-deep in water, a great congregation assembled from the three Wuhan cities to honour her memory. The church was hung with dozens of scrolls, prepared by the Chinese, and many tears were shed, for she was greatly loved. It was one of the most impressive services ever held in that church which has seen many memorable occasions. Afterwards a great number of friends made their way through increasing floods, to follow the coffin to the cemetery, a mile and a half away. The sun shone for a few minutes,—the first time for days,—and it was a beautiful evening. The last part of the way was high and dry, and a long double line of Chinese waited with flowers to receive the coffin. Many were the heartbreaking expressions of sorrow as the last sad rite was performed; then the grave was left in peace and beauty, a glorious heap of wreaths and tokens and sweet-scented flowers,

"So she passed over, and all the trumpets sounded for her on the other side."

in connection with the Five Year Movement.

In all her work she was conscious of a deep and real sense of fellowship and oneness with her Chinese colleagues; she once said that some of her happiest hours were spent at the close of the day in quiet talk with them when the work of the day was over. When opportunity came to go into the country she rejoiced. It was the opportunity not only to treat the sick who came, but also to preach to the crowds of men and women who gathered round her. This she loved and would gladly have done more of it had the occasion offered. She was first and foremost a great evangelist. She lived near to her Master and her desire was that others should know Him. Her joy in Him lit her face with that bright smile. To hear her pray was to be brought into His Presence.

Although she had various severe illnesses during these twenty-four years, yet, as soon as she recovered, she was up and working to her full strength once more. Her last illness, of five weeks, was to be the Call Home, and when at the very end she realised this, her great desire was for the Master she loved to come quickly. She felt so strongly that she was just going on into a fuller life, going to her real Home. During this time she was much helped by the knowledge that great numbers of friends, both Chinese and foreign, were praying for her.
NEW MEMBERS PROPOSED

Backus, Reno W. M.D. (Rush) M.E.F.B. Peiping, Hop.
Proposers: Dr. Bernard E. Read,
Dr. J. E. Skinner.

Scovel, Frederick Gilman M.D. (Cornell) P.N. Tsining, Sung
Proposers: Dr. Harold E. Henke,
Dr. Lois Pendleton Todd.

NEW MEMBERS ELECTED

Dr. M. E. Nordlund, S.A.M.C. Siangyang, Hup.
Dr. M. T. Yang, Weihwei Hospital Weihwei, Ho.
Dr. K. B. Liu, M.E.F.B. Wuhu, An.
Dr. R. MacKinley, U.C.C. Weihwei, Ho.