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Editorial

WE have no doubt that our readers will welcome Dr. Wade's contribution on Bacteriological Examination in Leprosy. Workers who have no access to a well equipped laboratory will be glad to have the detail of routine examination in cases of leprosy. Dr. Wade lays correct stress on the fact that many individuals do not make a routine bacteriological examination either because they do not think it is worth while, or because they are under the impression that certain lesions do not contain bacilli. We are glad that emphasis has been laid on the technique of examination because it is a most important procedure, and failure to find bacilli in a lesion is often due to faulty technique rather than the absence of bacilli. We would mention here that following the Manila classification those cases in which bacilli are found are usually termed cutaneous cases. This does not apply to nasal lesions, for in the rare event of nasal lesions being present and no bacilli being found in skin lesions, then the case comes under the neural category, but is for administrative purposes declared an open case. The simplicity of the method described enables workers in any part of the Empire to undertake bacteriological examination. The only necessities are suitable stains and a microscope. Unfortunately there are still a number of places where this elementary apparatus is not available.

We are glad to include in this issue a review of the Eye, Ear, Nose and Throat department of the National Leprosarium at Carville. This institution is in a unique position to investigate every aspect of leprosy, because attached to the institution are consultants such as Dr. McNair, who are specialists in their particular branch. We trust that should our readers desire further information on any point arising out of this article, they will communicate with us.

The Medical Secretary's reports on the West Indies are being reproduced in an abridged form in this and forthcoming numbers of the REVIEW. We are sure that our readers will find in the leprosy situation in the West Indies points which will be of interest, especially from the epidemiological standpoint.

Dr. Sharp's report on the Bunyoni Leprosy Colony for 1933-34, will be read with considerable interest. This report emphasises the importance of institutional treatment,

especially with regard to treatment in children. Dr. Sharp points out that the results in children have been satisfactory, and we have stressed from time to time that one of the most important factors in the success of treatment of active cases amongst children is the economic condition under which the children are living. The need for careful diet and proper environment is brought out very clearly in this article. It is of interest to note that it is mentioned that a child as young as six weeks old is stated to have well developed leprosy. If this is so, then as far as we are aware, it is the youngest case on record.

We publish two articles on nerve infection in leprosy. The first is an article on the treatment of nerve reaction. This is one of the most difficult symptoms which the physician has to treat, and any help in the relief of this most distressing complication will be welcome. We have no doubt that intradermal injections along the course of the nerve have decided benefit, for in at least one of our own cases a marked improvement resulted following such treatment. We are unconvinced, however, that operation on a nerve is of permanent value. We admit that where there is a nerve abscess the nerve trunk should be opened, as described by Dr. Lowe, but where the nerve is thickened without any evidence of abscess formation, then we consider that it is inadvisable to operate, for we have seen in a number of cases the resultant mutilation which is considerably worse than the deformity produced by the thickened nerve alone. The reason for this is probably that the trauma caused by operation results in a greater amount of scar tissue, and therefore of further destruction of the nerve itself. We do not suggest that nerve operations should not be done, but we issue this warning lest some of our readers may think that operating on nerves in a reactive stage of leprosy will always produce a lasting benefit.

We reprint from the *Medical Press and Circular* an article on "Leprosy in England." Our readers will be interested to be acquainted with the situation as far as it is known in the home country.

We have been very gratified with the response to Dr. Rose's article on the "Curability of Leprosy," which appeared in the issue of October, 1934, and we publish a further letter from Dr. J. J. Du Prè Le Roux, of Pretoria. The points which he raises merit careful consideration.

The Bacteriological Examination in Leprosy.

H. W. WADE.

TO a leprosy worker accustomed to the making of bacteriological examinations as a matter of simple routine, it comes as something of a shock to discover how many neglect this procedure, which is so essential in diagnosis, classification, and the evaluation of the results of treatment. Again, there is often cause for astonishment at the technique by which smears for the examination are prepared by those who do make it. Little has been said in the recent literature on this subject, perhaps because it is not realised how many of those who deal with patients are not well informed about it.

Exemplifying the condition spoken of, one correspondent tells of having had a bacteriological examination made in a case with lesions probably of a tuberculoid nature, as if it were an unusual procedure. Another who has recently begun to make such examinations, remarks, apparently puzzled, that he found cases that are obviously leprosy but that give negative smears. One has learned of an active clinic in which striking cases of the tuberculoid variety were classified as ordinary "nodular" simply because they had not been examined bacteriologically.

As regards technique, it seems that in some places to speak of the bacteriological examination brings to mind only the nasal smear; and at that, usually, smears made with a cotton swab used more or less blindly. Methods in use for obtaining material from skin lesions include blistering, and aspiration with a syringe. Of the "snip" method nothing will be said at this point. The "scraped-incision" method is often applied awkwardly and inefficiently. A radical departure from it that has been seen is to obtain serous and cellular material by scraping off the epidermis, and only the epidermis, from an area 0.5 cm. or more in diameter—with much discomfort for the patient and little chance of finding bacilli when they are few.* In the

* Two facts should be emphasised: *First*, that probably none of the active skin lesions is entirely bacillus-free, not even the leprides of neural leprosy, though in them it is often difficult or impossible to demonstrate bacilli by any available method. In many instances, as in new (reaction) lesions in cutaneous leprosy, or lesions almost cured, bacilli may be difficult to find by any standard method unless care is used in the examination, and with care they may sometimes be found in florid tuberculoid lesions that otherwise would be called negative. *Second*, that the leprotic infiltration is in the dermis, the epidermis and a thin layer immediately under it are uninvolved, as shown in Text-figure 1, so that when an infiltration is of slight degree the lesion-foci may be fairly deep, requiring considerably more than a superficial scratch to get to them.

examination of annular lesions material is sometimes taken only from the oldest part, the healed central area. The situation is such, one has come to feel, that attention should be drawn to it somewhat vigorously. Since the use of poor technique is due to lack of understanding of good technique, and since failure to make the examination freely, is probably due largely to an idea that the procedure is more or less difficult and disturbing, this paper is confined to a discussion of technique.

METHODS OF SKIN EXAMINATION.

For the routine, standard examination of skin lesions there are two widely known ways of obtaining smear material, namely, by excision and incision. The former involves removal of pieces of tissue, the latter requires only small simple cuts in the skin. Unusual methods and special procedures such as the aspiration of lymph nodes and the scraping of exposed nerves, need not be considered because none of them is suitable for a standard, routine examination.

1.—THE EXCISION METHOD.

Excision, done in one way or another, is the time-honoured method of obtaining material and the only one mentioned by older writers. The removed tissue has, of course, been dealt with in various ways, but evidently for many years the demonstration of bacilli was usually by histological sections, which made it more a research procedure than a routine measure. The first recorded effort to simplify the procedure of which the writer is aware was that of Alvarez, of Hawaii (1) who reported that he triturated the piece of excised tissue and smeared on slides the pulp so obtained. This method, though rather cumbersome, constituted a real advance because, as Alvarez pointed out, it permitted making a diagnosis in a comparatively short time, and it could be done by physicians who did not possess laboratory facilities.

The present-day survival of the excision procedure, essentially similar to that of Alvarez, is the snip method apparently devised by Muir, of Calcutta. This is described briefly in an appendix of the report of the Leonard Wood Memorial Conference (4) as follows :—

" . . . a small portion of the dermis, at least 2 millimeters thick, is nipped 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."

To meet the objection that this method of smearing spreads the material diffusely over too large an area of the slide, Lowe (2) holds the snip with forceps, raw surface uppermost,

and scrapes it with a knife, thus obtaining pulp with which a more concentrated smear can be made.

2.—THE INCISION METHOD.

The beginnings of this method are not known, but it was of course only a natural development to meet the needs of those seeking a simple, practicable method of getting bacteriological confirmation of diagnosis. The blister method was also evolved for this purpose, but it was much simpler and quicker to obtain material from a small incision.

Such a method had long been in use in Manila when, in 1916, the writer was assigned to the official diagnostic committee there. The local term for the examination as then made, was "examiner el sangre," and that was actually what was done; the material examined was chiefly blood or bloody lymph that exuded or was expressed from a small cut. As a rule the cellular material in such smears was so diluted and so spread over the slides that when bacilli were few or absent the examination was greatly prolonged, and even at that it is probable that many erroneously negative reports were made. In the following year the writer was in a position to modify the technique to essentially that now used, the "scraped-incision" variety of the so-called "slit" method. The following is a revision of published descriptions of it (6, 7). It is really simple and rapid, but attention should be given to the points discussed under "comments."

TECHNIQUE.

1. Cleanse the area to be examined by rubbing briefly though vigorously with a small cotton-wool sponge, wet with alcohol; soap and water, or even ether or gasoline may be used. Wipe dry with cotton-wool.

2. Pinch up the skin in a fold, applying enough compression to stop or minimise bleeding. When it cannot be actually picked up, compress it laterally as much as possible.

3. With a properly cleansed scalpel of suitable style and size make a small but real cut, 5 mm. or so long and deep enough (about 2 mm.) to get well into the infiltrated layer.

4. If blood or lymph exudes in any quantity wipe it off. With the knife-blade turned transversely to the line of cut, scrape the side and bottom of the cut repeatedly and with sufficient vigour to obtain a little actual tissue pulp from below the epidermis.

5. With the knife transfer the small amount of material obtained to a microscopic slide and make a uniform, moderately thick smear over a small area. Multiple smears from the same patient are best put on to a single slide.

6. For after-treatment of the cut the patient is simply given a bit of cotton-wool to compress it until oozing stops. No dressing is necessary. Though a wisp of cotton with collodion may be applied if desired.

Comments.—(a) The sites for examination should be selected with some care, choosing lesions that appear to be most active. Routine procedure does not include the examination of apparently normal skin, but it is well to recall that slight infiltration of the ear is difficult to detect and that apparently normal earlobes are sometimes found positive (3).

(b) It is often desirable to make *multiple smears*, one from each of several sites, for bacilli may be fairly numerous in one lesion and very few in another. A single negative smear means little, and it is only after repeated examinations that one is justified in declaring a case that is clinically suspicious or positive to be bacteriologically negative.

(c) One of the objectives of the cleansing is to avoid *contamination of the smear* by surface material. There may be free-living acid-fast bacilli on the skin, or fragments of fungus spores which may retain the stain. When getting the tissue pulp the epidermis should not be scraped.

(d) A possible source of error is *instrumental transfer* of bacilli from the smear of one lesion or patient to that of another. After the knife has been used it should be wiped clean with an alcohol-soaked sponge and heated in the direct flame sufficiently to destroy the bacilli, though the blade edge should not be burned.

(e) Nearly any kind of *knife* can be used, but the most satisfactory is a rather small, fairly full-bellied scalpel (see Text-figure 2, A). Interchangeable blades (Text-figure 2, B) are useful and may be economical but being less rigid they are on the whole less satisfactory. In scraping the incision (Text-figure 1), the knife should be held as one would a pencil but more vertically, and the effort applied more to the side of the cut than to the bottom.

(f) Twists or balls of *cotton-wool*, small for convenience and economy, preferably sterile, should be available in abundance. Alcohol-soaked ones are used in cleansing the skin and the knife, and dry ones for drying the skin, for wiping incisions when there is an excess of blood, and by the patient to stop oozing. Something into which to throw used cotton should be handy.

(g) Excessive *dilution of the tissue pulp* with blood should be avoided. The bacilli are mostly in the tissue itself and, while escaping blood may carry some of them with it, they are necessarily dispersed, and if they are few they may escape detection.

(h) Excessive *dispersion on the slide* is also a source of difficulty. Only a little pulp is required from a given skin spot*, and this should be concentrated in a small area (Text-figure 2). However, should a smear be too thin it is helpful to outline the smeared area with a wax pencil or even an ordinary pen, before the immersion oil is applied, so that it will be seen when the lens reaches the edge of the area. On the other hand *excessively thick smears* are to be avoided, especially if there is much blood in the material.

(i) When multiple smears are made they are best put on a *single slide* (Text-figure 2). Record is to be made of the source of each smear, but the individual smears need not be numbered; the first from the labelled end is always No. 1, and so on.

NASAL EXAMINATION.

The foregoing has only to do with the examination of the skin as required for diagnosis, clinical classification of cases, and evaluation of progress under treatment. In connection with the last, and also with administrative classification (*i.e.*, distinction between "open" and "closed"

* From a thick lepromatous lesion it is easy to obtain an abundance of pulp, often quite free from blood. From a lesion with little or no gross infiltration only a little pulp can be obtained without excessive scraping. It is in such cases that bacilli are apt to be few, and that it is particularly important to concentrate the material so that all of it may be examined.

cases), the nasal examination is of much value, though it should be considered a supplementary measure.

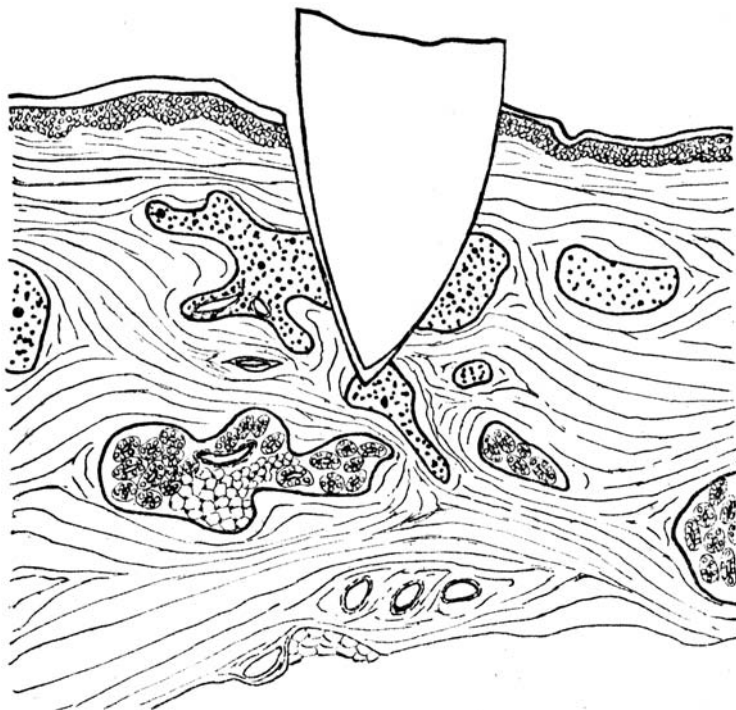


FIG. 1.—A semi-diagrammatic sketch showing the location of leprotic infiltration of slight degree, the proper depth of incision to reach it, and the position of the knife blade in obtaining tissue pulp.

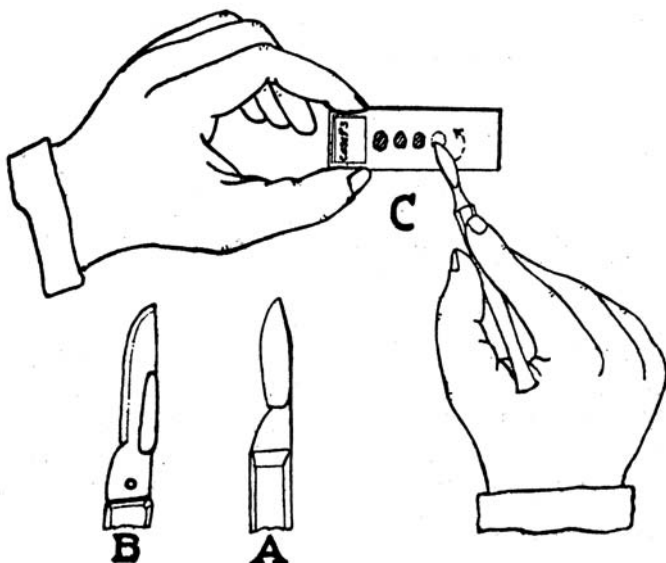


FIG. 2.—Showing A, a satisfactory scalpel for taking material (the size of blade indicated by the width of the handle), and, B, an interchangeable-blade knife that is also useful. In C is shown both the method of making the small, concentrated smear for examination, and of making multiple smears on a single slide.

With regard to the technique, if there is an unbroken mucous surface over a leprotic infiltration the bacilli may or may not be escaping at any given moment. Consequently, though a definitely positive finding in a smear of mucous swabbed from the surface is conclusive, * a negative finding is valueless. With the remark that both sides of the nose should be examined, the following is quoted from the appendix of the Memorial Conference report :—

“ 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.”

It may be added that it is often advantageous to wipe away mucous or other surface material before taking material for the smear. Also, that in a good light much can often be seen in the nose without speculum and head-mirror. The locations and appearances of the lesions that may be found cannot be recounted here (5).

DISCUSSION.

The main question that arises is how the incision and snip methods compare as regards practicability and efficiency. The writer's opinion, more and more firm as time passes, is that when properly applied the former is decidedly superior in simplicity and convenience for both physician and patient, and not inferior in efficiency.

Simplicity.—It is much easier to obtain the smear material by the incision method, and much simpler to deal with the little cut, which closes and really needs no dressing, than to dress a gaping scissors wound. Furthermore, only a scalpel has to be cleansed before the next specimen is taken.

Discomfort.—Done with any skill at all the incision technique involves much less discomfort to the patient than the other.

After-effects.—The incision has practically no after-effect ; it heals promptly, without infection, and usually without any perceptible scar even after repeated examinations. The snip-wound heals with a scar, and after a few examinations an earlobe, for example, may be conspicuously mutilated.

Practicability.—Smears may be made with the utmost freedom, from practically any site, including the alae nasae, nipple, and glans penis—regions that with most patients could not be examined at all by the more painful, mutilating method.

* Such a finding would not, by the way, be made on discovering a single bacillus or two that might be of a free-living, air-borne saprophyte.

Multiple and Repeated Examinations.—The advantage of being able to make at a given time smears from as many places as desired, and of repeating the examination as often as desired, is an important one. This is frequently seen in diagnostic work, but more generally in observing cases that have become negative under treatment.

Multiple Smears on a Slide.—The reduction of labour and time in staining and examining and the economy of material that is gained by the multiple method of smearing—at Culion 6 or 8 smears are regularly made on one slide, and often more—cannot be had when smears are made by either variety of the snip method.

Efficiency.—In comparative tests made by Lowe and Christian (3) it was found that the snip method was “slightly more efficient than the slit method.” It is granted that, specimen by specimen, this may be so; in view of the amount of tissue taken in a snip it would be rather surprising if it were not so when bacilli are few. But considering the limitations of that method as regards multiple and repeated examinations one must strongly question any claim for superiority, or even equality, on that ground.

With regard to the general question of the use of the bacteriological examination, it cannot be insisted too strongly that it is a clinical procedure, and an essential and simple one. Many men working with lepers have no bacteriological laboratory at their disposal, but any one who can examine sputum for the tubercle bacillus can make this examination. It is quite as simple, and many intelligent, conscientious ward and clinic helpers, both patients and others, have been trained to make it. It is to be hoped that it will not be long before no one will attempt to diagnose, classify or treat leprosy without routine use of this procedure, for until that time comes cases cannot be properly classified or the results of treatment properly evaluated.

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A Brief Review of the Eye, Ear, Nose and Throat Department at the National Leprosarium, Carville, Louisiana.

SPENCER B. MCNAIR.

EYE, nose, throat and laryngeal lesions are quite common amongst the patients at the National Leprosarium, Carville, La. The author has never seen an ear lesion (excluding auricle) which could be attributed to leprosy.

EYE.

The eye is often involved. Inflammatory lesions of the uveal tract are very painful and often lead to loss of sight.

In the treatment of lagophthalmos, several procedures have been followed with fairly good results. Lateral tarsorrhaphy was performed on four or five cases with a great deal of relief to patient. Lacrymation was less marked and the cornea was saved from undergoing further degenerative changes. Some of the patients object to this procedure when only one eye is involved. In such cases we have used the Kuhnt-Szymanowski procedure, as these patients happened to be elderly individuals. While the ectropion was not totally corrected relief was secured by shortening of the lower lid. The author had occasion to insert strips of fascia lata around the eyelids, passing under the internal canthal ligament and through the temporal fascia. This operation was done on two patients suffering from facial paralysis following mastoidectomy. In both cases relief was obtained. These patients were not sufferers of leprosy.

Our treatment of the infiltrated areas about the limbus has been mainly with the electric cautery. An area about one millimeter in width is cauterised. We are careful to destroy all conjunctival vessels in the involved area. Our cauterisation includes superficial layers of the sclera, being careful not to go too deep on account of danger of injuring the underlying structures.

Corneal infiltration is a major problem at our hospital. When accompanied by cyclitis or iridocyclitis we use atropine twice daily, salicylates for pain, and use some foreign protein for subcutaneous or intramuscular injection. Most of the patients receive relief from pain after use of the foreign protein and there is also a lessening of the inflammation. We have not used boiled milk on account of the reaction and pain usually associated with milk. We have

used the hemoprotein of Brooks, diphtheria antitoxin and Aolan, a milk preparation. We have favoured Aolan, as there is no rise in temperature, no pain associated with the administration and on account of its cheapness. Brooks hemoprotein has been of value but has to be given intravenously for best results.

Intraocular surgery, where there is an associated uveal lesion, has been disappointing. At first the result is good but soon a plastic exudate is observed occupying the operated area. After several operations followed by the irido cyclitis attacks, the eye-ball begins to atrophy, with its disastrous consequences.

Subconjunctival injections of epinephrine hydro-chloride followed by administration of powdered atropine has been found of value in cases of chronic irido-cyclitis.

Cases of chronic keratitis are fairly numerous and are a problem on account of the damage to vision. We have used gold sodium thiosulphate intravenously, foreign proteins and instillations of 20 per cent. chaulmoogra oil and dionine into the conjunctival sac. We believe our results have been better from the use of dionine than other agents.

Cataract operations where there is an associated uveal lesion have not been beneficial. One patient with cataracts, not associated with leprosy, was operated on, and sees 20/30 with corrective lenses. This patient is about thirty-five and was admitted to the hospital with cataracts.

Nose.

Many patients suffer with nasal lesions. Septal perforation, lepromatous growths of septum and inferior turbinate body, ulcers and accumulation of dried blood, pus and desquamated epithelium are the common nose lesions met with. Several patients have represented a complete stenosis of the nasal passage from firm fibrous adhesions at the site of an old ulcer. A few cases of facial paralysis have been troubled by collapse of the alae. Another group suffer from atrophy of the alar cartilage.

Lepromatous lesions of septum and turbinate have been most successfully treated with the electric cautery. We destroy all visible lesions which gives the sufferer immediate relief and subsidence of nasal bleeding. Following cauterisation, the patient receives treatment twice daily with 30 per cent. chaulmoogra oil in olive oil or chloretone inhalant. The chloretone or chaulmoogra is used as a spray. We have not found solutions of ephedrine as useful as the chaulmoogra or chloretone. Nearly two hundred patients report

twice daily for their nasal treatment. The spray removes any crusts or secretions in the nose and the freer breathing is gratifying to the sufferers.

At first nasal stenosis was a problem because of the recurrence of more scar tissue following operation. We now remove the affected turbinate bone, including remains of the middle and inferior. Following the operation the patient wears a rubber tube for four to ten weeks. After healing has occurred the tube can be removed and we have not noted any recurrence of the trouble after two years.

Infection of the lacrymal sac is included under the nose as we make an opening into the nose following removal of the sac. The operation has been performed on about a dozen cases. After removal of the sac by the external route, we make an opening into the nose by means of a mastoid curette. The external wound is then closed. Patients so treated have been entirely cured of any further trouble from the lacrymal region. Those who did not have the nasal opening continued to discharge pus into the conjunctival sac.

THROAT.

Tonsillectomy has been performed on about seventy-five patients in the past four and a half years. We use local anæsthesia exclusively. Healing is as prompt as in non-leprous patients. Secondary hemorrhage occurs about as frequently as one finds in a non-leprous patient. We give our prospective tonsillectomy cases calcium lactate a week before operation. A number of our operative cases have been free or practically free of "nerve pains" since operation, showing that the tonsils do act as a focus in a number of instances. We do not perform tonsillectomies on patients who have marked laryngeal or pharyngeal involvement.

LARYNX.

Laryngeal involvement is distressing and at times fatal. The patients showing laryngeal involvement are advanced cases and usually show numerous lesions about the body including the oro and the hypopharynx. Involvement of the epiglottis and the posterior commissure are the common sites of the lesions. We have used the electric cautery on ulcerated areas. Applications of silver nitrate to the affected area and the daily use of sprays to the affected part are beneficial. When there is marked obstruction tracheotomy is resorted to. Light therapy to the neck has been tried without benefit. We are now trying light therapy through the mouth.

EAR.

As stated at the beginning of this paper we have not seen any lesions of the external auditory canal, middle or internal ear, that we could attribute to leprosy. Our most common lesion is the middle ear abscess which is secondary to nose or throat lesions. Obstruction of the eustachian tube is sometimes met with, secondary to lesions in the nasopharynx.

We have performed five mastoidectomies in the past four and a half years. One patient was suffering with a lateral sinus thrombosis which required ligation of the jugular vein and opening of the affected part of the sinus. The convalescence in the mastoid cases was uneventful. Local anæsthesia was used on all cases.

PLASTIC SURGERY.

One patient suffering with a bilateral facial paralysis was treated by inserting a strip of fascia lata in each side of cheek and elevating the lower lip. He can now voluntarily close his mouth and is not worried by the saliva flowing from the mouth.

A few nasal deformities have been treated by inserting sections of rib in the affected area. At first the result was good but later there was an absorption of bone and cartilage and a return of the original deformity. We are now using animal ivory which we hope will be of some benefit.

The author has briefly summarised his work at the National Leprosarium during the past four and a half years. During that time about fifty thousand examinations were made by the author. All the lesions met with in private practice are encountered plus the lesions peculiar to leprosy. At first, we would become enthusiastic when some new treatment was recommended which was said to be curative, but after considerable experience we can truthfully say that the disease in its many manifestations is as puzzling as ever.

Note.

We find that "LEPROSY REVIEW," Vol. II., No. 4, is out of print. If any readers would be willing to return their copies of this issue, we should be very grateful.

Leprosy in the West Indies.

R. G. COCHRANE.

THE tour which was made recently through the West Indies revealed one or two most interesting facts. The two chief points which might be referred to briefly in passing, are firstly that the incidence of leprosy seems to go *pari passu* with the economic condition of the country and, secondly, from superficial observation, there seemed to be a racial factor influencing the type of disease seen in individuals. For instance, in Trinidad, where the East Indian population has been domiciled from the time of the repeal of the Slavery Act, Dr. Urich, the Medical Superintendent of the Chacachacare Leprosy Settlement, pointed out that the Indian almost invariably acquired a type of the disease which was different from the African, and, generally speaking, the negroid races showed much more severe cutaneous manifestations than the Indians.

The following notes are a short summary of the reports which have been forwarded to the various Governments concerned :—

JAMAICA.

Jamaica, the largest of the Islands, has a population of approximately 858,118, consisting of 14,473 white, 157,223 coloured, 660,420 black, and an East Indian proportion of 18,610. The remaining population consists of Chinese and other nationalities. These figures are from the census taken in 1921. At the end of 1922 the total population was 1,073,493. The island has been in British occupation since the seventeenth century. In 1896, the Leper Asylum Law was promulgated. This made provision for isolation of two kinds of cases : (a) the sufferer from leprosy who was unable to take care of himself ; (b) the pauper who was discovered begging or exposing himself in the public streets. So long as a case of leprosy was able to maintain himself in private and was not allowed to be at large, then on giving security in a bond of £20 the case was not transferred to the Asylum. The Leper Asylum Law therefore only makes provision for the isolation of such persons suffering from leprosy who are fit subjects for gratuitous relief, or who are unable through poverty to provide themselves with proper medical attendance and the medicine and diet suitable for this disease. Since the promulgation of the law, the admissions to the Asylum have been maintained at a level of about 120. At the end of 1933 there were 119 inmates, 56 females and 63 males, and a death-rate of 9.3%. In 1933, the total

discharges were 14 ; in 1931, 5 ; and in 1932, 2. During the period under consideration the population of Jamaica has increased considerably, and within the last decade the increase has been about 300,000.

Leprosy is probably more or less stationary in Jamaica. There is certainly no evidence of its increasing, and if one takes into consideration the considerable increase of population over the past decade, then it would be legitimate to conclude that the incidence of the disease is actually diminishing. The economic condition of Jamaica compared with the other islands, is comparatively good, the population is fairly highly civilised and there is not the same evidence of acute distress as there is in certain of the other islands. It is largely for these reasons that leprosy has become a problem which is not of as great a magnitude, as for instance, tuberculosis and yaws. The former disease is extremely rife throughout Jamaica, and the Government is concentrating on this problem. While it is evident that leprosy is not a serious problem in the island, there is reason to believe that there are certain foci of the disease which need attention. A glance at the map of Jamaica will indicate very clearly that there are certain parishes in which practically no cases have been reported. On the other hand, there are other parishes from which numerous cases have arisen from time to time. It is natural to find that around the larger towns such as Kingston, a greater number of cases arise. The reason for this is that the indigent pauper case tends to drift from the country into the towns. Furthermore, as a result of the crowding together in the poorer districts of the towns and the economic condition which ensues, the environment is more favourable for the spread of the disease.

It was concluded as a result of the examination of the areas from whence cases had been reported, that there were certain definite foci which might be more thoroughly investigated. For the purposes of such an investigation it was considered that any district from which three or more cases had arisen represented a possible focus, and as many of these areas came under the purview of those dealing with the problem of tuberculosis, it was thought possible that leprosy and tuberculosis in these areas might be considered together, for the methods for combating tuberculosis are similar to those for dealing with leprosy, especially with regard to propaganda, the raising of economic conditions, etc.

It was impossible in the time at one's disposal to examine

school children in these areas, and therefore, it was difficult to ascertain the incidence of the disease among such children.

As stated, the Leper Asylum Law only makes provision for the indigent case and therefore, those who are able to look after themselves do not need to be isolated. How far general practitioners treat the disease is difficult to ascertain, although I met quite a number of practitioners in Kingston at a lecture which was given there, and from talking with them and others, it is evident that it is not a disease which practitioners treat frequently. The Leper Asylum Law may need some modification, but before any such modification can be made, it would be essential to discover as far as possible, in more detail, the endemic foci. As the disease is not of undue importance, it is, in my opinion, unnecessary to develop a widespread campaign or organised anti-leprosy measures throughout the island. There are, however, two methods by which further information could be amassed on the results of which a policy could be shaped. Firstly, in so far as tuberculosis is a cognate subject, the tuberculosis officer might be given instructions quietly to watch for cases of leprosy. This is the easier, as all contacts of existing cases of tuberculosis are examined, and therefore it would not be unduly difficult to keep a watch for cases of leprosy. This pre-supposes that the officers concerned are able to diagnose cases of leprosy in the early stages. To this end it might be advantageous to acquaint such officers through existing pamphlets of the essentials of early diagnosis. It would be still more valuable if an officer were sent to Trinidad, or British Guiana, in order that he might become acquainted in more detail with the methods of early diagnosis, treatment and prevention of leprosy. It would be necessary, however, to warn those officers in the parishes from which cases would probably appear, not to become alarmed because of the existence of early cases, and that it is only the open case which needs to be considered a public health danger. It is impossible in an article of this nature to expand on this subject. In addition, in parishes where the disease appears to be endemic, propaganda in schools through health authorities could gradually be developed. Again, as leprosy and tuberculosis are transmitted in a similar fashion, such propaganda could be linked up with that on tuberculosis. In this way, excessive propaganda could be controlled. In fact, if the officers on the tuberculosis campaign could be persuaded to include leprosy in their work, it probably would be the simplest means of combating the problem.

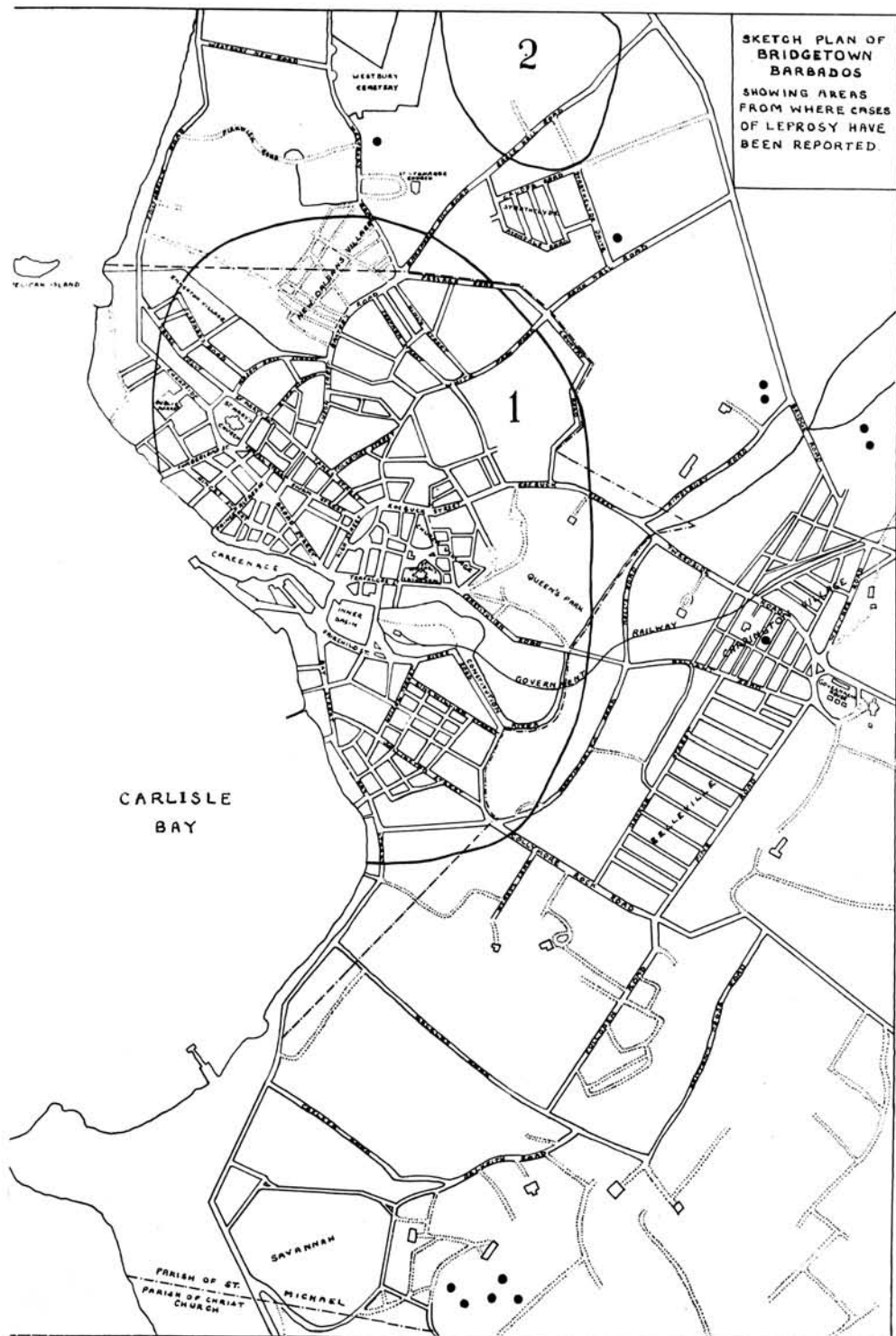
In view of the fact that the notification of leprosy does not on first sight appear to be resulting in the necessary information, it is suggested that all practitioners and medical officers be reminded that leprosy is a notifiable disease and that it would be permissible to notify such cases in a confidential manner, giving the number of cases, age and sex and district in which such cases were discovered, without stating name or other details. If the practitioners were encouraged to notify the disease in such a manner and confidentially along similar lines of notification as venereal disease in England, it might be an incentive to them to declare cases in their charge and so more accurate information might be available. If, as a result of these methods, a definite focus or foci of the disease were established, the next step in the prevention of leprosy would be to set apart an officer specially trained in early diagnosis with an all-round knowledge of the disease to commence a special detailed survey. It might be difficult to find an officer especially trained in the diagnosis of early leprosy and, therefore, if there were indications that the foci noted in this report were of importance, it would probably be worth while to send a medical man to Trinidad to have such training. If, however, it were found that no really important focus existed, then the machinery of leprosy control probably could be taken over by the tuberculosis department, if this suggestion were approved. General propaganda would probably be unwise, but in any area where leprosy is endemic, propaganda to combat the existing prejudices might be valuable. The belief about leprosy among the general public is that it is not a contagious disease, but that it is a blow from Heaven, and therefore the average individual, particularly the black population, takes no precautions whatever if he should come into contact with the disease. How far and to what extent any propaganda should be undertaken would depend on the result of the investigations suggested in this memorandum. It is impossible to make recommendations as to whether the Lepers' Home is situated in the right place, but if it were found out at a later date that more cases were being discovered, say in the Parish of Trelawny, then it would appear more reasonable to place an institution of the colony type with plenty of ground for cultivation in such an area, for it is always a difficulty to persuade cases to go into isolation a long way from the place where they live.

The general conclusion come to was that leprosy is not a disease which needs undue emphasis, and it will probably

MAP OF JAMAICA

SHOWING AREAS FROM WHERE
CASES OF LEPROSY
HAVE BEEN REPORTED





Area 1.—25 CASES OF LEPROSY REPORTED.
Area 2.—27 CASES OF LEPROSY REPORTED.
●.—REPRESENTS ISOLATED CASE REPORTED.

in the course of the next few decades, gradually disappear from the island. If the investigations are undertaken along the lines indicated, further information will be acquired concerning the disease and better methods of control will gradually be evolved.

BARBADOS.

The Island of Barbados is the most densely populated island in the British West Indies. It has a territory of approximately 166 sq. miles. The population in 1932 was 176,874. Its greatest length is 21 miles and its greatest breadth 14 miles. The average density is over 1,000 per sq. mile. The greatest density is in the parish of St. Michael, which has over 4,000 souls to the sq. mile.

Barbados has been in continuous occupation by the British since 1605. Leprosy has probably been an endemic disease from the time the island was settled until the present time. There seems, however, to be no doubt that the disease is at present on the decline. Further, it appears, as will be shown later, that there are only one or two foci which are of importance from the public health standpoint. This is shown by the fact that during the past ten years (1924-1934) the number of inmates in the home has fallen from 173 to 75.

The Leprosy Act lays down that every case of leprosy must be isolated either in the home on the outskirts of Bridgetown or else in such a fashion that the individual is completely isolated from the community in a house of his own. The criterion of such isolation, and for that matter for the diagnosis of leprosy, is based on the discovery of bacilli in the nasal mucous membrane.

In addition to the 75 inmates in the home there are 55 discharged inmates receiving monthly allowances and one case in private isolation. During the past 11 years, 85 cases have been discharged. It appears that there is considerable apprehension on the part of the general public regarding these cases, and it is well to emphasise the fact that cases discharged from the asylum with appropriate certificates are no longer a danger to the public and can be admitted into employment without endangering any community. There is a list of prohibited employments in which such persons cannot indulge. This might well be revised, for the more such patients are encouraged to return to ordinary life in the community, the less likely are they to relapse. Those cases, however, which are crippled and cannot find employment should probably remain in the home, or when

they are discharged from thence passed over to the Poor Law for maintenance.

The Leprosy Home is situated outside Bridgetown and, as has been stated, has a population of 75 inmates. It is kept tidy and the wards are clean. The type of construction gives it a prison-like appearance, but the authorities have endeavoured to overcome any such suggestion by providing recreational and gardening facilities. In addition to the men's and women's wards there is a section for better-class patients who are charged 5 dollars per month. The Medical Officer has had no special training and visits the Institution three times a week. Treatment is carried out by means of injections of alepol in a 3% solution. This is given intramuscularly, and chaulmoogra oil in a dose of 10 mm. is given twice a day. There is apparently no local treatment for the skin lesions. The Medical Officer visits the Institution regularly and performs his work to the best of his ability. He has, however, had no special training in leprosy. It has been suggested that it might be well to send him to Trinidad for a course of instruction. It is impossible adequately to treat the inmates or superintend the medical work of the institution unless the doctor in charge has acquired a special knowledge and, in the case of the Medical Officer who has other work to do, such knowledge is difficult to acquire unless he be sent to some institution for special training. Considering the size of the problem in Barbados, I am of opinion that the present institution for isolation of cases is adequate for the needs of the country.

As stated previously, the disease appears to be disappearing from the island and no longer needs to be considered as an endemic disease of any great importance; even so, the day when the disease disappears completely from the island could be considerably hastened if definite evidence of a focus or foci of the disease were discovered. It is naturally easier to deal, from the public health standpoint, with a disease which exists in certain areas than with one which is scattered uniformly throughout the country. As leprosy very seldom is found to be distributed evenly over a country, in all probability a focus or foci of the disease exists in Barbados. In order to ascertain whether such a focus existed, I had enquiries made along the following lines:—

- (1) The districts from which the last 100 admissions into the home came;
- (2) The addresses of the discharged inmates from 1930-1934.

As a result it was discovered that certain parishes have either only one or two cases reported or none at all. These are as follows :—

		<i>Discharged Inmates.</i>	<i>Inmates in Institution.</i>
St. Andrew	...	0	0
St. Thomas	...	0	1
St. Peter	...	1	1
St. Lucy	...	1	2

These parishes then need not be considered from a public health standpoint and no measures need be taken with regard to the control of leprosy.

Of the other parishes that of St. Michael has by far the heaviest incidence of leprosy, and the others of importance are apparently Christ Church, St. Philip and St. James. The figures are as follows :—

		<i>Discharged Inmates.</i>	<i>Inmates in Institution.</i>	<i>Total.</i>
St. Michael	...	37	51	88
St. Philip	...	6	8	14
St. James	...	9	3	12
Christ Church		6	22	28

All the cases from the St. Michael's parish appear to be coming from in and around Bridgetown, and the cases from Christ Church from the Coastal belt. I have endeavoured to make a spot map of the Parish of St. Michael showing from whence the cases are reported, and on examination it will be found that the chief areas which appear to be of importance are the following :—City area, Black Rock, Eagle Hall and Cave Hill, Carrington Village, St. Matthew and Greenhill. In the parish of Christ Church, cases are being reported (1) from Hastings and St. Lawrence, and (2) from Maxwell, Kendal Hill and Lowthers.

It, therefore, should not be difficult to examine contacts of the cases arising in this parish and to make a survey of the school children in an endeavour to find out where the disease is appearing during the early years of life. Further, if a number of non-infectious active cases were discovered, it should be fairly simple to organise some kind of treatment and observation centre for such individuals.

Owing to the favourable situation of Barbados, its equable climate and its general economic standard, one can confidently conclude that in the course of the next few decades leprosy should have been eliminated from the island.

Further Report on Bunyonyi Leprosy Colony, Kigezi, for 1933-4, with Statistics.

L. E. S. SHARP.

THE activities and scope of the anti-leprosy measures, undertaken by the colony, have made great progress during the last twelve months. This has been due to :—

1. Increasing numbers of admissions to the colony.
2. The greatly increased assistance given by the Government in grants and native labour.
3. The addition to our staff of Miss Forbes, who is a trained and experienced teacher, as well as Miss Martin, who has been acting Matron of the hospital during Miss Langley's absence.

There were two hundred and twenty-two fresh admissions during the last twelve months, thus increasing the total from 300 to 522 by April, 1934. This increase has proportionately increased the work of the Hospital, in the way of injections, dressings and general treatment; in addition to the management of hygienic measures necessary in administering and caring for so large a number of semi-invalid persons. During 1933-34 the Kigezi administration built 35 grass huts for newcomers, and this year have undertaken to supply the labour for building 35 more permanent and hygienic huts to replace old grass ones. These huts are being constructed of brick and thatched with papyrus. Last September, a hurricane tore a part of the roof from the hospital; this has been repaired and the Hospital generally renovated. The extra land, reclaimed from the wild pig, granted to the colony last year for purpose of cultivation, has been much appreciated, and half of it is already under excellent crops. This year, provision for pasturage for flocks and herds, on the neighbouring island of Bushara, has made the inmates even more contented. To make provision for the future for firewood, etc., some 50,000 eucalyptus trees have been planted.

On September 5th, 1933, His Excellency and Lady Bourdillon visited the colony to open the new school buildings. There are now over 100 children in this school, under Miss Forbes and a staff of six teachers, half of whom, are inmates in the colony. The Government E.V. Syllabus is followed, for which purpose the school is divided into

seven classes. Most satisfactory progress has been made both physically and mentally. Of 100 children, 33 have become arrested during the year, a most gratifying result. The need of a home for untainted children has been felt for some time, owing to the susceptibility of young children to infection from their parents. (We have a well developed case *only six weeks old*!) This has been provided through the generosity of a supporter of the Mission to Lepers, and the building is now completed, consisting of two dormitories, a nursery playroom, and the necessary service quarters. It has been built on an ideal site, on the top of a hill well above the regular village life of the colony. Here we have planned to admit all children under five not infected, and are getting them as early as possible. It is found that the chances of children becoming infected by their parents is very great. There are 34 babies under five in the colony already infected, and perhaps 26 under five still uninfected. So that 57% of children become infected before five years of age, and probably 75% eventually, if not separated. The difficulties of getting the parents' consent is not inconsiderable, and tact and patience are needed.

Sixty visitors have inspected the colony during the year, including the following Government officials:—the Assistant Chief Secretary, the Director of Medical and Sanitary Services, the Assistant Director of Medical and Sanitary Services and the Provincial Commissioner. The colony has enjoyed the continued co-operation and assistance of the local Administration, which is doing much to further the purposes of the colony. These anti-leprosy measures would be made still further effective and permanent were some of the native chiefs more capable, and their influence more respected by the peasantry in parts of the district where there still remains a great deal of leprosy.

There is one matter which, if rectified, would have a most beneficial effect on the whole question of leprosy in this district. It will be noted from the statistical sheets as follows:—

1. That at least 60% of children of lepers become infected while they are *little children*.
2. One-third of the population here are children under 16.
3. That of these children 75% are in the category C1 and N1, *i.e.*, early or mild cases.
4. That among 194 C1 and N1 cases in the colony, 43% became arrested during the year.

5. That of all arrested cases during 1933, *i.e.*, 90, 92% were C1 and N1 cases.

With these figures in mind, it is indeed a tragedy that parents are allowed to *prevent* their children from coming into the colony. Yet hundreds of such parents are preventing their children, who are early cases, from a *very fair chance of recovery* and good health for purely selfish reasons, such as the excuse so often heard, "I need them to fetch water for me, and to collect my firewood." The Regulation permitting infected adults to live among the healthy, infecting their neighbours and children, will, I suppose, not be altered at present. But could not a modification be introduced, to the effect that where infected children are found, their parents or guardians may *not* prevent their admission to a colony, which is efficiently run to the satisfaction of the Government? It would seem that the statistical evidence we possess justifies some such modifications; and general considerations of Infant and Child Welfare demand no less. Such a modification would also indirectly provide just that added incentive to infected parents to migrate to the colonies, which is so desirable and beneficial to all concerned.

This suggestion is earnestly commended to the Committee's support, with a view to being recommended for consideration to His Excellency the Governor.

NOTES ON COMPILING OF STATISTICS.

Classification.—The inmates for convenience have been divided into the following classes:—

1. C1 and N1 or a combination of both, which comprise all early cases and mild infections.

2. C2 and C3, all severe cutaneous infections.

3. N2 and N3, nerve cases of long standing or extensive nerve infection.

4. Mixed 2 and 3, severe cases, including heavy infection of both kinds.

Results of Treatment.—It is often very difficult to estimate with accuracy as to whether any particular case is improved or not, or again, arrested or not. Most of the early cases are negative microscopically, and every case is not susceptible to measuring of the lesions. The results have been arrived at as far as possible by measurement of lesions, and general health has also been brought into consideration. It is hoped that the large numbers observed in each type, and with each form of treatment will, however, outweigh any uncertainty which may have existed in estimating the result in a few of the cases.

Extent of Treatment.—My statistics for last year were perhaps open to one criticism, in that I did not differentiate between those who had received many injections of, say, alepol, and so had been adequately influenced by the drug, and those cases which received few injections. I have, therefore, following the example of other workers as reported in the LEPROSY REVIEW, divided the results of treatment in each case into three categories :—

1. Cases treated with many injections.
2. Cases treated with few injections.
3. Cases treated without any specific injections.

In this way it would seem possible, not only to observe which cases did better on alepol, for example, or those without injections, but also whether increasing the number of injections would improve the aggregate results ; and so a double check on the effect of any drug can be obtained. The cases are divided under types, and also under five different courses of treatment :—

1. Alepol.
2. Hydnocreol.
3. Brilliant Green.
4. Mixed courses of the above.
5. No specific injections.

Again, 1, 2, 3 and 4 are subdivided into many or few injections.

As will be seen from the types treated, a fair number of every type has been treated with each of all five courses, and the cases have not been specially selected in any way.

Total numbers in Colony, 25/4/34 : 522.

Total under treatment 3 months and over, surveyed 1933-34 : 396.

Died ...	13 = 3%	Improved ...	180 = 46%
Worse ...	33 = 8%	Arrested ...	90 = 23%
Stationary	80 = 20%		

Ages and sexes of inmates (405) :—

	Males	Females	Totals.
Infants (1—4) ...	12	22	34 = 8%
Children (5—15) ...	58	37	95 = 24%
Young Adults (16—30) ...	78	47	125 = 31%
Middle aged and old (30—70) ...	86	65	151 = 37%
Total ...	234	171	405
	57%	43%	

Types of Leprosy :—

G1 and N1	...	194	(mild nerve and cutaneous)	48%
G2 and C3	...	57	} 120 } (advanced cutaneous) 29% } 154 (advanced nerve) 38%	14%
G2, C3, N2, N3, Mixed	...	63		15%
N2 and N3	...	91		23%

Types Arrested :—

N1 and C1	83 = 92%
N2 and N3	6 = 7%
Mixed ...	1 = 1%
<hr/>	
	90
N1 and C1	194 Mild cases
	83 Arrested = 43%

Total results of treatment with and without specific injections

(a) Total treated with many specific injections	...	...	201
Worse ...	23 = 11%	Improved	98 = 49%
Stationary	46 = 23%	Arrested ...	34 = 17%
(b) Total treated with few specific injections	...	...	125
Worse ...	9 = 8%	Improved	56 = 45%
Stationary	27 = 21%	Arrested ...	33 = 26%
(c) Total treated without specific injections	57
Worse ...	1 = 2%	Improved	26 = 46%
Stationary	7 = 12%	Arrested ...	23 = 40%

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TREATED ON ALEPOL.—RESULTS.

Treated on few injections alepol (1—8) exclusively. Cases : 92.
N1 and C2 cases : 42.

Results : Worse ...	1 = 2%	Improved	8 = 19%
Stationary	11 = 26%	Arrested	22 = 53%

N2 and N3 cases : 23.

Results : Worse ...	2 = 9%	Improved	17 = 74%
Stationary	3 = 13%	Arrested	1 = 4%

Treated on few injections alepol (1—8) exclusively.
C2 and C3 cases : 15.

Results : Worse	3 = 20%	Improved	7 = 47%
Stationary	5 = 33%		

Mixed N2 and N3, C2 and C3 cases : 12.

Results : Worse ...	2 = 17%	Improved	7 = 58%
Stationary	2 = 17%	Arrested	1 = 8%

Treated on many injections alepol (8—30) exclusively. Cases 103.
N1 and C1 cases : 42.

Results : Worse ...	2 = 5%	Improved	13 = 31%
Stationary	17 = 40%	Arrested	10 = 24%

N2 and N3 cases : 26.

Results : Worse ...	3 = 11%	Improved	14 = 54%
Stationary	6 = 24%	Arrested	3 = 11%

C2 and C3 cases : 12.

Results : Worse ...	2 = 17%	Improved	7 = 58%
Stationary	3 = 25%	Arrested	0

Mixed cases C2, N2, C3, N3 : 23.

Results :	Worse ...	8 = 35%	Improved	12 = 52%
	Stationary	3 = 13%	Arrested	0

Treated exclusively on few injections alepol : 92.

Results :	Worse ...	8 = 9%	Improved	39 = 42%
	Stationary	21 = 23%	Arrested	24 = 26%

Treated exclusively on many injections alepol : 103.

Results :	Worse	15 = 15%	Improved	46 = 44%
	Stationary	29 = 28%	Arrested	13 = 13%

Treated exclusively on alepol : 195.

Results :	Worse	23 = 11%	Improved	85 = 44%
	Stationary	50 = 26%	Arrested	37 = 19%

Treated exclusively on few injections (1—8) hydnocreol : 9.

Results :	Worse ...	0	Improved	6 = 67%
	Stationary	1 = 11%	Arrested ...	2 = 22%

Treated exclusively on many injections (9—30) hydnocreol : 24.

Results :	Worse ...	1 = 4%	Improved	17 = 71%
	Stationary	4 = 17%	Arrested	2 = 8%

Treated exclusively on hydnocreol : 33.

Results :	Worse	1 = 3%	Improved	23 = 70%
	Stationary	5 = 15%	Arrested	4 = 12%

Treated exclusively on few injections (1—8) Brilliant Green : 16.

Results :	Worse ...	0	Improved	8 = 50%
	Stationary	2 = 13%	Arrested	6 = 37%

Treated exclusively on many injections (9—30) Brilliant Green : 9.

Results :	Worse ...	1 = 11%	Improved	4 = 45%
	Stationary	1 = 11%	Arrested	3 = 33%

Treated exclusively on Brilliant Green : 25.

Results :	Worse	1 = 4%	Improved	12 = 48%
	Stationary	3 = 12%	Arrested	9 = 36%

Treated on few mixed injections (1—8). Total 8.

Results :	Worse	1 = 12%	Improved	3 = 38%
	Stationary	3 = 38%	Arrested	1 = 12%

Treated on many mixed injections (9—40). Total 65.

N1 and C1 cases : 24.

Results :	Worse	0	Improved	7 = 29%
	Stationary	1 = 4%	Arrested	16 = 67%

N2 and N3 cases : 16.

Results :	Worse ...	1 = 6%	Improved	9 = 56%
	Stationary	6 = 38%	Arrested	0

C2 and C3 cases : 15.

Results :	Worse	3 = 20%	Improved	8 = 53%
	Stationary	4 = 27%	Arrested	0

C2, N2, C3, N3 cases : 10.

Results :	Worse	2 = 20%	Improved	7 = 70%
	Stationary	1 = 10%	Arrested	0

Total cases treated by mixed injections (9—40) : 65.

Results :	Worse	.. 6 = 9%	Improved	31 = 48%
	Stationary	12 = 18%	Arrested	16 = 25%

Treated without specific injections : 57.

N1, C1 cases : 46.

Results :	Worse	0	Improved	20 = 44%
	Stationary	4 = 8%	Arrested	22 = 48%

N2, N3 cases : 4.

Results :	Worse	...	0	Improved	3 = 75%
	Stationary		0	Arrested	1 = 25%

C2, C3 cases : 2.

Results :	Worse	...	0	Improved	2 = 100%
	Stationary		0	Arrested	0

C2, N2, C3, N3 cases : 5.

Results :	Worse	1 = 20%	Improved	1 = 20%
	Stationary	3 = 60%	Arrested	0

Total treated without specific injections : 57.

Results :	Worse	1 = 2%	Improved	26 = 46%
	Stationary	7 = 12%	Arrested	23 = 40%

OBSERVATIONS ON STATISTICS.

1. The results of treatment in the Colony for 1933-34, taken as a whole, are quite as encouraging as last year. They show a low death-rate, and a large percentage of improvements and arrests.

2. The high percentage of children affected and the large number of arrests among them have already been commented on elsewhere in the report.

3. Forty-eight per cent. of all cases are C1 and N1, and of these 43% shew arrest.

4. In providing an adequate number of controls, as explained above, it is hoped that the statistics will be of greater value than uncontrolled figures.

5. Taking each treatment separately, it seems generally to apply that there is little to choose in efficacy between the drugs tested, and that comparative results suggest that the fewer the injections the more favourable the result.

I do not claim that this is actually the case, but it suggests that the value of these drugs has often been over-estimated, and will in time be found to be limited to certain types of case.

Treatment of Nerve Reaction.

DONALD P. DOW and JOHN S. NARAYAN.

THERE is perhaps no problem in the therapeutics of leprosy so perplexing as the treatment of lepra-reaction. In this article we do not wish to consider the question of treatment in general, but merely one of the accompaniments of the reaction, namely, neuritis. It may or may not be accompanied by fever or thickness of nerve. In severe cases it may terminate in nerve abscess.

The pathology of nerve infection in leprosy is sufficiently well known as to need no description, but from the clinical aspects we can roughly divide the cases into two classes.

(i) Destruction of the nerve. This type of case naturally is not amenable to treatment, though palliative treatment may benefit the general conditions of the muscles, or prevent total destruction of the nerve where the damage is only partial.

(ii) Infection of the nerve without destruction of its essential structures. This is the type of case which should respond to treatment, if treatment is considered as of any avail. We can divide this class into three sub-divisions according to signs and symptoms, and the following division fits in quite well, according to the type of treatment and the response to that treatment.

(a) Acute type of reaction : The patient feels ill, may or may not have temperature, the affected nerve or nerves are acutely painful and tender. The affected nerves are thickened though often not markedly so. The condition is an acute inflammatory one and ends in resolution or, in very severe cases, in abscess formation.

(b) The sub-acute type : The signs and symptoms are similar to the acute type, though less severe in onset and course.

(c) Chronic type : This usually occurs in late nerve type as the result of secondary changes taking place in the nerve tissue, resulting in destruction of the nerve. The nerve is felt as a thick fibrous cord and is tender on pressure. There is pain probably trophic in origin, very persistent, usually afebrile. This pain is probably due to the pressure of the contracting fibrous tissue in the nerve sheath.

These types are well known to leprosy workers and are common in leprosy hospitals. The treatment may be along two lines :—

(1) Drugs. (2) Diathermy.

We will not discuss the merits of diathermy here, though

all cases here, at some stage, are under that line of treatment. Suffice it to say that according to our experience diathermy is definitely contra-indicated in the acute type of nerve reaction, as it aggravates the condition. The result in the other types we hope to be able to record on some future occasion, nor need we discuss in detail the various drugs which are given during the acute stage to bring relief, though we should like to describe one form of drug treatment which has proved very beneficial, namely, intradermal injections along the course of the nerve. One to 4 c.c. of hydnocarpus oil, or its esters, are injected intradermally along the course of the nerve, the injected sites being 6 to 10 mm. apart. The same is repeated three or four days later, if pain and tenderness are still present, though in the majority of cases improvement is marked. The drug is never injected into the nerve. All the cases in the series were males.

The following Tables show the results in cases :—

TABLE I.

(1) No.	(2) Age	(3) Nerve	(4) Type	(5) Thickening	(6) No. of Injections	(7) Result	(8) Period without recurrence of symptoms up-to-date
1	30	L.U.	A.	Slight	2	Good	7 months
2	25	R.U.	A.	"	2	"	5 "
3	25	L.U.	A.	Moderate	1	"	5 "
4	28	R.U.	S.A.	Slight	2	"	2 "
5	30	R.U.	A.	No thickening	2	"	3 "
6	40	R.U.	A.	Slight	2	"	5 "
7	20	R.U.	A.	"	2	"	2 "
8	25	R.U.	A.	"	2	"	2 "
9	30	L.U.	C.	Moderate	2	"	2 "
10	23	L.U.	S.A.	Slight	2	"	3 "
11	30	R.U.	S.A.	"	2	"	2 "
12	35	R.U.	C.	Moderate	3	"	4 "
13	22	R.U.	C.	"	2	"	6 "
14	20	R.U.	C.	"	2	"	4 "
15	30	L.U.	A.	No thickening	2	"	1½ "
16	30	L.U.	A.	"	3	"	3 "
17	25	L.U.	C.	Moderate	2	"	2 "
18	23	R.U.	A.	Slight	4	"	5 "
19	30	R.U.	C.	Moderate	3	"	2 "
20	30	R.U.	C.	Slight	3	"	1½ "
21	35	R.U.	A.	Moderate	2	"	3 "
22	18	L.A. &	A.	Slight	1	"	2 "
23	28	R.U.	C.	Moderate	2	"	1½ "
24	28	L.U.	C.	"	4	"	6 "

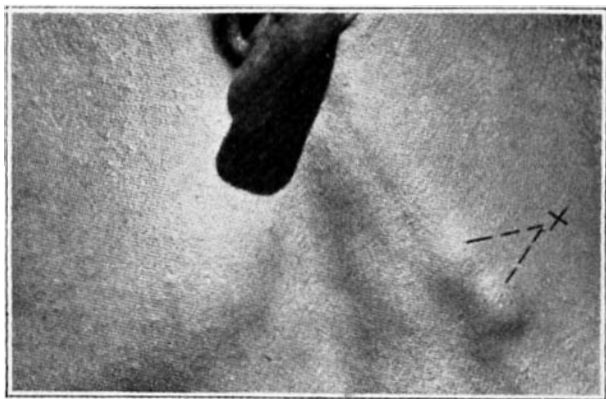
Nerve effected : L.U. = Left Ulnar.
R.U. = Right Ulnar.
L.A. = Left Auricular.

Type : A. = Acute.
S.A. = Sub-acute.
C. = Chronic.

N.B.—The number of injections in column (6) indicates how many injections were required to bring complete relief with cessation of pain and tenderness ;
The last column, (No. 8), indicates the duration of time, from the date of last injection up to the present date, during which there has been no recurrence.

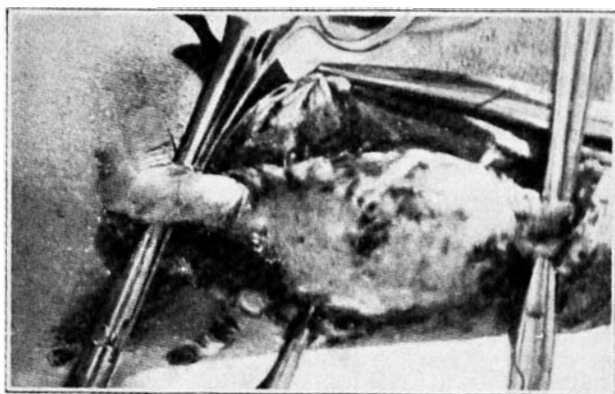


LEPERS' HOME, SPANISH TOWN, JAMAICA,
SHOWING GENERAL VIEWS OF WARDS.



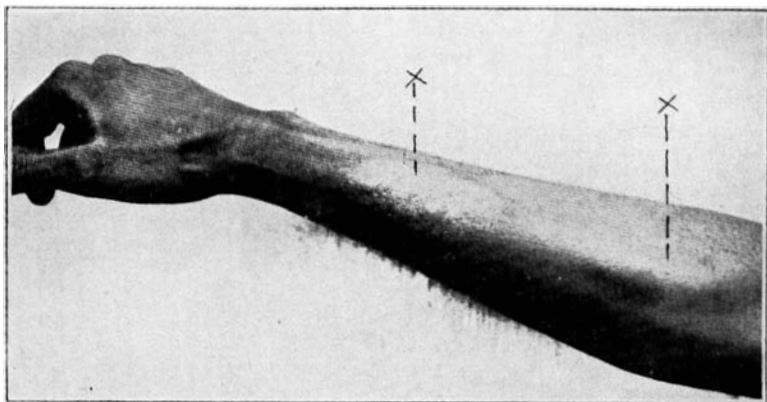
Double Abscess in the Great Auricular Nerve.

The tip of the earlobe and its shadow are in the upper part of the picture.
(Reproduced from "INTERNATIONAL JOURNAL OF LEPROSY," Vol. 2, No. 3, 1934).



Abscess of Ulnar Nerve exposed at operation.

The encapsulated abscess is seen in the middle, with the thickened nerve at each end.
(Reproduced from "INTERNATIONAL JOURNAL OF LEPROSY," Vol. 2, No. 3, 1934).



Abscess in Cutaneous Nerve Supplying Macule.

(Reproduced from "INTERNATIONAL JOURNAL OF LEPROSY," Vol. 2, No. 3, 1934).

TABLE II.

1. Number of cases treated	24
2. Types of cases treated :—	
Acute	12
Sub-acute	3
Chronic	9
3. Number of nerves thickened either slightly or moderately	21
4. Number of nerves without thickening	3
5. Number of cases in which thickening of nerve is reduced slightly or moderately	12
6. The average dose of drug injected each time	2 c.c.
7. The total number of cases free from symptoms of pain and tenderness	24

Conclusion :—

1. Intradermal injections of hydnocarpus oil or its esters will give more beneficial and satisfactory results in relieving pain and tenderness in nerve reaction than other drugs and local applications in any stage.

2. The thickening of the nerve may or may not be reduced.

3. The length and course of treatment is less.

4. The recurrence of reaction is so far nil in all cases and the average time of interval without recurrence is so far roughly three months on average up-to-date.

A Further Note on Nerve Abscess in Leprosy.

J. LOWE.

(*Reprinted from "International Journal of Leprosy," Vol. 2, No. 3, 1934.*)

THE following notes have been prepared in response to an inquiry regarding certain cases of nerve abscess demonstrated to Wade when visiting the Dichpali Leprosy Hospital, from one of which was taken the material which he describes in a separate paper. The present note serves to supplement my previous report on the subject.

Incidence.—During the eight years that I was at Dichpali I saw about 5,000 cases of leprosy, and operated on roughly 100 cases of nerve abscess. The incidence thus works out at about 2 per cent. However, about half of these abscesses developed under treatment by potassium iodide. Since they would probably not have occurred without this treatment, the natural incidence in that region is probably not more than 1 per cent. A rather curious fact in this connection is that I do not remember ever seeing a case in a female.

Type of Case.—This condition is seen almost exclusively in pure nerve-type cases. Occasionally an abscess will be found in a N2-C1 case, but practically never in cases with marked cutaneous lesions, even if there are co-existing nerve lesions.

Nerves affected.—The ulnar nerve above the elbow is the commonest site of this lesion. However, I have seen abscesses in the median nerve at the wrist and also higher up, in the radial in the arm and forearm, in the common peroneal and superficial peroneal, in almost all the cutaneous nerves of the forearm and leg, and also in the great auricular.

Multiple abscesses in the same cutaneous nerve are commonly seen, but the condition is not as frequently multiple in the nerve trunks. It is also a fairly common occurrence to find abscesses in more than one nerve in the same patient. I had under observation for several years a patient who during the time developed fourteen abscesses, situated in the following nerves: both ulnars, both common peroneals, both posterior cutaneous nerves of the legs, and both superficial peroneals; there were also three abscesses in cutaneous nerves of one forearm, two in those of the other, and one in a cutaneous nerve in an upper arm.

Relation to the Nerve.—The process of necrosis and liquefaction starts inside the nerve sheath. At this stage there is often pain, which is sometimes excruciating. This occurs particularly when nerve trunks like the ulnar are involved, for abscesses in cutaneous nerves are frequently quite painless. Often the abscess bursts through the sheath and forms a swelling outside it, connected with the nerve by a pedicle. When this happens there is much less pain because of diminished tension within the sheath. The abscess outside the nerve may attain the size of a hen's egg, but it is usually smaller. Sometimes where there are multiple abscesses in one nerve, caseation between the abscesses is detected at operation, and inside the nerve sheath there may be a sinus which joins up the different abscesses.

Content of Abscess.—Usually the abscess contains a fluid or semi-fluid material centrally, while in the outer parts the content is grumous and cheesy. I have found *Mycobacterium leprae* in smears from about 50 per cent. of the abscesses, always in small numbers. In practically every case smears made at the time of operation from the thickened nerve near the abscess have shown some—not many—bacilli.

Progress and Significance.—Abscess formation is, as a rule, not an acute process but rather a chronic one, requiring

several weeks or months. There is first inflammation and thickening of the nerve, followed later by caseation and the formation of a cold abscess. This condition, being inside the sheath, causes a fusiform swelling that may not be detected as an abscess except at operation. However, as has been said, the abscess often bursts through the sheath and burrows in the neighbouring tissues, frequently becoming adherent to the skin or other structures. It may even perforate the skin; the sinus thus formed discharges for several weeks or months, healing and breaking down again, and this may continue for years before final healing takes place.

Frequently a single nerve abscess is the only sign of active leprosy in the patient. I consider that this condition indicates a good prognosis, for it seems to be associated with marked immunity and to be method of localising the disease and of healing. In many such patients the disease undergoes spontaneous arrest, and in no case have I observed the subsequent development of marked cutaneous lesions. Unfortunately, abscess formation is frequently followed by trophic lesions in the distribution of the affected nerve.

Treatment of Nerve Abscess.—The occurrence of definite nerve abscess in a nerve trunk, such as the ulnar, I regard as indicating the necessity of surgical treatment. Even if there is merely painful fusiform swelling of the nerve, which may or may not be an abscess, operation is advisable. The affected nerve is exposed under general anæsthesia. If the abscess has burst through the sheath, the entire mass, including the surrounding capsule can be excised. At the same time the nerve should be carefully dissected out or stripped over the area of marked thickening. If removal of the sheath is impossible owing to dense adhesions, multiple longitudinal incisions through it should be made in order to relieve the pressure. Frequently caseous material is found inside the sheath; this should be removed as far as possible, with care to avoid damage to the nerve fibres. Drainage is usually unnecessary.

This operative procedure greatly accelerates the healing of nerve abscess, and in cases in which the abscess is inside the sheath, the removal of the sheath relieves the pressure and the resulting pain which may be very severe. If operation is performed early, before the inflammation and pressure have permanently damaged or destroyed the nerve fibre and before trophic lesions have developed, these developments may be prevented. With abscesses in cutaneous

nerves surgical treatment is not so essential since severe pain is not usually present, and such abscesses of course do not cause trophic lesions. However, though not essential, operation is often advisable.

Nerve Abscess in Calcutta.—This condition is quite as common in Calcutta as it is in Dichpali, but there are differences. In the latter place they are seen most commonly in the nerve trunks; in the former they are most common in cutaneous nerves supplying (tuberculoid) macules. This corresponds to the differences in the clinical manifestations of nerve leprosy as it is seen in these two centres. In Dichpali glove and stocking anæsthesia, etc., are the commonest manifestations of this type of the disease, whereas in Calcutta macular (tuberculoid) lesions predominate.

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The Irritant Constituent of Anti-Leprotic Oils.

H. PAGET, J. W. TREVAN, A. M. P. ATTWOOD.

(*Abstract of a Paper published in “The International Journal of Leprosy,” 1934; 2, 149.*)

OBSERVATIONS made in these laboratories and elsewhere during the last few years have shown that chaulmoogric and hydnocarpic acids and their derivatives deteriorate on long exposure to air. For instance, aqueous solutions of the sodium salts of the acids *hydnocarpus wightiana* oil become darker in colour and cloudy, with a lowering of the pH and the optical rotation. The chaulmoogric ester of hydroxymercuri-*m*-hydroxybenzaldehyde (1), which is completely soluble in oils when freshly made, loses this property on long keeping. Muir (2) and others have pointed out that oil expressed from stale seeds or which has been exposed unduly to light and air is more irritant on injection than a fresh sample.

Pain caused on injection of these preparations may be due to two factors. First, there is the irreducible minimum caused on injection of fresh neutral oil, or of carefully prepared ethyl chaulmoograte or hydnocarpate. This is to be regarded as inherent, and bound up with the chemical

constitution and physiological action of these acids. There may also be a second factor, artificial in origin and variable in degree, which has been attributed to incipient rancidity in the oil, to decomposition during distillation in the case of the esters (3), or to excessive alkalinity in the case of the sodium salts, until Jackson (4) showed that pH could not be correlated with the degree of irritation. As, however, it seemed possible that in each of these cases the second factor in pain production might be due to a single cause, the authors have conducted a search for an irritant substance in the fraction, constituting about 25 per cent. of the total acids of the oil, the composition of which is still undetermined. For this purpose it was convenient to use sapucainha oil, of which a quantity was already under investigation and which resembles very closely the oil of *hydnocarpus wightiana* (5, 6, 7).

The chemical part of this work consisted in:—

1. The isolation of the oil from the seed by extraction with carbon tetrachloride, and confirmation of its resemblance to *hydnocarpus* oil.

2. The preparation of the fatty acids from the oil by saponification, and their separation by crystallisation from alcohol into *A*, the "crystalline acids," and *B*, the "residual" or "syrupe acids."

3. The further separation of the residual acids *B* into the "oily acid," the "keto-acids" and the "tarry acids."

Cold processes of separation were used as far as possible, since the work of previous authors (8, 9) indicates that neither the residual acids nor their esters can be distilled without decomposition. Each of these fractions was converted to the sodium salts and the ethyl esters for biological examination. The crystalline acids *A* amounted to about 56.5 per cent. of the total acids and had all the properties of a mixture of chaulmoogric and *hydnocarpic* acids.

The "oily acid" (5 per cent.) was obtained as a golden yellow oil, solidifying at 10—15 deg. C., and probably still containing some dissolved crystalline acids. The "keto-acids" (4.5 per cent.) formed a white crystalline solid melting at 101—103 deg. C. The "tarry acids" (about 9 per cent.) were obtained as a viscous and intractable black residue, forming a copper salt insoluble in acetone and ether.

The most interesting of these components from the point of view of the treatment of leprosy is the "tarry acids." It is highly irritating on injection in the form of its ethyl esters, which cannot be distilled without decomposition

even under 0.5 mm. pressure. It may also prove to be identical with the acid resulting from the long exposure of oils, or esters of chaulmoogric and hydnocarpic acids to air. It seems most likely that it constitutes the additional irritant factor in oils and esters which have deteriorated.

For comparison with the esters of the "tarry acids," a quantity of the ethyl esters of the crystalline acids was exposed to light and air in shallow dishes during the summer months. It showed a rise in acid value and specific gravity and a fall in iodine absorption value, which indicates a lower degree of unsaturation in the molecule. The optical rotation was greatly reduced. In each of these respects the exposed esters resemble the esters of the "tarry acids," and it is hoped by further work to establish definitely that these two products consist largely of the same constituent.

The other components of the total acids, viz., the crystalline acids (A), the "oily acids" and the "keto-acids," yield ethyl esters, which distil without apparent decomposition under reduced pressure, and there is no indication that they become irritant as a result of such distillation. No obvious decomposition occurred when the ethyl esters of the crystalline acids were distilled even under atmospheric pressure, although a small increase in acid value and fall in optical rotation and iodine absorption value indicate that a slight change is produced by overheating and that it is of the same character as that resulting from exposure to air; these changes are not further affected by steaming.

*The test for irritant properties was carried out by the injection of the material into the skin of the guinea pig, either undiluted or diluted with bland solvents. The hair was removed by clipping and the use of depilatory pastes was avoided as the skin becomes unduly sensitive to the necrotic action of the drug. The diluents used were ethyl oleate and commercial "liquid paraffin," both of which were absorbed, usually without more than a slight trace of redness and with no necrosis. The blandest members of the chaulmoogric acid series studied, viz., iodised ethyl esters, produced very little more reaction than the diluent itself. With the more irritating members of the series a greater degree of vascular reaction was followed by thickening, necrosis, and the formation of a black scab which sloughed off. The most irritant produced complete necrosis of an area up to one centimetre or more in diameter. If the drug was diluted before injection, the area of the scab

* J. W. Trevan and A. M. P. Attwood are responsible for all experiments on animals.

diminished in size and the scab might take four to six days to form. The highest dilution per cent. at which slight necrosis occurs has been used to compare the various preparations studied and is denoted as the minimal necrosing concentration (M.N.C.).

<i>Free acids.</i>					<i>M.N.C.</i>	<i>Diluent.</i>
1.	Total acids	...	...	...	1.5	Liquid Paraffin
2.	Oily acids	...	...	...	1.5	"
3.	Syrupy acids	...	...	...	0.375	Ethyl oleate
<i>Ethyl esters.</i>						
4.	Of total acids, distilled 185—215 deg./					
	0.5 mm.	...	...	...	100	Liquid paraffin
5.	Of "Crystalline acids":—					
	(a) Dist. at 198—215 deg./14 m.m.				75	"
	(b) Dist. at 345—355 deg./760 mm.				75	"
	(c) 5b steamed	...	...	...	75	"
	(d) 5b iodised	...	...	negative at 100		
	(e) 5a after exposure to air	...	...	3		"
6.	Of oily acids, distilled 175—215 deg./					
	0.5 mm.	...	...	negative at 100		"
7.	Of keto-acids, distilled 215—230 deg./					
	0.5 mm.	...	...	...	19	Ethyl oleate
8.	Of syrupy acids, undistilled	...	...	...	38	Liquid paraffin
9.	Of syrupy acids, distilled 200—250 deg./					
	0.5 mm.	...	...	...	10	"
10.	Of tarry acids, undistilled	...	...	...	6.25	Ethyl oleate
<i>Sodium salts.</i>						
11.	Of total acids	...	...	...	2.25	Water
12.	Of oily acids	...	...	...	2.25	"
13.	Of keto-acids	...	...	...	2.25	"
14.	Of syrupy acids	...	...	...	1.5	"
15.	Of tarry acids	...	...	...	1.5	"

The crystalline acids, keto-acids and tarry acids were too insoluble in the free state for injection.

It is clear from these results that the crystalline acids and the oily acid are bland products when administered as esters. In comparison with the syrupy acids the oily acid is relatively inert as an irritant, even in the free state. Distillation of the ethyl esters of the crystalline acids at atmospheric pressure instead of at 14 mm. does not increase their irritant quality, while the latter can still be reduced materially by iodisation. It should be noted, however, that iodised esters of the crystalline acids are less stable than iodised esters of the total acids. The ethyl esters of the keto-acids are clearly less bland than those of the crystalline and oily acids, but in the form of the sodium salts they are not more irritant than the sodium salts of these fractions, although the difference between any of the soaps is comparatively small. The "syrupy acids," their ethyl

esters, cause a degree of irritation intermediate between that caused by the oily acids and the tarry acids, of which the syrupy acids mainly consist ; this irritation is increased when the esters are distilled, and the tarry constituent thereby partly decomposed. The esters of the tarry acids and the exposed ethyl esters are far more irritant than any of the other products.

The practical outcome of these results may be stated as follows :—Stocks of chaulmoogra and hydnocarpus preparations should be kept in a cool, dark place in full bottles. Under these conditions they are quite stable. As it is not practicable constantly to transfer a stock actually in use to smaller bottles, the quantity issued from stock for use in a leper institution should not exceed, say, one month's supply.

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The Leprosy Situation in England.

*(Reprinted from Medical Press and Circular,
October, 1934.)*

R. G. COCHRANE.

THE average general practitioner would consider that the possibility of a case of leprosy coming into his consulting room would be so rare as not to warrant any thought being given to it. Yet Britain, with her vast colonial possessions and her people travelling throughout the world, is more subject to sporadic cases occurring than almost any other country. Therefore, it should not come as a surprise to medical men to be informed that leprosy is not only seen in the country, but that there is a voluntary colony for those afflicted with the disease.

As the authorities do not consider that the disease comes within the purview of preventive medicine as far as this country is concerned, there is no means of knowing the exact number of cases in the country, but the general estimate is between 50 and 100. The Home in Essex has accommodation for 12 patients. This means that at any one time there

is a greater number of cases outside the Home than inside. The Home has been established for twenty-one years, and is entirely voluntary. Its maintenance is rendered possible by voluntary subscriptions, though of late years it has suffered greatly from the depression, and is now in serious financial straits. As the Government give no financial assistance whatever, the position and outlook at the present time is somewhat foreboding. The actual nursing and attendance is done by a Church of England community, the Community of St. Giles, and the leprosy Home is managed by a Committee, of which Dr. J. M. H. MacLeod is Chairman. This is the only residential Home in the country, and up-to-date treatment and care is available for any sufferer who is stricken with this disease, and it would be a very great tragedy if this institution of mercy had to close its doors for lack of funds.

It is generally held that under modern conditions of civilisation leprosy does not tend to spread, and this is true of the disease in this country. Physicians who come across cases in this country naturally advise measures similar to those suggested in tuberculosis, *viz.*, separate room, separate bed, separate eating utensils and separate towels and bedding, etc., with adequate disinfection before being sent to the laundry. If such measures are carried out, there is no likelihood of spread, and even when no precautions are taken the danger to the adult population is negligible. Among children and young adolescents the position is different. I, personally, hold that should such come in contact with infective cases, there is an element of risk which is not negligible. Except for one instance, the contact cases in this country of which I have personal knowledge, have been in children or young adolescents.

In view of the fact that the great majority of cases which the writer has come across in this country have in the first instance been seen by general practitioners, it is of some value perhaps to suggest lines along which a diagnosis of leprosy should be made. It is of interest to note among the above cases that odd ones have turned up in five different provincial towns, not any of which were the large seaports from which such cases are expected to be observed from time to time.

In the first place let it be remembered that when the signs and symptoms of the disease are discovered which are of text-book nature, the disease has usually advanced beyond any hope of complete recovery. It is sound enough advice to be highly suspicious and seek necessary further advice

if any one of the following points are apparent in any individual who has a somewhat puzzling complaint :—

(1) Residence in the tropics for a period, whether prolonged or not, and whether recent or not. The latent period of leprosy can be as long as forty years after residence in the tropics has ceased, and recently two cases have been seen, one of whom had left the tropics thirty years ago and the other sixteen.

(2) History of burns without knowledge of having been burnt. In two cases recently, one woman complained of burning herself on a hot-water bottle, and the other, a man, complained of receiving burns at his work, both without pain.

(3) Erythematous or infiltrated patches which have persisted for a long period which do not irritate and do not readily comply to any known type of skin disease. It is well to remember that leprosy in the European is liable to be very deceptive, and the diagnosis which I have come across have been Dhobie's itch, pityriasis versicolor, parapsoriasis, syphilis, etc.

(4) The anæsthesia in leprosy initially is to superficial touch, *e.g.*, cotton wool, and not to pin pricks.

(5) Callosities and corns covering a trophic ulcer.

(6) Because a patch is not anæsthetic, it is not a *sine qua non* that it is *not* leprosy. This is a common fallacy, and I would most emphatically state that many patches on the trunk are not necessarily anæsthetic and yet they may be leprosy.

It can, however, be said that in practically all cases anæsthesia will be found somewhere, but not necessarily on the lesion. Therefore, if the following points are noted, the great majority of cases will be discovered.

(1) Anæsthesia to light touch is usually present on the ulnar distribution of the forearm, especially the outer side of the little finger, and/or the distribution of the peroneal nerve, especially on the outer side of the foot.

(2) The great majority of erythematous patches seen in the European contain bacilli. These usually are readily found by making a slit scraping as follows: A scalpel is taken, a small incision sufficiently deep to penetrate the cutis is made, but as little blood as possible drawn, the base of the incision is scraped, the tissue juice smeared on a slide and the slide fixed and stained by the ordinary Ziehl Nielson method. If acid-fast rods are found, then the diagnosis is clinched. The following points should be remembered:

- (a) It is useless to look for acid-fast bacilli in ulceration which is of a trophic nature or lesions of neural origin.
(b) The nasal mucosa, while often positive to a nasal scraping is not necessarily so.

With regard to treatment and clinical progress, sufficient is it to say that the average European appears to be highly resistant to the disease, but if this resistance is broken down, he usually advances rapidly, and then the outlook is poor. The older the patient the better the outlook, for it is in the growing periods of life that the disease advances most rapidly. The general routine treatment for cases in this country is the same as elsewhere. The basis of treatment is some derivative of hydnocarpus (chaulmoogra) oil. If the patients are of the type where intradermal injections are indicated, and can stand them, then they are given intradermal esters or hydnocarpus oil and creosote. The latter preparation is more generally used because of the staining properties of the iodised esters, which in the fair skin may persist for two years or more. In addition to this, other remedies are used, such as Solganol B Oleosum, carbon dioxide snow and potassium antimony tartrate where indicated. It has been found that small doses of Solganol B Oleosum are very useful. The average case in this country is difficult to treat because they are usually cutaneous cases, and the problem of reactions is a difficult one. It is in the subreactive stages that a course of Solganol B Oleosum is found to be of some value. The dosage which has been given is a six weeks' course commencing with two injections of 0.01, two injections of 0.05, and two injections of 0.1. Carbon dioxide snow has been found useful in the reduction of nodules. A fairly long application is needed for the nodules, about one to one and a half minutes, but for a less fibrous type, twenty seconds to forty seconds is sufficient. While it has been stated that the general outlook in treatment for the case in this country is poor, yet a great deal can be done to alleviate their symptoms and make life bearable. While leprosy in England is a rare disease, it occurs sufficiently enough for the general physician to remember that he may come across it.

With regard to the preventive aspects of the disease, the writer holds that while it may not be necessary to make leprosy a notifiable disease, yet there is a sufficient amount in the country to warrant an effort being made to find out if possible the number of cases in existence, and to ascertain whether the position is such that official action should be taken.

The Leprosy Colony, Uzuakoli, S. Nigeria.

Second Annual Report, March 31st, 1934.

J. A. K. BROWN.

ON the 31st March, 1933, the number of patients in residence was three hundred and ninety. At the time of writing this, the second Annual Report, there are four hundred and thirty-six inmates of the Colony, showing a net increase during the year of forty-six in-patients. Taking into account those, who for various reasons have left the Colony and those who have died, a total of five hundred and forty-six cases have had treatment as in-patients, whilst a further two hundred have received treatment as out-patients once a week with an average attendance of approximately one hundred and twenty. The actual figures showing the record of the various Divisions in the Owerri Province are in Table I, as follows :—

	TABLE I.										
	1933	Admis- sions	Total	Dis- charges	Dismis- sals	Left	Deaths	1934	Adults	Chil- dren	Total
Okigwe	148	26	174	4	4	7	9	150	127	23	150
Owerri	57	93	150	2	6	10	19	113	102	11	113
Bende	131	10	141	7	10	6	6	112	74	38	112
Ahoada	26	18	44	1	1	10	2	30	27	3	30
Aba	12	9	21	—	—	—	1	20	19	1	20
Others	16	—	16	2	—	3	—	11	10	1	11
Totals	390	156	546	16	21	36	37	436	359	77	436

Table II shows the numbers of those who are independent, partly dependent and wholly dependent. Those classed as "independent" subsist themselves, by trading in the Colony or by obtaining assistance from home. Those "partly dependent" receive half subsistence from the colony. Those "dependent" are subsisted entirely at the expense of the colony funds, being paid in money or kind for work done, the work being the maintenance and development of the colony. A distinction has been made between adults and children, as the cost of subsistence of a child is less than for an adult.

TABLE II.							
		Independent.		Partly Dependent.	Dependent.		Total.
		Adults.	Children.	Adults.	Adults.	Children.	
Okigwe	...	3	2	—	124	21	150
Owerri	...	1	—	—	101	11	113
Bende	...	37	27	18	19	11	112
Ahoada	...	—	—	—	27	3	30
Aba	...	—	—	—	19	1	20
Others	...	1	—	—	9	1	11
		42	29	18	299	48	436

Table III shows the numbers of men, women and children included in the total resident on March 31st, 1934, of four hundred and thirty-six, together with their classification.

TABLE III.

	Men.	Women.	Children.	Total.
Early Cases	24	13	28	65
Late Cases (able-bodied)	149	56	30	235
Advanced Cases (disabled)	88	29	19	136
	<hr/> 261	<hr/> 98	<hr/> 77	<hr/> 436

Of the thirty-seven deaths, twenty-eight took place in the first half of the year. Eighteen of them were among a group of patients in a very advanced stage of the disease on admission, and not really suitable cases for a treatment centre. The causes of death were principally intercurrent diseases, such as pneumonia, dysentery, and chronic nephritis, whilst in one case in a patient making good progress, death was sudden and due to cerebral hæmorrhage.

Of those admitted, thirty-six have left. The larger proportion of these were patients who did not stay long enough to find out whether they would like the settlement or not. Four of these left the same day that they arrived, others stayed less than one month. Of the remainder some had permission to return to their homes for a holiday, as they were feeling better, and as their health has apparently continued, they have not seen any reason to return. Others have been called to their homes by some domestic trouble, and it has been reported that their condition has been made worse by the long journey, and they have not been able to make the return journey. A few cases left when they were allotted a piece of land to farm to provide their means of subsistence, preferring to do the regular development work of the colony for a weekly remuneration.

It is with a sense of satisfaction that sixteen cases are reported discharged. Eleven of these were cases of nerve leprosy, the other five having involvement of both nerves and skin. They were all discharged as uninfected, or, as recommended by the International Conference of 1931, held at Manila, "closed cases," there being no bacilli detectable on examination. Three of the sixteen discharged were classed as "arrested cases," having shown no signs of activity for a period of between one and two years. The other thirteen were described as "quiescent," having shown no activity for at least three months. All were recommended to report periodically for re-examination. It would be a mistake to suggest that these cases are cured; they have been rendered, as far as is ascertainable, uninfected to

other people, and free from all symptoms. If they can maintain their bodily resistances at a high level, they may proceed to permanent arrest of the disease; the natural tendency, however, after leaving the settlement is to revert to the habits and conditions in which the disease first made its attack.

The treatment adopted has been similar to that reported previously, namely, the eradication as far as possible of co-existing diseases, followed by carefully controlled injections of alepol or a 50% mixture of hydnocarpus oil and its ethyl ester. The injections have been intramuscular, but in a number of cases with a limited number of patches, iodised moogrol has been injected intradermally. Half the dose of alepol that could be tolerated without a reaction has been given intramuscularly, the balance of the dose being given with iodised moogrol intradermally.

A few cases were given intravenous injections of mercurochrome. There was swelling and bursting of some of the nodules in two cases. Two of the patients thought that their general condition was better, and their sedimentation index was improved. In the other cases there was no marked improvement.

An attempt has also been made to evaluate the addition of the vitamin B complex, in concentrated form, to the diet of some of the inmates. The absence of this vitamin results in beri-beri and polyneuritis, dermatitis, pellagra and deficient development, the sequel depending on the relative or absolute deficiency of different components of the complex together with other factors. The mycobacterium leprae resists attempt to culture and inoculate it successfully, and it is recognised that leprosy develops only in those with some defect in their natural resistances. It seemed reasonable to ask whether the development of leprosy in the human body might depend upon a partial deficiency of some component of the vitamin B complex, or on the other hand whether such a partial deficiency among other factors, might predispose considerably to the invasion of leprosy.

The work done in the settlement so far consists of inquiries into the ordinary diets of the patients prior to admission. Different groups have then had daily administrations of vitamin B in concentrated form, and comparisons made with control groups. Fifty children were chosen first, this being the commonest age of onset, and as at this age the body needs all its reserves for growth and development. A second group consisted of twenty-five male adult cases free from complications of the disease.

Observations have been kept over a period of nine months, and if results justify it, a special report may be issued later. Opportunity is taken here, however, of remarking that from the enquiries made it was apparent that many of the cases had been accustomed to an excessive carbohydrate dietary, including protein low in quality and biological value, with fluctuating and sub-minimal quantities of both vitamins B and C, and that in some of the cases to whom vitamin B was administered, there was a definite general bodily response.

The uninfected children of the inmates have now been separated from their parents, and are housed in a cement block Babies House provided by the Nigerian Branch of the British Empire Leprosy Relief Association. Originally there were about twenty such children, but some of these have been returned to their homes to the care of relations. At the present time, however, there are six children being fed artificially, in the charge of clean nurses, and it is hoped that this will prevent these children contracting leprosy.

The principal work in the colony has been its continual development. Much ground has been rooted to provide more town space, and other ground has been prepared for an oil palm plantation. The farms were on a communal basis, and the yields were in keeping with the average in the district. The new farms are partly communal and partly individual. About eighty patients have been given a piece of land and seed yams, with the hope that after the harvest they will be able to subsist themselves. Until the harvest they are working part of the week for the colony, and receiving a remuneration accordingly. It was found that a large number of the cases were not well enough to become independent farmers; whilst some that were well enough preferred regular hours doing colony work, with regular remuneration, and at first were obstinate with regard to the change.

In addition, everybody in the colony has been given a small plot of ground in which to grow a few extra vegetables.

The social, recreational and religious work in the colony has been provided for financially by the Methodist Missionary Society. Clothing and blankets have been provided for the poor, and work in the school, the Boy Scouts and the band has been maintained. Presents were given to all the patients at Christmas, and prizes to the winners of the Annual Sports on Boxing Day.

A number of visits have been paid during the year. It was gratifying to have visits from parties of Chiefs under the guidance of the respective District Officers of the Ahoada and Owerri Divisions. The colony has been especially honoured by visits of His Excellency the Governor of Nigeria and Lady Cameron, His Honour the Acting Lieut.-Governor of the Southern Provinces, The Director of Medical Services of Nigeria, and the Residents of the Owerri Province.

Reviews.

“TROPICAL MEDICINE,” by Sir LEONARD ROGERS and Sir JOHN W. D. MEGAW. (J. & A. Churchill, Ltd. 15/-).

A second edition in five years indicates that this book has met a definite need. We are certain that the new edition will be as popular as the previous one, for we are not aware of any other book which so well describes the various tropical conditions at so reasonable a price. No worker in the Tropics should be without a copy of this book.

In the Malarial section we are particularly pleased to notice that the indications for treatment are especially well given and with a complete lack of dogmatism. It is natural to find that the diseases which occur in India are, generally speaking, more thoroughly described than those occurring in other parts of the Tropics, for these two distinguished workers have spent the best part of their lives elucidating tropical problems in that country.

We are more particularly interested in the leprosy section, and consider that the account is sufficiently complete for the average worker to be able to grasp the disease intelligently. It is to be expected that this section should be efficiently done, for the author has had wide experience of the disease, and has made considerable contributions to the solution of the problem.

We note that the depigmented patches of leprosy are described as white. This, generally speaking, is not the case, and the description as it is tends to make the reader confuse leprosy with leucoderma. Again, we believe that many hypopigmented patches are not anaesthetic to light touch. If anaesthesia is stressed as essential before a diagnosis is made very early lesions may be missed.

We would congratulate the authors on the production of a book on tropical medicine at a reasonable price and not too cumbersome, and wish this second edition all the success that it deserves. R.G.C.

“INTERNATIONAL JOURNAL OF LEPROSY.” Vol. 2, No. 1 January—March, 1934.

This number comes up to the standard of previous numbers, and we would take note of one or two of the more important articles.

Prof. Marchoux describes a case of infection with leprosy as the result of a needle wound, which pricked an assistant while operating on a leprotic nodule from the arm of a patient. This would serve to remind workers in leprosy that while the danger of infection is minimum, it does occur on occasion.

Dr. Wade contributes the first of a series of articles on tuberculoid

changes in leprosy. This is a most important contribution, and has raised considerable interest amongst the workers in leprosy. Because of the importance of this contribution we reproduce the summary and conclusions.

1. A variety of tuberculoid leprosy seen in South Africa, which in certain respects differs from the usual, is discussed on the basis of thirteen of the sixteen cases from which biopsy specimens were obtained for histological examination, and more than twenty-five others examined less carefully. Cases of this variety are distinguished from others by South African leprologists, but not on the basis that is indicated by their histological characteristics.

2. The well-established terms "tuberculoid," as applied to a non-specific histological picture, and "tuberculoid leprosy," signifying a distinct and clinically recognisable variety of the disease, are held to be appropriate and useful.

3. A tentative clinical picture of the lesions under discussion is set up. The outstanding peculiarity of the condition is an unusual tendency to a rough, pebbled or "granular" surface, and striking linear lesions are also seen. The relatively slight sensory disturbance common in these cases is correlated with a slight degree of nerve involvement in the sections studied.

4. The essential microscopic unit lesion, called the "tuberculoid," does not differ in these cases from the typical in material from other sources, having the essential epithelioid focus accompanied by more or less round-cell infiltration, with Langhans' giant cells present inconstantly and in varying numbers, and rarely any necrosis whatever and little tendency to scar-formation. Activity is apparently associated with abundance of epithelioid tissue and giant cells. An interesting fibroblast-like variety of epithelioid cell is apparently associated with special indolence and persistence of the lesions.

5. Bacteriological smears from the cases here dealt with in detail, and sections stained for bacilli by the author's method, showed no acid-fast bacilli, which is typical of the ordinary forms and phrases of the tuberculoid lesion. With a single exception the bacteriologically positive cases, not dealt with in the present report, showed unusual features.

6. The sections permit observation of the extension of the process into the normal skin. In the zone which clinically shows only slight erythema there is slight to moderate perivascular round-cell infiltration in the papillary layer, indicating extension of the process along the vascular plexus. Ordinarily there is little further change until the full-blown granuloma develops, though sometimes there is a transition stage. In certain evidently early lesions the deeper layers are apparently invaded by extension downward; in others, more advanced or chronic, the manner of invasion of the deeper tissue is not evident.

7. Resolution, at least where especially prompt as in certain of the specimens examined, may be very complete. Ordinarily, there is comparatively little fibrosis, though it is sometimes sufficient to be clinically evident. Non-resolution, with plaque formation, and recurrence are conditions that call for special study.

8. Several questions that can be elucidated only by workers actually dealing with such cases are suggested. Certain others, especially that of lepra reaction in such lesions, will be considered in later articles of the present series.

Dr. Lowe contributes an article on the sex incidence in leprosy. In a comparison between sex incidences in leprosy and tuberculosis certain resemblances are pointed out which suggest a similarity between these two diseases.

The possible causes of the difference in the sex incidence of leprosy are considered to be (a) environmental, (b) physiological. The environmental factor is probably the chief factor. In many countries men are more exposed to infection and to conditions which predispose to leprosy.

Environment, however, does not seem to explain fully the difference in incidence in some countries, and it is considered possible that physiological differences may be associated with the difference in susceptibility.

The bearing of these findings on the epidemiology of leprosy is briefly discussed. It is considered that they indicate the importance of sources of infection outside the house and family.

Interesting articles on leprosy in Malaya and Afghanistan are contributed by Dr. Ryrie and Dr. Lichtwardt.

As is customary, the more important articles which have appeared in other periodicals have been reprinted. R.G.C.

Correspondence.

PRETORIA LEPROSY INSTITUTION,

The Editor, "Leprosy Review,"

28th August, 1934.

131 Baker Street, London, W.1.

I have read with great interest the article on "The Curability of Leprosy," by Dr. F. G. Rose, M.D., who discusses a matter of considerable importance which has always received our close attention in South Africa.

I must congratulate Dr. Rose on the very efficient way in which his cases are followed up and on account of this his figures are particularly valuable and merit very careful consideration.

Dr. Lowe's statement that recrudescence most frequently occurs within the first two years after arrest finds ample proof in his statistics and can probably be endorsed by most leprologists. On the other hand his assumption that recurrence of symptoms is largely due to insufficient treatment will probably meet with less support.

While duration and regularity of treatment have a definite influence on its success, I feel it would be illogical to omit consideration of such important factors as: stage of disease, nutrition, puberty, childbirth, septic conditions and intercurrent diseases.

It must also be borne in mind that the only means at our disposal for estimating arrest are :—

- (a) A bacteriological examination of material obtained superficially from cases in whom the infection is frequently deep seated.
- (b) Clinical observation.

The possibility of error in (a) is obvious, and in (b) where we are entirely dependent upon the human element it is well known.

Is it not probable that these inaccurate means of assessing "arrest" are responsible for many relapses?

Yours faithfully, J. J. DU PRE LE ROUX.

Obituary.

KENNETH GRANT FRASER.

IT was with a very great sense of loss that we heard of the passing of Kenneth Grant Fraser, F.R.C.S.E., of Lui, in the Southern Sudan, on January 9th, 1935.

Dr. Fraser returned to his station last year in indifferent health, but he was a man possessed of a temperament which overcame all difficulties, and he did not allow ill health and the knowledge that he would not see his Home Country again to prevent him from going back to the post of duty and finishing his work.

Dr. Fraser qualified L.R.C.P. and S. Edinburgh and L.R.F.P.S. Glasgow in 1914. He proceeded to his F.R.C.S. Edinburgh in 1920. During the war he saw service in the R.A.M.C., reaching the rank of major, and was decorated with the Croix de Guerre.

Dr. Fraser will be best known for the amazing work he accomplished in the Southern Sudan. Going out there towards the end of 1920 as a Missionary of the Church Missionary Society, he commenced his work amongst the unruly Moru Tribe, where for decades past tribal warfare had been the rule rather than the exception. Through his strong personality and Christian convictions he built up a work which transformed those warlike warriors into a peaceful, law-abiding community.

On account of the prevalence of leprosy, Dr. Fraser organised a leprosy colony. The writer had the privilege of visiting Lui in 1930, and was struck by the quiet, efficient way Dr. Fraser pursued his duties, and the whole-hearted devotion which was manifest in all his work. The few days which were spent in Lui gave one an insight into the value of such work, not only from the point of view of physical relief but also in the matter of spiritual comfort. We would like to add our word of appreciation of the beneficent labours of Dr. Fraser. He, of all men, gave up everything for the work he loved, and left a lasting memory in the affection of the community amongst whom he laboured.

Our deepest sympathy is extended to Mrs. Fraser, and we cherish the memory of one whose loving labours accomplished a work which will ever be remembered and admired.

R.G.C.