

LEPROSY REVIEW.

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EDITOR - R. G. COCHRANE, M.D.

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The Association does not accept responsibility for views expressed by the writers. Communications may be sent to the Editor, at 29, Dorset Square, London, N.W.1.

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LEPROSY

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"Deals with leprosy in detail from every aspect and will, no doubt, long remain the authoritative handbook of the subject. We recommend this book unreservedly."—*Brit. Med. Jour.*

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Editorial.

WE would draw the attention of our readers to page 132 of the REVIEW, the Extract of Current Literature. We feel that the article Dr. John Lowe has contributed to the "Indian Medical Gazette" is one of very great interest, and we would advise all workers to read the original if at all possible. Dr. Lowe stresses a number of very important points which we have endeavoured to emphasise from time to time. It is of the utmost importance to find this well known authority sounding a word of caution and advising against unreasoned optimism. We have still a long way to go in the therapeutics of leprosy. The work of the last fifteen years marks a very useful and important step towards the control of leprosy. It cannot be too strongly stressed that once a case has become an advanced cutaneous one (C3) it is extremely difficult to render it bacteriologically negative.

Dr. Lowe mentions a fact of utmost importance to the question of the prevention of the disease when he says that many cases of leprosy are of a mild nature in India, and may continue for many years with little evidence of decrease or increase. The fact that a survey of leprosy may actually show a high incidence of people with obvious signs of the disease is not the most important. The estimation of the relative virulence of the malady as shown by the proportion of neural and cutaneous cases and the proportion of children and adults afflicted is of greater value. Dr. Low lays stress on the necessity for really intensive study being undertaken. Much of the leprosy work done at present, admirable and excellent though it is, is doing little to contribute towards the ultimate control of the disease. Unless individual endeavours are linked up with an efficient system this disease will be very difficult, if not impossible to control. We hope that Dr. Lowe's suggestions for India will be adopted elsewhere, and that authorities will realise the importance of creating at least one study and research centre in countries where leprosy is endemic. Much money and time is being spent on the disease, but little of real constructive value is being done in many parts. One adequate centre with someone undertaking the investigation of the disease scientifically and systematically, is of greater help in the ultimate solution of the problem than many small camps where the work cannot be adequately supervised, or the results conserved or followed up. We make no apology for

abstracting this article so fully, as we believe that it deserves all possible publicity.

The article by Dr. Dixey on the Gold Coast gives the situation up to the time he left. We fear, however, that as a result of the prevalent depression and retrenchment even the "*status quo*" is hardly being maintained. On all sides medical work is suffering, and schemes for leprosy prevention are the first to be affected. Not until either Government or an organisation such as the British Empire Leprosy Relief Association is endowed sufficiently to be able to place medical men in each colony studying the question, is there any real hope of controlling the scourge. While the problem does not cry out dramatically for solution, yet it is an urgent one, and the economic loss to the country must be very considerable when we realise that the victims are stricken in the very prime of life.

This number of the REVIEW contains other very practical articles which will be of extreme interest to those in charge of colonies and to nurses. Sister Thornton's contribution shows how much can be done with the raw material in the institutions, and we trust it will be helpful to those who have undertaken nursing duties. Mr. McKean shows once again how much a part the patients themselves can take in the general management of an institution.

In the Indian section we have reprinted a note on the intradermal treatment. Dr. Muir mentions the point that it takes some 32 punctures to inject 1 c.c. We feel this is more than the average patient can stand, and if this rule is adhered to, none but the most spartan will put up with this method of treatment. Intradermal injections, however, are of the utmost importance, and wherever possible, should be used. We are able now to announce the fact that iodised esters as used by the Philippine workers can be obtained in this country, and we are prepared to supply limited quantities and also the appropriate needles to those wishing to try out the intradermal treatment.

We are indebted to Dr. Manson-Bahr for contributing another article. He deals briefly in this paper with the treatment of dysentery and this forms the second of a series of contributions on general diseases which we hope to include from time to time to help nurses and others who are in charge of leprosy work where there is no qualified medical man to consult.

Leprosy in the Gold Coast.

M. B. D. DIXEY.

DURING the last three years leprosy work in the Gold Coast has been proceeding along the following lines :—

- (a) A leprosy survey of the Colony.
 - (b) The formation of leprosy out-patient clinics at stations where medical officers are resident.
 - (c) Propaganda in regard to leprosy work.
 - (d) Clinical and laboratory investigations on cases in the existing settlements.
- (a) As the results of this survey are of great interest, I propose to give a résumé of the findings.

The largest number of cases have been noted in Ashanti and the Northern Territories ; fewer cases have been seen in the Eastern Province and in Togoland, and fewer still in the Central and Western Provinces.

Eastern Province.

In Accra, the Contagious Diseases Hospital is used as a Leprosy Settlement, and accommodates 42 cases. In other districts with the exception of the Kwaha district, few cases came forward through the circularisation of the Chiefs, the majority having been seen by medical officers during their work and treated as out-patients.

At Mpraeso the Omanhene rendered assistance and over 174 cases have been seen ; between 50 and 100 of these attend fairly regularly for treatment. If a central settlement is agreed upon at Kumasi, it is thought that those cases living at a distance from Mpraeso might agree to go there, rather than have a local settlement.

Central Province.

With the exception of the Saltpond district, the circularisation of the Chiefs proved futile. In the Saltpond district, 33 cases came forward, but none of these cases, in spite of free treatment, have come forward for treatment. In the Cape Coast district, 40 cases were seen during the investigations in 1928 ; of these, only one has persevered with treatment. At Oda, the medical officer found several cases which were attending for treatment fairly regularly.

Western Province.

Few cases have been noted in this Province, except at Axim, where 90 cases have been seen. The attendances, are,

however, very irregular, owing to the distance to be traversed to the clinic. A settlement is desired chiefly by people not affected by the disease ; its formation would be a complicated matter, owing to the need for the co-operation of the seven Amanhene in the district.

Ashanti.

In Ashanti a large number of cases have been seen, especially around Kumasi and the Kokofu division of the Bekwai district which borders Lake Bozumtwi ; 735 cases have been seen in this area, of which 774 are undergoing treatment. At Kumasi Contagious Diseases Hospital, 378 cases are at present undergoing treatment ; at Bekwai, attendances are unfortunately irregular, owing to the distance to the clinic, and a settlement is favoured.

At Kintampo, over 200 cases have been seen. Attendances are, however, not very regular, and a settlement is recommended by the medical officer, as the only method of dealing with this problem successfully.

At Sunnyani, attendances are poor, as the travelling in the district has been much curtailed.

At Obuasi, 36 cases are attending treatment fairly regularly.

The question of a settlement for all these cases has been suggested. The late Senior Health Officer at Kumasi was in favour of a large settlement at Kumasi to serve the whole of Ashanti. If, however, this would be out of the question at present, owing to financial stringency, the present arrangement at the Kumasi Contagious Diseases Hospital, together with a smaller scheme at Kokofu carried out with the assistance of the Omanhene and run by the medical officer from Bekwai might be possible. There can be no doubt that owing to the nature of the Kokofu division and its distance from Bekwai attendances cannot but be poor. This case, therefore, demands some kind of settlement, especially as this division appears to have one of the highest leprosy rates in the world.

Northern Territories.

In the Northern Territories, and particularly in the Northern Province, where the population is dense, the water supply is a difficulty in the dry season, shortages of food occur, and sanitation is absent, leprosy is very prevalent. The number of cases seen is large, and many more would appear were there a larger medical staff to see and treat the cases.

The White Fathers at Navrongo received a grant from the British Empire Leprosy Relief Association in 1929, towards building and equipment. Another Sister has just arrived to assist with the treatment. Work started in September. Many cases have been seen in the district, but owing to the distance to be covered to the centre there are as yet but few in regular attendance. A village settlement has been suggested and political assistance promised in its construction.

In the Lawra Tuma and Wa districts, 630 cases have been seen; owing to the distance to be covered in order to reach the only two medical officers in this area, very few of these cases are attending for treatment.

At Tamale, 520 cases have been seen, and the majority of those from villages near Tamale are attending regularly. Those at a distance from Tamale are also attending, but irregularly. A village settlement has been proposed for these cases, and would undoubtedly be a success if commenced immediately; otherwise, with the prolonged treatment required and the distance to be covered to the Tamale clinic, numbers may commence to drop and a great opportunity to consolidate leprosy work in Tamale will have passed.

Togoland.

In Southern Togoland, owing to the Ho settlement, cases are now coming forward for treatment in the earlier stages of the disease, and are prepared to stay a considerable period in order to get rid of the disease, or ameliorate their condition; the work is becoming well established. In the Kete, Krachi and Yendi districts conditions are more primitive and work is a more difficult problem in regard to leprosy.

Some of the main difficulties which are met with in leprosy work are :—

- (a) The type of leprosy.
- (b) The apathy of the people.
- (c) The slow progress of treatment.
- (d) The paucity of medical officers.

(a) The anæsthetic (nerve) type of leprosy appears to be the predominant type throughout the colony. Nodular leprosy, which is so repulsive, is less common. (The "A" type case is more common than the "B" type case, according to Muir's classification. From figures to hand the percentage of anæsthetic cases varies in different parts of the colony from between 81 per cent. and 66 per cent. of the total number of cases seen. This experience is similar to experience in Southern Nigeria, the Congo and South Africa, and is

undoubtedly a stumbling block in carrying out leprosy work, as it has been argued "that this type of leprosy is not a virulent type, it has existed from time immemorial, and only a small percentage of those infected develop the disfiguration and deformities seen in the later stages of the disease."

(b) Sufferers in many parts of the country, especially in the Northern Province of the Northern territories, are well tolerated by their fellows, eating and drinking out of the same utensils as healthy persons, sleeping in the same room and even in the same bed, or mat. In some places more precautions are taken after the death of a patient to avoid the disease than were ever thought of during his life time. The natives can usually recognise leprosy even in its early stages and appreciate its infective nature; most of them dread the disease, and few will admit that their parents have suffered from leprosy, though in many cases it is undoubtedly a fact. In many parts of the country there are various native customs, the object of which is to segregate the sufferer or cast him out, but on closer investigation in most parts of the colony, little notice appears to be taken of these customs, and nothing appears to be done to arrest the spread of the disease. In certain districts near the coast the fear of leprosy is greater and the sufferer is sometimes segregated on a farm in a hut.

(c) The treatment of leprosy is not so spectacular as the treatment of yaws, where immediate and visible results are often observed. Often cases are disheartened by their slow progress, and discontinue treatment.

(d) Medical officers are few and far between. Distances to treatment centres are often great, and may perhaps be in a district where both languages and people are foreign to the patient, so that unless accommodation can be obtained close to the treatment centre and maintenance of some sort provided, the patient is unable to prolong his stay sufficiently to have the necessary treatment.

There is no doubt that these difficulties are gradually being overcome in many parts of the colony by out-patient clinics, settlements and propaganda. The value of treatment is being slowly realised, and efforts are being made to find accommodation for cases that are prepared to stay.

The cases at the Contagious Diseases Hospital, Accra, were examined last year (1930) and this year (1931) I have been able, with the kind help of the Medical Research Institute, to carry out further examinations on the cases at Ho, while stationed there as medical officer. The aim in making these investigations has been to study the symptoms

and signs of the disease, to note the common concomitant infections in this district, and also the results of treatment.

Observations at Ho Leprosy Settlement, Togoland.

There are 515 cases in the Ho settlement, the majority of whom come from this district.

The Ho district comprises the southern section of British Togoland. The southern part of the district consists of savannah country, and the northern part forest country of a hilly nature. 776 cases have been seen and examined, giving a leprosy incidence of over seven per mille. The greater number of these cases have been seen at Ho, or are at present at Ho, in the settlement. There appears to be little if any difference in the leprosy incidence in the savannah part as opposed to the forest part of the district.

Certain points of interest have been noted while making notes on the cases in the settlement. It must, however, be remembered that it is often difficult to get accurate information from primitive people in regard to the length of time that they have had the disease, any prodromata they may have noticed, &c. In making the following observations, use has only been made of the case cards of those patients who appeared to understand the questions asked and to give intelligent replies—about 70 per cent. of the total number.

Sex and Age Incidence.

There are in the settlement 310 males and 205 females. The number of males in the district closely coincides with the number of females. There is, therefore, a large preponderance of males over females suffering from the disease.

The age of onset in the various age periods expressed in percentages is as follows :—

| Age | 1-10 | 11-20 | 21-30 | 31-40 | 41-50 | Over 50 |
|-----------|------|-------|-------|-------|-------|---------|
| Males ... | 8 | 21 | 35 | 27 | 8 | 1 |
| Females | 12 | 21 | 31 | 27 | 8 | 1 |

In over 50 per cent. of cases was leprosy first noted between 10 and 30, and in over 75 per cent. between 10 and 40. This is similar to observations in other parts of West Africa.

Occupation.

The chief industry of the district is farming. Farmers are, therefore, in a majority. There does not appear to be any marked increase in the leprosy incidence in any particular trade in the district.

Type of Leprosy.

The classification of these cases has been carried out

according to the method recommended by Muir, which with slight modifications appears to have been adopted in the recent International Congress on Leprosy in the Philippine Islands. The "A" type of case, being those in which no bacilli can be demonstrated, are diagnosed clinically by nerve signs, while "B" cases are those in which bacilli can be demonstrated, in the skin lesions. The "B" type embraces all cases of nodular leprosy, and mixed types, as in these mixed cases bacilli are demonstrable.

The "A2" type consists of cases in the late anæsthetic stage of the disease, in which late nerve manifestations, such as acroteric anæsthesia and trophic signs are to be found.

The cases at Ho may be classified as follows :—

| | <i>Purely anæsthetic (A1 and A2 type).</i> | <i>Nodular and Mixed. (B types)</i> |
|-------------|--|---|
| Males ... | 66% | 34% |
| Females ... | 70% | 30% |

The anæsthetic cases consist of the following percentages of early anæsthetic (A1) and late anæsthetic cases (A2):—

| | <i>Early anæsthetic.</i> | <i>Late anæsthetic.</i> |
|-------------|--------------------------|-------------------------|
| Males ... | 57% | 43% |
| Females ... | 61% | 39% |

A hopeful sign is that the number of cases coming in in the early anæsthetic stage of the disease is on the increase.

Duration of the Disease.

The average duration of the disease in the males and females in the various stages of the disease was as follows :—

| | <i>Males.</i> | <i>Females.</i> |
|-----------------------|---------------|-----------------|
| Early anæsthetic ... | 4.9 years | 5.9 years |
| Nodular and mixed ... | 5.7 years | 6.2 years |
| Late anæsthetic ... | 10.6 years | 10.4 years |

This table merely expresses averages. In the table of type of the disease it will have been noticed that less than one-third of the patients are nodular, and have passed through the nodular phase. There are, however, cases in the settlement that have remained in the early anæsthetic stage for 30 years or more, and also some cases that have shown late anæsthetic signs within a few months of onset. In regard to nodular cases, some cases commence as nodular leprosy without having ever shown anæsthetic signs, and have remained nodular for 30 years or more. From the above table there may be a slight tendency for a case to become nodular, if it is going to become nodular, between the fifth and tenth year of the disease.

It is difficult to understand why only about one-third of the total cases ever pass through a nodular phase. The disease may have been so long endemic in this area that there is a high degree of immunity in the native population. A full investigation was carried out in Accra on 40 patients in 1929 to see if there were any marked concomitant infections in nodular cases lowering the vitality and the resistance of the patient in nodular cases, as opposed to anæsthetic cases, but no conclusion could be arrived at.

Prodromata.

In the majority of cases (70 per cent.) it seemed that the patient failed to notice any prodromata before the onset of the initial lesion. In 30 per cent. of the cases certain prodromata were noticed before any sign of a lesion. These symptoms were in order of frequency, pain, fever, paræsthesia, headache, weakness and prickly sensations under the skin. In a few cases the initial lesion was first noticed on the site of an old ulcer or lesion of crab yaws.

Initial Lesion.

The commonest types of initial lesion appear to be :—

(a) A pale copper coloured macule, which slowly enlarges, in the skin. Anæsthesia to light touch can sometimes be demonstrated in it. There is also often a loss of the sense of heat and cold. The colour is due to partial loss of pigment. It is the commonest initial lesion.

(b) A raised discoloured patch in which bacilli can often be demonstrated.

(c) A marked acroteric anæsthesia of a hand or foot. This is rare.

(d) An atrophy of a group of muscles in the hand or foot causing drop wrist and drop foot. Only two cases of this type were seen.

The types (c) and (d) are instances of cases where nothing has been noted by the patient until there has been marked nerve involvement.

Sometimes in the routine medical examination of patients in general medical work, one observes small depigmented patches of leprosy in which it is often possible to demonstrate anæsthesia to light touch or heat and cold. On enquiry it is often found that the patient has had the disease for years and has never bothered about treatment as the disease has not progressed.

In other cases leprotic lesions are seen which have been submitted to native medicines and various devices, such as

scarification and rubbing in gunpowder in order to camouflage all signs of the disease. The usual preparation seems to be some kind of vegetable dye. Keloids sometimes result from the gunpowder treatment. A few cases appear to have been deliberately burnt with a hot iron, and the leprosy can be seen extending from all round the edges of the resulting scar.

The Site of the Initial Lesion.

This is sometimes of interest. In this district the cheeks and forehead, the back, the buttocks and extensor surfaces are common sites for the initial lesion. Initial lesions on the feet are not common. No initial lesions were noted on the scalp. The native dress of the district consists of a cover cloth loosely draped about the body. This is tied around the waist while at work, and at night they lie on mats completely enshrouded in mats. The women wear a loose bodice and a cloth draped round the lower part of the body, reaching almost to the feet. From the common sites of the initial lesion infection would appear to be most often from contact with infected clothing or from lying on an infected mat. The common sites for the initial lesion do show some variation in different parts of the Colony. Around Lake Bosumtwi, in Ashanti, where crab yaws is very prevalent, the site of the initial lesion is often noted round these lesions. In the Northern Territories, especially in the Northern Province, where water shortages occur very often during the dry season, and craw craw is very prevalent, there appears to be frequently a co-relation between the sites commonly affected by craw-craw, and thus frequently scratched, and the initial lesions of leprosy. The natives notice this fact themselves.

Nasal Smears.

These smears are made by rubbing the nasal septum with a sterile platinum loop and rubbing it on a slide, and afterwards staining by Ziehl Neilsen's method.

As a result of this test it was found that 35 males and five females who appeared from the physical signs to be purely anæsthetic or "A" cases, were found to be "B" cases in which bacilli were demonstrable, which showed an error in the clinical diagnosis of 11 per cent. in the males and 2 per cent. in the females. In 86 per cent. of the nodular cases could bacilli be found in the nasal smears, and in the remaining 14 per cent. bacilli could be found in the lesions.

The nodular and mixed types "B" are, therefore, the chief source of infection.

Thickening of the Superficial Nerves.

This was noted in 15 per cent. of cases ; the ulnar and the superficial nerves are usually the nerves involved.

Concomitant Infections.

It is an essential part of leprosy treatment to search for concomitant infections which may be lowering the vitality of the patient and nullifying the effect of treatment.

In every case, thick blood films were taken and examined for microfilaria and malaria. The films were taken between 10 a.m. and noon. A single drop of blood examination gives a rather low indication of the numbers infected. To obtain accurate figures repeated examinations during the day are necessary. The results showed that 23 per cent. of the inmates of the Leprosy Settlement harboured microfilaria loa loa. A control was done by examining 100 out-patients seen on trek throughout the district, the films also being taken between 10 a.m. and noon. Of these, 17 per cent. showed the presence of microfilaria loa loa. None of the patients complained of Calabar swellings, though I have once or twice seen symptoms suggestive of Calabar swellings in hospital out-patients.

The number of cases suffering from filarial or malarial infection is not proportionately greater in the nodular and mixed cases. It can not, therefore, be said that the vitality of these cases is lowered more than the anæsthetic cases by this infection.

The examination of the stools has not yet been completed. The commonest helminthic infections in this district appear to be ascariis, trichuris, strongyloides and ankylostome infections. Tape worms are sometimes seen. In hospital practice helminthic infections, with the exception of ascariis and oxyuris infections, are not a frequent cause of complaint by the patient.

It has not been possible to complete taking the Wassermann reaction of all the cases, owing to transport difficulties, and the fact that only a small number can be taken each week. For despatch the serum is separated off and pippered into small ampoules into which has been put a very small amount of boracic acid, as recommended by Butler. These ampoules are sealed and posted to Accra. The serum appears to keep well and very few have arrived in Accra contaminated or spoilt.

It has been claimed that a positive Wassermann reaction is apt to occur in cases of nodular leprosy when there is no yaws or syphilis present. This is, however, not thought to

occur if Kolmer's new method of carrying out the Wassermann reaction is adopted.

Of 108 Wassermanns done to date, 56 have been positive, giving a percentage of 52 per cent. This is high, but it must be borne in mind that yaws is very prevalent throughout the district.

The results were as follows among the cases :—

| | | | | |
|-------------------|-----|-----|-----|----|
| Early anæsthetic | ... | ... | ... | 23 |
| Nodular and mixed | ... | ... | ... | 17 |
| Late anæsthetic | ... | ... | ... | 16 |

All the cases were males.

There is not a marked difference between the rates for the anæsthetic and nodular cases.

Complications.—Ulcers.

There are patients with ulcers, the majority being trophic ulcers, some, however, being broken down nodules.

Eye lesions are not uncommon in nodular cases, and are usually of the nature of an irido-cyclitis.

Treatment.

During observations over a period of ten months, the following results have been noted at Ho :—

| | | | | | |
|--------------------|-----|-----|-----|-----|-----|
| Greatly improved | ... | ... | ... | ... | 119 |
| Improving | ... | ... | ... | ... | 295 |
| Slight improvement | ... | ... | ... | ... | 47 |
| Stationary | ... | ... | ... | ... | 25 |
| Worse | ... | ... | ... | ... | 29 |

During the year, 23 patients were discharged as clinically and bacteriologically free of the disease, and have to report at six monthly intervals.

Any concomitant infection found is treated. For cases with yaws or with a positive Wasserman, a course of N.A.B. or Sorbita is given.

Leprosy treatment consists in the bi-weekly subcutaneous injection of "Alepol," and the external application of trichloroacetic acid in varying strengths to the skin lesions. Potassium iodide is now only used in specially selected early cases.

Moogrol, which is a more irritating injection, and expensive form of treatment, is preferred by many of the patients, although results from its use do not appear more satisfactory than results obtained from Alepol. Doubtless there is in the primitive mind an idea that the more painful an injection is, the more efficacious it will be.

In the treatment of ulcers, hot permanganate baths

are useful in sloughing cases, and eucalyptus oil and iodoform have been found useful for granulating surfaces. Trophic ulcers sometimes require to be scraped.

In 20 cases, Ideal Milk injections have been employed. Smart reactions occur which are difficult to control. The results have not been altogether satisfactory.

Work is an essential and all cases that are not suffering from the effects of a reaction should be turned on to some kind of task for at least an hour a day. One is continually struck by the fact that the industrious patients seem to improve very much more rapidly than those that sit down all day, doing nothing. All are encouraged to work, and have small farms. I do not believe that there is any danger of a native African working too hard for his strength, even in a leprosy settlement. I have never seen any ill results from work.

There is no doubt that the disease goes in cycles of remissions and exacerbations, whether it is being treated or not, and it is important to stop treatment when there are signs of acute exacerbation or reaction, otherwise the disease may be aggravated.

Summary.

1.—Leprosy is prevalent throughout the Gold Coast and British Togoland.

2.—Among the chief difficulties to contend with are :—

(a) The apathy of the people in many parts of the country.

(b) The slow and non-spectacular results of treatment.

(c) The anæsthetic type of leprosy predominates, and may partly account for this apathy.

(d) The paucity of medical officers and the distances to treatment centres for many of the patients.

3.—The average case of leprosy appears to go slowly from the early anæsthetic stage into the late anæsthetic stage. Few show nodular symptoms.

4.—Prodromata appear to be often unnoticed before the onset of the initial lesion in the Ho district.

5.—The common concomitant infections in the Ho district are given.

6.—Out-patient clinics have been found useful, and settlements for cases living at a distance from treatment centres.

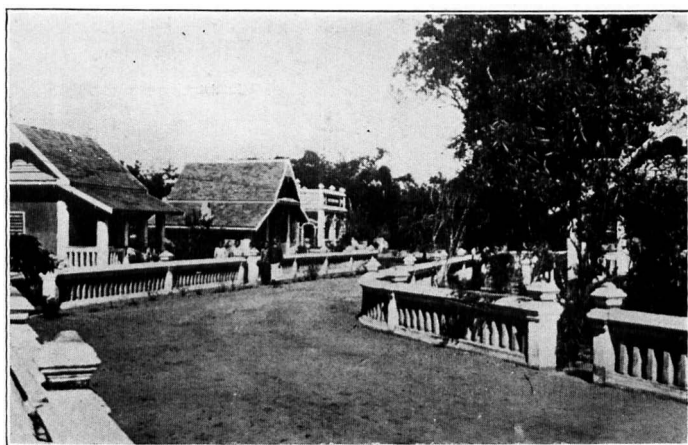
7.—The results of treatment are given, and important points mentioned.



SKETCH MAP OF THE GOLD COAST SHOWING MAIN TREATMENT CENTRES
(1931).



GENERAL VIEW OF WARDS. CHIENGMAI LEPROSY COLONY
(SIAM). NOTE WARD IBROW ON THE LEFT.



VIEW OF THE MEN'S COTTAGES. CHIENGMAI LEPROSY
COLONY.

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The Place of Local Self-Government in Leprosy Home Administration.

J. HUGH MCKEAN.

LEPROSY homes supported entirely or in part by some such organisation as the American Mission to Lepers are confronted with the serious problem of staffing their institutions with an adequate and well trained force. This is due mainly to the fact that funds are limited, and that the number of such institutions requiring financial help are many, and are constantly increasing. As is the case with the Chiengmai Leprosy Home, the superintendents of many such institutions are recruited from the members of the Mission operating in that particular country. Other pressing mission duties make large demands on the time of the superintendent so that many asylums are seriously handicapped by inadequate supervision. We had to meet such a problem at Chiengmai from the very first and found the solution in local self-government. Local self-government as adopted by this institution is patterned after the Siamese form of village government. It has been in operation for more than twenty years, and has given, and still gives satisfaction.

Placing the responsibility on the inmates of the asylum has opened our eyes to the fact that many of them are thoroughly dependable and need only guidance and patience to make them valuable workers. Always before them is the fact that the institution is theirs. As a result, they take pride in their work and are constantly on guard to inspire the same feeling in others who become careless.

For the purpose of self-government the institution is divided into three distinct groups. Over each group is placed a headman and his assistant, who are responsible for the behaviour of those under their direct charge. A chief headman or mayor elected by them is directly responsible to the management and must answer for the efficient handling of all internal affairs. During recent years, this idea of self-government has been expanded until at the present time practically all of the affairs of this asylum are in the hands of the patients.

A department of Morals and Behaviour functions under the oversight of Christian elders. A sanitary squad of eight men and four women, cares for the sick, gives the semi-weekly injections of chaulmoogra oil and is responsible for the cleanliness of the institution. Homeguards, composed of 27 uniformed men keep order among the more than four hundred inmates and insure protection from outsiders. A court, made up of the chief-headman, the minor headmen, and the elders, tries all minor offences, settles disputes and imposes penalties. The management sits with the court only in an advisory capacity. A labour organisation has charge of all work of the institution. Each kind of work is under the supervision of a skilled workman trained in the asylum. In this labour group are to be found clerks, store-keepers, masons, carpenters, blacksmiths, sawyers, tailors, barbers, painters, &c. Practically every patient is a worker. Only the incapacitated are exempt. Each individual is assigned work according to his physical strength and ability.

In an institution of four hundred patients, the variety of work is comparable to that of any other village of like size. More than 140 buildings fronted with fences provides ample work for a score of men. The numerous roads, with flowers and strips of lawn, give work to many who are unable to do heavy labour. We believe in work as an integral part of treatment. It keeps patients physically fit, and it is our experience that those who work are able to take maximum injections of chaulmoogra oil with very little discomfort. Best of all our patients believe in the efficacy of work which makes the assignment of tasks a comparatively easy matter.

The advantages resulting from the above-mentioned scheme of self-government are many, only the most apparent of which are mentioned.

(1) It relieves the management of an enormous amount of detailed oversight of a type for which it is hardly fitted.

(2) Under an enterprising and wise headman the intimate affairs of their daily lives runs smoothly.

(3) It brings contentment and fosters a feeling of responsibility towards, and pride in, an efficient management.

(4) It changes their status from "outcast" to "Citizen."

The inmates of this institution are encouraged in all their attempts to assume responsibility. It is a task requiring considerable patience and self-effacement on the part of the management, but one which brings in rich rewards to both the inmates and those who have the work in hand.

Leprosy in Argentine.

E. P. FIDANZA.

History.

UNTIL quite recently a case of leprosy was looked upon as a rarity and commented upon with surprise. It was known that a certain district of the country was infected but this raised no alarm as the infection was believed to be limited to that district, and no new cases were described outside. In the most important works on leprosy, when considering the geographical distribution, all the southern part of South America, including Argentine and Chile was reported free from the disease. During recent years the absence of prophylactic precautions, together with better medical knowledge of the disease, has brought to light the bitter truth of the situation, namely, an increase in the incidence of cases; a consequence foreseen for some time past, and of which the public authorities took no heed for many years.

The origin of leprosy in the Argentine is difficult to establish. Most historians agree that the indigenous population was free from leprosy, the disease being introduced after the discovery by the colonists. It is supposed that some of the black slaves brought from Africa to Brazil were infected, and later they emigrated down the River Paraná, disseminating the disease along its borders. Even in our day this district is the one most severely attacked. Others maintain that leprosy was first introduced to the Argentine coast by a Norwegian sailing boat about 1850. The crew, many of whom were infected with leprosy, settled in different towns along the River Paraná, *e.g.*, Bella Vista and Reconquista, and from there spread the disease to other parts of the country. This theory can be ruled out as cases of leprosy were known to exist in the country before that time.

Statistics.

The first figures referring to the number of cases of leprosy in the country date from 1891 when it was calculated there were about 300. In 1906 a congress for the purpose of discussing the disease met in Buenos Aires and from data supplied by the representatives from the different provinces a total of 700 living cases was obtained. It is only after this date that Penna and authorities like Sommer and Aberastury called attention to the seriousness of the problem and the invasive tendency of the disease. Later Baliña and Puente in Buenos Aires and myself in Rosario (Santa Fé) have insisted in publications and lectures on the urgent necessity for definite, complete prophylactic measures.

In 1928, the National Public Health Department sent out a questionnaire to more than 5,000 doctors, referring to the incidence of leprosy. About half answered, and 1,560 cases were reported; it is calculated that if all had replied the figure would have been more like 3,000. The majority of leprologists agree that the total number of persons affected can be approximately determined by multiplying the reported cases by two. In that case the number of cases in the country is between 6,000 and 7,000, *i.e.*, the total population being over eleven millions, there are five cases per 10,000 inhabitants.

In 1929, the National Public Health Department sent out commissions to several provinces to establish a census; 1,800 cases were reported, a figure we believe far below the actual number owing to certain defects in the manner with which the census was carried out.

Epidemiology.

The country is not attacked equally in all its districts. In certain parts the disease is observed while elsewhere is almost free. The provinces most affected are those which border the River Paraná: Corrientes, Entre Ríos, and Santa Fé, which make up the Littoral Argentino, together with Misiones, Chaco and Formosa, and part of the Province of Buenos Aires. This region which occupies about one-fifth of the country and contains 40 per cent. of the population, has no less than 87 per cent. of the cases of leprosy.

Why are the greater proportion of sufferers in this region?
We attribute it to three factors:—

(1) In these provinces, particularly Santa Fé, Corrientes and Entre Ríos, the first foci of leprosy appeared and the disease has followed its invasory tendency during more than 80 years without the slightest prophylactic measures on the part of the authorities.

(2) This region has the dampest and hottest climate in the country which confirms the opinion of most leprologists, such as Sir Leonard Rogers, that the disease flourishes best under these climatic conditions, following the courses of the rivers.

(3) This region contains the two centres for the study of leprosy, Buenos Aires and Rosario, where the early diagnoses, which constitute a large proportion of the statistic figures, are made.

The second region, much less important, is composed of the provinces forming the centre of the country, Córdoba, San Luis, Tucuman, Salta, &c., which give together 11 per cent. of those infected.

On the other hand, the provinces bordering on the Andes, Mendoza, San Juan, and Territory of the Andes, are practically free, only giving 2 per cent. of the total number of cases.

To Sum Up.

The geographical distribution of leprosy in the Argentine can be divided into three regions which are :—

(A) The littoral, badly infected and limited to the east by countries also severely infected by the disease, *e.g.*, Brazil, Paraguay and Uruguay. (See map facing p. 128.)

(B) The middle region, much less infected but still with over 10 per cent.

(C) The Andine or Cordillera region which can be classified as free and which is limited on the West by Chili where leprosy is rare. (See map.)

A similar map has been published by Professor Baliña (Sem. Med. 1928, No. 47); we have modified it so as to show the greater incidence of cases in the region of great rivers.

Clinical Types.

I believe, generally speaking, the disease presents itself in a benign form and that the severe bacillary types described are due in most cases to a mistaken diagnosis in the early stage and consequent bad treatment or neglect. Under these circumstances when the patient returns to a centre where the disease is well known, his illness, which started as a simple lesion, has now become generalised and deformative and, therefore, is considered serious. For many years amongst my students in the Faculty of Medicine I have insisted on the importance of early diagnosis and have thus contributed to the fact that to-day a much larger number of cases are

recognised at the beginning of the disease, which permits of its arrest and improvement. Our experience shows us that the forms usually occurring amongst the out-patients attending the skin department are the C_1N_1 in accordance with the latest classification of Manila; and we insist that the day the disease is better known in the country, a different view of its gravity will be taken. Of 150 cases which attended at the Hospital Carrasco of Rosario more than 110 pertain to type C_1N_1 . The second place is occupied by the tubercular form C_2 , the purely nervous forms N_1N_2 being much less frequent. These proportions I consider interesting enough to note.

Prophylaxis.

We must admit that till to-day extremely little has been done for the cases of leprosy. Last century anti-leprosy prophylaxis was nil, though as a historical fact it can be mentioned that a colony for sufferers from the disease was founded in Colastiné (Province of Santa Fé), but owing to a revolution in 1878, the patients escaped, probably spreading the disease throughout the province and the establishment was closed. It was only at the beginning of this century and as a result of the Leprosy Conference organised by the National Department of Public Health in 1906, that the adoption of prophylactic measures on the part of the public authorities was voted and a law formulated which unfortunately did not materialise. However, the seed was sown, and although the instigators of the prophylaxis campaign, whose names are worthy to be venerated, Penna, Sommer and Aberastury, have not been able to realise the work they visualised, their pupils, amongst whom are Baliña, Puente, myself and many others, recognise their efforts and continue their work.

In 1923, the Government commissioned Professor Aberastury to form a law on National Prophylaxis against Leprosy which in 1926 became Law No. 11,359. In honour of the scientist we call this Aberastury's Law. Unfortunately the application of the law has not been possible so far, owing to the indifference of the public authorities.

During these last years, Dr. Puente, director of the Leprosy Section in the National Department of Public Health, has effected by order of the Government, the acquisition of large territories in Corrientes, Entre Ríos, Córdoba, Salta, &c., for the creation of Leprosy Colonies, one of which is nearly ready on the island of Cerrito (Corrientes).

To-day in the Argentine Republic we only have two

places for the exclusive treatment of cases of leprosy, which are :—

(1) *The Leprosy Block of the Hospital Muniz (Buenos Aires).*

This was created at the instigation of Professor Penna in 1900, and occupies a section of the Hospital Muniz, which is exclusively for infectious and contagious diseases.

Although large the block is too small to accommodate the large number of cases who flock to it from the interior of the country, and which until three years ago was their only asylum.

At present in the block are housed 200 patients, the tubercular and mutilated forms predominating, many of whom no longer receive treatment.

(2) *The Leprosy Block of the Hospital Carrasco (Rosario).*

This was created at my instigation, together with the help of Doctors Fernandez and Schujman in 1921, and occupies part of the Hospital Carrasco which is reserved for infectious and contagious diseases.

This department, which at its beginning had to overcome enormous difficulties owing to the fact it had no official recognition, now, in spite of the small number of available beds, constitutes the most important leprosy centre in the country, not only for the public service it renders but also because it has become a centre of study and research applied to the treatment of the disease as we shall see later.

The Leprosy Section of the Hospital Carrasco consists of :—

(1) A ward for men with 22 beds for cases type C_1 N_1 to which the patients are only admitted for special forms of treatment which are difficult to apply as out-patients.

(2) A ward for men with 15 beds devoted to the most contagious cases of types C_2 N_2 and C_3 N_3 .

(3) A small ward with 13 beds for women, thus giving a total of 50 in-patients.

(4) A special out-patient consulting room which is used exclusively for the treatment of leprosy, where about 110 patients are treated who receive two or three weekly injections. Most of these cases are only slightly contagious.

(5) A section for the examination of contacts of which we submitted a special file for the consideration of the Committee on Leprosy of the League of Nations. Actually there are more than 350 files with information of examinations effected every three months, which without doubt will

provide important epidemiological data to be the subject of a special publication.

(6) A consulting room for diseases of the skin at the entrance of the hospital which has given excellent results as it functions in an infected district and has permitted the discovery of early cases.

Treatment.

Generally speaking, we can say in our country the derivatives of chaulmoogra oil are exclusively used, preferably the ethyl esters of *Taraktogenos kurzii* and *Hydnocarpus wightiana*. We have tried many medicaments in the department but our best results have been obtained using esters of the Chaulmestrol and Alepol type with potassium iodide. We agree (with Dr. Cochrane) that potassium iodide can be given in small doses to the incipient varieties without producing harmful general reactions. Using these drugs together during three years, in more than 100 cases we have obtained highly satisfactory results which we have already published. Shortly we are publishing a more complete work on the subject.

On a lesser scale we have used Ginoilo iodade and coloidal chaulmoogra, both Argentine products prepared for us by Dr. Oreste Calcagno.

We have been studying the action of Leprosan or Catosan sent us by Bayer and Co., and have obtained some interesting results which we will describe later. For local treatment we use carbon-dioxide snow and 50 per cent. trichloracetic acid with good results.

But above all, I wish to draw attention to the importance of keeping the general health of the patient in good condition without which measure all specific treatment fails. At the same time it is necessary to raise the morale of the patients by providing them with mental comfort and distractions. By encouraging the patients they become optimistic and constant in their attendance for the continuation of the treatment, so much so that our patients never stop visiting us and at times more often than we demanded, and we see in their expressions of gratitude that they recognise us as their helpers and not their persecutors.

The humanitarian sentiment of the rest of the people seems to be waking from its lethargy and several societies have been started by ladies anxious to lighten the burden of these miserable sufferers.

We welcome all help, both moral and material which will aid us in a few years to rid the country of this disease.

The Treatment of Dysentery.

PHILIP MANSON-BAHR.

IT is by no means easy to give a concise account of the modern ideas on the treatment of dysentery without some understanding of differential diagnosis. Exact diagnosis is at the root of the whole subject, and this may be somewhat difficult.

Dysentery is best classified as a symptom-complex due to a most varied etiology.

Bacillary Dysentery.

Caused either by Shiga's bacillus, Flexner's bacillus, or, according to recent ideas, by Sonne's bacillus, has a world-wide distribution and occurs in epidemic form, as a rule. Sporadic cases do occur from time to time in Northern Europe, even in England, but it is of more frequent incidence in mental asylums and other similar institutions. In the tropics and sub-tropics and in every country with a constantly high summer temperature this disease is widespread and it is an infection to which the newcomer is especially prone.

Protozoal Dysentery.

This is caused by the invasion of the large intestine by protozoa, and of these we recognise two species, the *Entamæba histolytica* and the *Balantidium coli*, which are liable to do so. Intestinal balantidiasis is so rare that we need hardly discuss it here at all. On the other hand, amœbiasis is a very widespread disease. The term amœbiasis is used advisedly to denote the infection of the body with *Entamæba histolytica* for this organism occasionally migrates from the bowel and becomes transplanted into the liver, lung or even brain, where it causes metastatic abscesses.

Acute cases of amœbic dysentery, that is cases with acute symptoms, diarrhœa, abdominal pain and other subjective symptoms are rare. Usually the disease assumes a chronic form, so that the average amœbic case is a much drawn out and less dramatic affair than is the bacillary disease. Once a person is infected with *Entamæba histolytica* unless properly treated probably remains so for life, so that cases of long-standing infection are of quite common

occurrence. I have encountered cases who have harboured the *Entamœba histolytica* for 30 years or more without seriously undermining their general health.

Finally there is to be considered that form of dysentery which is due to *helminthic* infection. Dysenteric symptoms are especially liable to appear in persons infected with one of the bilharzia parasites in which case the eggs of the parasite in endeavouring to reach the exterior pass through the walls of the bowel producing ulceration and various forms of lesions in so doing. Naturally these much more serious infections are more troublesome to deal with.

In addition to these well-recognised more or less tropical forms of dysentery there remain a whole category of conditions, such as tuberculosis, syphilis, malignant disease and various kinds of growth of the bowel which may produce symptoms more or less indistinguishable. Treatment of these various conditions should be based upon two main principles :—

(a) Treatment directed towards the eradication of the source of the disease.

(b) Treatment directed towards the maintenance of the patient's general condition.

Bacillary dysentery, for instance, is a sharp and dramatic disease. It requires early vigorous measures, and above all, skilful nursing, not always obtainable in those parts where this type of dysentery is rife.

The dietetic question is of great importance. The patient's body is being drained of fluid by the constant diarrhœa, his tissues are being poisoned with the toxins of the causal organism. As much fluid as can be tolerated must be given by the mouth, this should consist of lemonade, barley-water, beef tea, chicken broth, meat extracts, &c. A diet composed entirely of milk is not well tolerated.

Opium, morphia and sedatives generally should be used cautiously as a means of alleviating the distressing colicky pains, the straining or tenesmus, and in order to obtain rest and sleep, but not as a means of curing the disease. The old idea of treating bacillary dysentery by means of lead and opium pills has been relegated to the past. It was based upon putting the bowel "into splints," but, in so doing, it produces a condition of intestinal stasis and increases the absorbability of toxins from the bowel wall.

The main principles underlying treatment have been based on the opposite method. It has been found that by

giving aperients such as salines (magnesium or sodium sulphates) the bowel is kept clean of intestinal contents, and at the same time the toxins of the bacillus which are so highly deleterious are got rid of. The generally accepted plan is to give sodium sulphate in drachm doses every two hours for the first 48 hours of the illness and thereafter four times daily till the major dysenteric symptoms have abated and until the stools have become fæculent once more. Some observers have reported equally good results with rhubarb in medicinal doses and others with castor oil. In cases where diarrhœa of a choleraic character persists after the blood and mucus stage has been passed, Colloidal Kaolin (Crooke's), or bolus alba (a mixture of charcoal and kaolin), suspended in water in doses of three teaspoonfuls every two hours has the effect of checking the flux and helps to eliminate the dysenteric toxins.

Yatren (iodine-oxyquinoline sulphonic acid) in pill form by the mouth or injected as a lavage in the strength of 2½ per cent. per rectum has been found to exert a beneficial effect in resistant cases.

The serum treatment of bacillary dysentery is being much more widely adopted as time goes on. The best brands of antidysenteric serum are made by the Lister Institute in this country and in America by Mulford's. Whichever brand of serum is used, the underlying principle is the same. The best sera are those which are richest in Shiga antigens, for it is generally accepted that it is these Shiga bacillus infections which are the most serious clinical cases. The serum requires to be injected in considerable doses and as early as is possible in the course of the disease. This is true when bacillary dysentery attacks small children, especially European children in whom it may lead to a rapidly fatal issue and be ushered in by convulsions.

The indications for the use of serum should be based upon the patient's general condition. If he is really ill with pyrexia, small rapid pulse, sunken painful abdomen and a malar flush it suggests that he is suffering badly from the absorption of dysenteric toxins. The frequency of the diarrhœa, *i.e.*, more than 18 stools in the 24 hours is also important. In very severe and fulminating cases anti-dysenteric serum should be injected slowly and should be warmed and strained through sterilised filter paper first. If there is much collapse and, if the blood pressure is unduly low, a pint of normal saline should be injected as well. Precautions must be taken to guard against anaphylaxis by enquiring whether horse

serum has been injected some time previously. Apparently the serum is absorbed more quickly when given by the intramuscular than by the subcutaneous route, and this method has the superadded advantage of being far less painful. Sometimes it may be necessary to give 50 c.c. or even more up to 100 c.c. The adductors of the thigh or the gluteus muscle may be used for the purpose. Very often serum treatment is complicated by the supervention, seven to ten days afterwards, of a serum rash, urticaria, accompanied by pyrexia and joint pains. It is possible to prevent the major manifestations by vigorous treatment with calcium lactate (20 gr. a day).

There are several complications of bacillary dysentery, the chief being dysenteric arthritis and iritis. Both are apt to supervene accompanied by pyrexia and general symptoms of intoxication during convalescence in the third week of the disease when the stools are becoming semi-formed and fæculent once again. The arthritis is best treated by general measures, such as radiant heat, massage and Scott's dressing applied to the joints; the iritis by means of an eye-shade and atropine drops. Occasionally bacillary dysentery may develop into a chronic form and this is a much dreaded complication and one which is extremely difficult to treat.

Chronic bacillary dysentery is really a chronic diarrhœa which may be accompanied by great emaciation and anæmia which develops gradually and insidiously months, it may be years, subsequent to the original attack. Many of these cases have been noted amongst war pensioners, and in whom the symptoms became manifest five, six or even more years after the Armistice, when the original infection was contracted on active service. Apart from operative measures, such as appendicostomy and cæcostomy which must always be reserved for the most intractable and otherwise hopeless cases, chronic bacillary dysentery is best treated by means of intestinal lavage. Many substances are used for irrigating the bowel, notably sodium bicarbonate and eusol. The former is given in a 2 per cent. solution in hot water and one or more pints are injected slowly by means of a tube and funnel into the rectum and permitted to penetrate the bowel. On the whole, especially when the diarrhœa is accompanied by a degree of septic absorption, eusol gives the best results. At first, the drug is given greatly diluted, one part of eusol to nine parts of water, but the strongest solution which can be tolerated is four parts eusol to six parts warm water. The injections should be given very slowly on alternate days

and the procedure kept up till it can be ascertained by sigmoidoscopic examination that healing of the bowel is taking place. The aftercare and dietary are most important in all clinical forms of bacillary dysentery. In order to avoid post dysenteric constipation it is usually necessary for the patient to take liquid paraffin or petrolagar in teaspoonful doses at night for some considerable time. Then the diet should be carefully attended to. As a rule, the return to red meat and starchy foods, such as potatoes, cellulose containing vegetables, such as cabbages, must be gradual. Alcohol taken in the form of whisky or beer appears to have an especially deleterious effect on dysenterics and should be prohibited for at least two months after apparent complete recovery.

Frequently a post-dysenteric colitis supervenes with the passage of "unsatisfactory" stool and excess of mucus. For this condition I find the eating of Psyllium seeds (*Plantago ovata*) to be beneficial. The seeds are either chewed or soaked in water when a gelatinous substance exudes which acts as a demulcent. It is rather like eating canary seed, but it certainly seems to exert a most soothing effect on the bowel.

The Treatment of Amœbic Dysentery is an entirely different affair. The drug treatment is at once highly specific, and is diametrically opposed to that outlined for the bacillary disease. Hence before embarking on this highly specialised treatment it is more than ever necessary to make doubly sure that one's diagnosis is correct.

There is no doubt now to the mind of anyone that emetine (the alkaloid of ipecacuanha) has a highly selective action for the *Entamœba histolytica*, but I am quite certain that emetine should be reserved only for the acute stage of intestinal amœbiasis and for the treatment of the major complications, such as liver abscess. Emetine is given in the form of emetine hydrochloride dissolved in ampoules of distilled water and of a capacity of 1 c.c. each. The dose for an adult of 140 lbs. ($63\frac{1}{2}$ kg.) is one grain, and the total dosage spread over as many days for the control of the dysenteric symptoms should not exceed 10 grs. More than this, it should not be necessary to give or else toxic symptoms may supervene, and these toxic symptoms are by no means to be despised. They consist of various manifestations of which myositis and neuritis are the most severe and it must be borne in mind that some people who are specially

susceptible to emetine are apt to develop cardiac symptoms which are sufficiently alarming.

For the more chronic forms of the disease, amœbic dysentery being essentially of a chronic and relapsing nature, the compound known as emetine-bismuthous-iodide has been introduced. This is a bright red fine powder, which when introduced into the stomach exerts powerful emetic properties. It has been used essentially in those forms of chronic amœbic dysentery in which cysts are being passed in the fæces emetine-bismuth-iodide (or E.B.I. for short) was introduced about 1916.

As originally advised, the drug was given in gelatin covered capsules each containing 3 grains of the drug, over a course of twelve days, making a total of 36 grains altogether. As the patient was kept on a very strict dietary of milk over the whole period, the treatment was a very exhaustive one ; but in the majority of cases it succeeded in eradicating the infection where emetine injections had failed. Still relapses continued to recur with blood and mucus stools containing demonstrable entamœbæ in individuals who had been subjected to one or more courses of E.B.I. and it became customary to regard them as instances of infection with emetine-fast amœbæ. Various modifications of E.B.I. have been effected with the idea of making the drug less nauseating. The chief of these are E.P.I. (emetine periodide), and Auremetine. It is said that both these latter drugs may be given in considerably larger individual doses than E.B.I. My own experience leads me to assert that, while all are nauseating, E.P.I. is the least emetic of the three ; but I am by no means convinced that it is equally as efficacious as E.B.I. The maximum dose of E.P.I. for an adult male is about 4 grains. With all these emetine compounds it is necessary to prepare the patient before the drug is given. The diet should be very light and should consist for the most part of milk (two pints), fish and chicken in the middle of the day, eggs, toast, butter and rusks. In order effectually to prevent vomiting, no solid food should be permitted for three hours before the drug is taken, and it is good practice to give a sedative such as luminal grs. 1, or *Tinct. opii*, minims 10, half an hour beforehand.

Since 1922, a new drug has been introduced which appears to have very powerful anti-amœbic properties. *Yatren* is an iodine-oxyquinolin-sulphonic acid compound. It can be given, either by the mouth or in the form of a

small rectal enema ; from the latter situation it is absorbed and soon after is excreted in the urine where it can be recognised by appropriate tests. When given in sufficient quantities by the mouth to exert a lethal effect upon the *entamœbæ*, it is apt to cause a very exhausting and intractable diarrhœa and on this account its administration has been abandoned, except as a form of after-treatment. In this manner, I find that it is very useful when given in pill form (four grains each), for one month subsequent to more active measures. In my own opinion, in order to obtain a permanent cure (for that is what one is aiming at) yatren should be given by the rectum in the form of rectal injections. I have now carried this out in over 200 cases with eminently satisfactory results. The lumen of the bowel must first be cleared of mucus and intestinal contents by means of an enema (one pint) of 2 per cent. sodium bicarbonate and 20 minutes to half an hour later the Yatren solution is injected. This is made by dissolving five grammes of Yatren in eight ounces of warm water, which results in a sherry-coloured solution. This is injected slowly by means of a catheter and funnel. The Yatren solution should be retained in the bowel as long as is possible, a period usually of six to eight hours during which it will percolate through the large intestine, coming into contact with amœbic lesions which it instantly heals up (as can be observed by frequent sigmoidoscopic examination). When excreted once more the Yatren solution appears as a greenish, slimy fluid, due probably to liberation of iodine. Yatren is practically non-toxic and the only disagreeable effect so far observed has been a flannely or roseolar rash which is apt to appear on the day following treatment. As there is no absolute evidence that Yatren solution invariably heals all the amœbic lesions in the large bowel, especially when it does not come into contact with them in the upper portion, I have been, during the last six years, combining both the Yatren and E.B.I. treatments, giving a total of 27 grains E.B.I. and ten enemata of Yatren on as many successive days. The end results of this combined treatment, have been eminently successful, so that I have records only of two subsequent parasitic relapses, both of whom have been permanently cured by a further Yatren course. In these especially intractable cases the Yatren solution may be used as strong as 5 per cent. without giving rise to any inconvenience.

As an after cure of intestinal amœbiasis, I use Stovarsol in small doses. This is an arsenical preparation (Acetyl-oxy-amino-phenyl-arsenic acid), it has acquired

a considerable reputation as a cure for amœbic dysentery in France, but there is no actual proof that it exerts any direct action upon the amœbæ themselves. Probably it is a very distinct intestinal tonic ; it braces up the system and makes the patient feel better. I usually give it in one tablet a day for 14 days subsequent to active treatment, but I consider it very necessary that care should be exercised in prescribing Stovarsol. In some people it is very liable to produce toxic symptoms and curious rubeolar arsenical rashes are comparatively common after its use. Therefore, the wise man should not prescribe more than one tablet a day. This treatment is best reinforced by Yatren of which one pill should be given at night for one month. As regards diet, in the after treatment of intestinal amœbiasis, I consider that it is necessary to exert a moderate amount of care for one month or so. One red meat meal, as beef or mutton, may be allowed for lunch, whilst chicken, fish and eggs, milk, milk puddings and green vegetables should make up the major portion of the dietary. It is a sensible measure to interdict all alcohol for one month.

Patients who have suffered from amœbic dysentery are apt to be distressed with flatulency for some time afterwards ; they may have a tendency to constipation and be forced to take petrolagar or liquid paraffin at night, but in my experience when once vigorously treated, the bowel action soon becomes restored to normal and the patient is not plagued by stenosis, adhesions and all kinds of malformations such as are described in the older textbooks of medicine.

Finally, regarding the third class of dysentery—the helminthic dysenteries—where these are due to intestinal bilharziasis, it is necessary to extirpate the parent bilharzia worms themselves as they are the source of the trouble. This is done by intravenous injections of tartar emetic, commencing with small doses of half-grain each, and gradually working up to two-and-a-half grains. A total course of treatment of 30 to 40 grains appears to be necessary in the case of intestinal bilharziasis ; but intravenous therapy alone does not, of course, entirely cure the intestinal lesions, for where there are large polypi, it may be necessary to have recourse to surgical measures in order to remove them.

As I remarked at the commencement of this paper, dysentery is a very large subject, and if I were to attempt to describe those conditions which simulate true dysentery closely and to embark on a discussion of their treatments, I am afraid I should overstep all bounds.

Notes on the Use of Glycerine for the Alleviation of the Pain Reaction in the Subcutaneous Administration of Sodium Hydnocarpate.

J. T. JACKSON.

THE use of glycerine has been advocated by the author¹ as an addition to solutions of sodium hydnocarpate to be injected by the method of subcutaneous infiltration in the treatment of leprosy for the purpose of reducing the pain reaction commonly occurring when sodium hydnocarpate solutions alone are used.

Glycerine has been used for this purpose at the Bankura Leprosy Home for some time with good results. Not always has there been complete elimination of pain, but the pain reaction in most cases has been considerably reduced and it is possible that it could be almost entirely eliminated if the strength of the glycerine solution is properly regulated.

On account of the soothing effect which glycerine has upon irritated tissues generally and its good penetrating power, one would expect that its addition to the sodium hydnocarpate solution to be injected would be an advantage. The addition would in this way be expected also to increase the absorbing power of the tissues and thereby shorten the time of the pain reaction (if any) resulting from such an injection.

The strength of the solution generally employed has been 2·5 c.c. of pure double distilled glycerine to 100 c.c. of 3 per cent. sodium hydnocarpate solution containing 0·5 per cent. of carbolic acid. Full particulars for the preparation of the solution are given in the original article¹.

These notes are an account of an experiment carried out at the same time and in the same way as the tests made on the pain reaction resulting from the injection of different fractions of sodium hydnocarpate in solutions of varying Hydrogen-ion concentration². When the first two sets of series of courses of injections in these experiments had been completed, a further set of two series of courses was carried out by adding glycerine to the various solutions of sodium hydnocarpate to bring them to the strength mentioned above. The "Pain Factor" was then again determined for each fraction of sodium hydnocarpate in the same way as before and the resulting observations compared with those

| o. and ex of attient reated. | Leprosy Classifica- tion. | Remarks on Areas of Anesthesia possibly affecting Pain Factor. General Health (G.H.) and Age. | Fraction of Sodium Hyd- nocarpate. | Left arm, 2 c.c. | | | | Right arm, 3 c.c. | | | | Left leg, 4 c.c. | | | | | |
|---------------------------------------|---------------------------------|---|--|--------------------------|--------|---|-------------|--------------------------|--------|--------|------------------------|--------------------------|--------|------|-------------|--------------------------|------|
| | | | | Days after Injection. | | | P.F. (3) | Days after Injection. | | | P.F. (3) | Days after Injection. | | | P.F. (3) | | |
| | | | | 1 | 2 | 3 | | 1 | 2 | 3 | | 4 | 1 | 2 | | 3 | 4 |
| ies I. | | | | | | | | | | | | | | | | | |
| 16 F | N ₁ /N ₂ | Injection areas unaffected. G.H., very good. Age about 35 | A | v.s. | v.v.s. | — | 0 | v.s. | m.p. | p. | N ₉ s. | 66.7 | v.s. | v.s. | v.v.s. | — | 0 |
| 2 F | C ₃ /N ₂ | Injection areas unaffected. G.H., good. Age about 35 | B | v.s. | — | — | 0 | v.s. | v.v.s. | — | — | 0 | v.v.s. | — | — | — | 0 |
| 18 F | C ₁ /N ₂ | Injection areas unaffected. G.H., fair. Age about 40 | C | v.s. | v.v.s. | — | 0 | v.s. | s. | v.s. | — | 0 | v.s. | v.s. | v.v.s. | — | 0 |
| 19 F | N ₂ | Injection areas unaffected. G.H., very good. Age about 40 | D | v.s. | v.v.s. | — | 0 | s. | m.p. | m.p. | m.p. | 100 | p. | s. | v.s. | [I] v.s. | 33.3 |
| 20 F | N ₁ /N ₂ | Anterior R. leg slightly affected. G.H., good. Age about 40 | E | s. | v.s. | — | 0 | s. | p. | s. | N ₉ v.s. | 33.3 | s. | s.d. | v.s. | v.s. | 0 |
| eries II. | | | | | | | | | | | | | | | | | |
| 21 M | C ₂ /N ₂ | Injection areas unaffected. G.H., good. Age about 35 | A | — | — | — | 0 | — | v.s. | m.p. | s. | 33.3 | — | v.s. | — | — | 0 |
| 12 M | N ₁ /N ₂ | L. leg probably affected. G.H., fair. Age about 30 | B | p. | v.s. | — | 33.3 | s. | v.s. | v.s. | — | 0 | s. | v.s. | v.v.s. | — | 0 |
| 23 M | N ₁ /N ₂ | Anterior both legs. G.H., good. Age about 26 | C | v.v.s. | — | — | 0 | s. | v.s. | v.v.s. | — | 0 | s. | s. | v.s. | v.v.s. | 0 |
| 24 M | N ₂ | R. leg affected, L. leg slightly. G.H., very good. Age about 50 | D | — | — | — | 0 | s. | v.s. | — | — | 0 | s. | s.d. | v.s. | N ₇ v.v.s. | 0 |
| 10 M | C ₁ /N ₂ | Injection areas unaffected. G.H., very good. Age about 28 | E | — | — | — | 0 | v.s. | v.s. | — | — | 0 | v.s. | — | — | — | 0 |

TABLE

| No. and Sex of Patient Treated. | Leprosy Classification. | Remarks on Areas of Anæsthesia possibly affecting Pain Factor. General Health (G.H.) and Age. | Fraction of Sodium Hydnocarpate. | Left arm, 2 c.c. | | | | Right arm, 3 c.c. | | | | Left leg, 4 c.c. | | | | |
|---------------------------------|--------------------------------|---|----------------------------------|-----------------------|--------|--------|----------|-----------------------|--------|--------|----------|-----------------------|--------|--------|----------|---|
| | | | | Days after Injection. | | | P.F. (3) | Days after Injection. | | | P.F. (3) | Days after Injection. | | | P.F. (3) | |
| | | | | 1 | 2 | 3 | | 1 | 2 | 3 | | 4 | 1 | 2 | | 3 |
| Series I. | | | | | | | | | | | | | | | | |
| 16 F | N ₁ /N ₂ | Injection areas unaffected. G.H., very good. Age about 35 | A | v.v.s. | v.v.s. | — | 0 | v.v.s. | v.s. | — | — | 0 | v.v.s. | — | — | 0 |
| 2 F | C ₃ /N ₂ | Injection areas unaffected. G.H., good. Age about 35 | B | v.v.s. | — | — | 0 | v.v.s. | — | — | — | 0 | v.v.s. | — | — | 0 |
| 18 F | C ₁ /N ₂ | Injection areas unaffected. G.H., fair. Age about 40 | C | v.s. | v.v.s. | — | 0 | v.v.s. | v.v.s. | v.v.s. | — | 0 | v.v.s. | — | — | 0 |
| 19 F | N ₂ | Injection areas unaffected. G.H., very good. Age about 40 | D | — | — | — | 0 | v.v.s. | — | — | — | 0 | v.v.s. | — | — | 0 |
| 20 F | N ₁ /N ₂ | Anterior R. leg slightly affected. G.H., good. Age about 40 | E | v.s. | v.v.s. | — | 0 | v.s. | v.s. | v.v.s. | — | 0 | v.v.s. | — | — | 0 |
| Series II. | | | | | | | | | | | | | | | | |
| 21 M | C ₂ /N ₂ | Injection areas unaffected. G.H., good. Age about 35 | A | v.v.s. | — | — | 0 | v.v.s. | — | — | — | 0 | v.v.s. | v.v.s. | — | 0 |
| 12 M | N ₁ /N ₂ | L. leg probably affected. G.H., fair. Age about 30 | B | v.s. | v.v.s. | v.v.s. | 0 | v.s. | v.s.d. | v.v.s. | — | 0 | v.v.s. | — | — | 0 |
| 23 M | N ₁ /N ₂ | Anterior both legs. G.H., good. Age about 26 | C | — | — | — | 0 | v.s. | v.v.s. | — | — | 0 | v.v.s. | — | — | 0 |
| 24 M | N ₂ | R. leg affected, L. leg slightly. G.H., very good. Age about 50 | D | — | v.v.s. | — | 0 | v.s. | v.s.d. | v.v.s. | — | 0 | v.s. | v.v.s. | v.v.s. | 0 |
| 10 M | C ₁ /N ₂ | Injection areas unaffected. G.H. very good. Age about 28 | E | — | — | — | 0 | — | — | — | — | 0 | — | — | — | 0 |

| Right leg, 6 c.c. | | | | | | Left thigh, 8 c.c. | | | | | | Right thigh, 10 c.c. | | | | | | Remarks. | Average P.F. for each In- |
|-----------------------|--------|--------|--------|---------------------|----------|-----------------------|------|------|------|---------------------|----------|-----------------------|--------|------|------|-------------------------|----------|---|---------------------------|
| Days after Injection. | | | | | F.P. (4) | Days after Injection. | | | | | P.F. (4) | Days after Injection. | | | | | P.F. (5) | | |
| 1 | 2 | 3 | 4 | 5 | | 1 | 2 | 3 | 4 | 5 | | 1 | 2 | 3 | 4 | 5 | | | |
| v.s. | p. | s. | v.s. | N ₆ v.s. | 25 | — | v.s. | p. | s. | v.s. | 25 | s. | m.p. | p. | s. | N ₆ v.s. | 40 | N ₆ , N ₉ =Normal 6th and 9th day | 26.1 |
| v.v.s. | v.s. | v.v.s. | v.v.s. | — | 0 | v.s. | s. | v.s. | — | — | 0 | s. | p. | s. | s.d. | N ₈ v.s. | 20 | N ₈ =Normal on 8th day | 3.3 |
| s. | v.s. | — | — | — | 0 | s. | v.s. | — | — | — | 0 | v.s. | v.v.s. | — | — | — | 0 | | 0 |
| p. | p. | p. | s. | v.s. | 75 | s. | s.d. | v.s. | — | — | 0 | s. | s. | s. | v.s. | — | 0 | Much pain and Induration after 3 c.c. N ₁₀ =Normal on 10th day | 34.7 |
| v.s. | v.v.s. | — | — | — | 0 | v.s. | p. | s. | v.s. | v.v.s. | 25 | s. | m.p. | s. | s.d. | N ₉ p. | 40 | N ₇ , N ₉ =Normal on 7th and 9th day | 16.4 |
| — | — | — | — | — | 0 | — | p. | p.d. | p.d. | v.s. | 75 | v.s. | p. | p.d. | s. | N ₆ v.s. | 40 | N ₆ =Normal on 6th day | 24.7 |
| p. | p.i. | p.d. | s. | [I] s. | 75 | p. | p.d. | p.d. | v.s. | v.s. | 75 | | | | | | | Injections stopped after 8 c.c. (N ₈ =normal on 8th day) | 36.7 |
| s. | v.s. | — | — | — | 0 | v.s. | m.p. | p.d. | s. | [I] v.s. | 50 | p. | m.p. | p.d. | s. | — | 60 | | 18.3 |
| s. | p. | p. | s. | N ₆ v.s. | 50 | v.s. | p. | p.d. | s. | N ₆ v.s. | 50 | s. | s.d. | s.d. | v.s. | v.v.s. | 0 | N ₆ , N ₇ =Normal on 6th and 7th day | 16.7 |
| s. | p. | s. | v.s. | [I] — | 20 | s. | p. | p.d. | s. | N ₆ — | 50 | p. | m.p. | s. | s. | [I] N ₈ v.s. | 40 | N ₆ , N ₈ =Normal on 6th and 8th day | 18.3 |

I.

| Right leg, 6 c.c. | | | | | | Left thigh, 8 c.c. | | | | | | Right thigh, 10 c.c. | | | | | | R marks. | Average P.F. for each In- jection Co. |
|--------------------------|--------|--------|----|------|-------------|--------------------------|--------|--------|--------|---|-------------|--------------------------|--------|--------|--------|-------------------|-------------|--------------------------------------|---|
| Days after Injection. | | | | | P.F. (4) | Days after Injection. | | | | | P.F. (4) | Days after Injection. | | | | | P.F. (5) | | |
| 1 | 2 | 3 | 4 | 5 | | 1 | 2 | 3 | 4 | 5 | | 1 | 2 | 3 | 4 | 5 | | | |
| — | — | — | — | — | 0 | v.v.s. | — | — | — | — | 0 | v.s. | p. | v.s. | v.v.s. | — | 20 | N ₈ =Normal on 8th day | 3.3 |
| v.s. | v.v.s. | — | — | — | 0 | v.s. | — | — | — | — | 0 | v.v.s. | v.v.s. | — | — | — | 0 | | 0 |
| v.v.s. | v.v.s. | — | — | — | 0 | v.v.s. | — | — | — | — | 0 | v.v.s. | v.v.s. | — | — | — | 0 | | 0 |
| v.v.s. | — | — | — | — | 0 | v.s. | — | — | — | — | 0 | p. | p. | p.d. | v.s. | v.v.s. | 60 | | 10.0 |
| v.s. | v.v.s. | — | — | — | 0 | p. | v.s. | — | — | — | 25 | p. | v.s. | v.v.s. | — | — | 20 | | 7.5 |
| v.s. | v.s.d. | v.v.s. | — | — | 0 | v.s. | p. | v.s. | v.v.s. | — | 25 | v.s. | v.s. | v.v.s. | — | — | 0 | | 4.2 |
| p. | v.v.s. | v.v.s. | — | — | 25 | v.s. | v.v.s. | — | — | — | 0 | p. | m.p. | p. | p.d. | N ₈ s. | 80 | | 17.5 |
| s. | v.s. | v.s.d. | — | — | 0 | s. | v.s. | — | — | — | 0 | m.p. | s. | v.s. | v.v.s. | — | 20 | | 3.3 |
| s. | p. | p. | s. | v.s. | 50 | s. | v.s. | v.v.s. | — | — | 0 | s. | p. | p.d. | v.s. | v.v.s. | 40 | 15.0 | |
| v.s. | v.s.d. | — | — | — | 0 | v.s. | v.s. | v.v.s. | v.v.s. | — | 0 | v.s. | v.v.s. | v.s. | v.v.s. | — | 0 | 0 | |

— pain; m.p. = much pain; p.i. = pain increasing; p.d. = pain decreasing; I = induration.

obtained on the same patients when previously injected with the solutions without the glycerine addition.

Experimental.—The fractions of sodium hydnocarpate used were those marked A, B, C, D, E; particulars of which are given in the previous paper².

The patients selected generally, as far as possible, were those who had had the highest pain reaction when using sodium hydnocarpate alone. The designation numbers of the patients in the Tables here given are the same as those used in the Tables published in the last issue of *Leprosy Review*.

The period covering the injections was from early October to early November, 1929, immediately following the completion of the tests made with the sodium hydnocarpate solutions alone, so that as far as possible, the other varying factors influencing the pain reaction were kept as constant as possible for comparative purposes.

The observations were made and the Pain Factor (P.F.) calculated in the same way for each course of injections as previously described². The records thus obtained are given in the Tables on pages 122 and 123.

Table I.—The particulars here given are the observations made on the patients selected for treatment with the glycerine solution, but in this case when treated with the solutions of sodium hydnocarpate employed alone. The particulars are taken from Tables I and II of the previous paper².

Table II.—Here are recorded the observations made on the same patients as in Table I above using the same fractions

TABLE III.

COMPARING "PAIN FACTOR" OF SODIUM HYDNOCARPATE SOLUTIONS WITH AND WITHOUT GLYCERINE.

| Fraction of Sodium Hydnocarpate. | Mean P.F. from Table IV. (See previous paper). | P.F. of Solutions with Glycerine— Table II. | | | Decrease in Mean P.F. | Per cent. Decrease in P.F. |
|----------------------------------|---|--|------------|-----------|-----------------------|----------------------------|
| | | Series I. | Series II. | Mean P.F. | | |
| A. | 13.4 | 3.3 | 4.2 | 3.8 | 9.6 | 71.6 |
| B. | 15.9 | 0 | 17.5 | 8.8 | 7.1 | 44.7 |
| C. | 3.1 | 0 | 3.3 | 1.7 | 1.4 | 45.2 |
| D. | 23.3 | 10.0 | 15.0 | 12.5 | 10.8 | 46.4 |
| E.* | 12.2 | 7.5 | 0 | 3.8 | 8.4 | 68.9 |

Average Percentage Decrease in P.F. = 55.4.

* Commercial Product.

of sodium hydnocarpate solution but with the addition of glycerine to each solution in the same strength as given above.

Table III.—In this Table a comparison is made between

(a) the Mean Pain Factor, as previously determined for the five fractions of sodium hydnocarpate examined without any addition of glycerine, and

(b) the Mean P.F. after the addition of glycerine. As a basis for comparison, the Mean P.F. given in column two is that found for the samples of sodium hydnocarpate as recorded in Table IV. of the article already referred to.

Conclusions.

That the use of glycerine as an addition to solutions of sodium hydnocarpate for subcutaneous injections is undoubtedly of benefit in reducing the pain reaction usually following such injections.

From Table III above it will be seen that the average percentage decrease in the "Pain Factor" is 55.4; the minimum decrease being 44.7 per cent. and the maximum 71.6 per cent. There is no doubt that this figure would be higher still if the strength of the glycerine solution is increased. It was not possible at the time to carry out further comparative tests with higher percentages of glycerine.

As the pain reaction following the injection of solutions of sodium hydnocarpate has been shown to have no direct relationship with the Hydrogen-ion concentrations of these solutions for the range of pH examined¹, the author suggests that the varying results obtained with different batches and products of sodium hydnocarpate, so far as their pain reaction is concerned, can be overcome and considerably reduced by the addition of glycerine when injections are to be made by the subcutaneous infiltration method.

REFERENCES.

¹Jackson, J. T. "Alleviation of Pain following the Administration of 'Alepol' Subcutaneously," "The Superintendent," No. 16, Aug., 1929, and "Leprosy Notes," No. 7, 1929.

²Jackson, J. T. "Some Observations on the Influence of the Hydrogen-ion Concentration on the Pain Reaction in the Administration of Sodium Hydnocarpate Solutions by Subcutaneous Infiltration." Leprosy Review, Vol. III, No. 2, 1932.

INDIAN SECTION.

The Duties of a Nursing Superintendent in a Leprosy Settlement.

M. P. THORNTON.

ONE of the chief duties of a sister in a leprosy settlement is to train others to nurse the sick as well as give the special treatment for leprosy. Sufferers from leprosy may have many other ailments in addition, and only under trained supervision can these be treated. For instance, in the Leprosy Homes at Purulia quite a number of the patients have severe anæmia, the result of hookworm in their systems. With the co-operation of the nurses and a dispenser for the microscopical examinations, during 1930, 150 of the worst cases were successfully treated, another 200 partially so. During the following year the remainder of the patients were examined and treated where necessary. No light task as there are over 800 people altogether.

A few enquiries made, brought to light the fact that many of the cases of leprosy had made a marked improvement. In March, the four homes for children suffering from leprosy were entirely cleared of hookworm trouble. The following December the Medical Superintendent remarked at the quarterly examination how surprisingly all the children had improved that year. One other striking case came under notice. Madan had received treatment for about five years. Every microscopic examination showed that he was still a positive case, the number of bacilli in the skin and mucosa lessening for a time, then remaining stationary for some period. In April, 1930, he was treated for hookworm, and after two months' treatment this was eliminated. Further tests for leprosy were found negative, and in December he was discharged from the Homes as "symptom free."

In every settlement there are many types of people; from these we can obtain our nurses for training. Personally, I am not in favour of using the healthy children in our Homes to train as nurses in the leprosy hospital. Patients of the cutaneous type of leprosy requiring hospital treatment are usually of the most infective type. Because of this, only nurses already trained to deal with contagious diseases are suitable, unless they already have the same disease. In Purulia, we had only ignorant village women who were willing to come forward for training for the Women's

Hospital. In the Men's Hospital, matters were a little better, as these nurses could read and write in the vernacular.

Patience and perseverance overcame the illiteracy in the Women's Hospital. Two learnt to read thermometers and mark charts correctly. After a while, more intelligent girls were obtainable. Classes are held from time to time, of a simple nature, *e.g.*, a talk on anatomy dealing perhaps with some special point occurring in some particular disease prevalent at the time, *e.g.*, cases of pneumonia provide a good opportunity to give a lecture on the lungs that may be remembered. The illiterate nurse has her interest aroused, and is, therefore, enabled to nurse her patient more intelligently. She will also probably retain more than a little of the knowledge thus obtained. With the more literate, notebooks can be used. Talks on hygiene, medicines, diets are appreciated, if not given too frequently. This, of course, does not apply to the more educated nurse, who is able to attend frequent regular classes. Theatre duties are taught in the operating theatre after the essentials of surgical asepsis have been explained. In spite of the latter, I found the nurses had not really grasped surgical asepsis until they had actually assisted in the theatre. To have all new nurses in the theatre for a start was a trifle difficult, but by giving each one a certain duty and making them understand they had no other duty to think of, they managed very well. At present, six out of our staff of eighteen can now take any part of theatre duties, four being able to assist the surgeon, if necessary.

Practical classes for bandaging are held, to learn the correct method of special bandaging. I found the nurses very apt with simple methods for hands and feet, even if not the approved method, which would not always answer on some of the queer shaped stumps we get in the advanced nerve cases.

As previously mentioned, studies of special diseases lead to more intelligent nursing. Malarial patients have their quinine on the strike of time, remaining under nets from 5 p.m. until 5 a.m., hookworm cases are followed up with iron tonics, repeated treatments and examinations where necessary, fourteen doses being our highest number for one case. Nurses are responsible for looking up any defaulters. In the case of tuberculosis they have learnt the danger of infection, and report any person in the Homes known to have a troublesome morning cough. These can then be examined and isolated in the Tubercular Hospital if necessary. Where this has been done the house of the patient is then whitewashed, and a nurse is responsible for the

thorough disinfection of the floor before the other inmates return to it. I have always found these duties carried out, the nurses responding well to the responsibility given to them. In dealing with the septic troubles, again the trained nurses' teaching is invaluable.

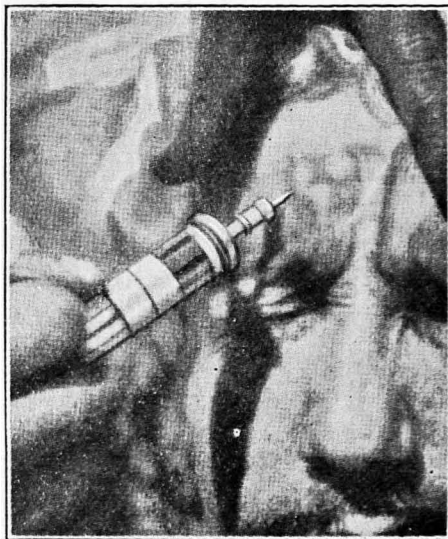
Studying the necessity for cleanliness in small details prepares the way for the asepsis necessary when giving the injection treatment for leprosy. A nurse who has had a brief time in hospital training will prove more apt when sent to work in the treatment department. Owing to the chronic nature of the nursing chiefly required in hospital for leprosy patients it is possible to let the nurses work also in the treatment department. For instance, women injectors are better for the treatment of women and it is possible for the more educated female nurses to attend to this work, the less intelligent remaining in hospital to attend to the duties, these carrying out the day's routine. The nurses know, and have seen the results from an injection badly given, and may have had to attend to the sufferer day after day, and this tends to make them more careful. Also their lectures on the necessity for cleanliness and asepsis make them appreciate the technique of their work more than if merely learning "how" to give an injection.

Another side of the trained nurses work is Child Welfare. Mothers admitted with infants are immediately looked up, the children then moved to separate homes where these are provided. Mothers are usually quite ready to give up the little ones within three days of their arrival when they see and hear a little of the care that will be given to their children.

Another duty falling to the superintendence of a trained nurse is the regular treatment of the eyes, ears, nose and throat cases. Before the former clinic was commenced in Purulia by the late Dr. Landeman and Sister Grimshaw, eye cases had been treated sporadically in either hospital or dispensary, attendance being very irregular, as patients did not like waiting their turn, neither would they all come early to have treatment before the ordinary dressings began. Now they have their special clinic, opened for a certain time each morning. Later in the day the same room is used for the other special clinics. Working in these places we have a number of workers who are themselves sufferers from leprosy and are able to do the necessary treatment under a Sister's supervision.

The teaching of games and exercises for the girls should not be excluded. Boys are naturally energetic, act on their own initiative and obtain plenty of exercise by means of

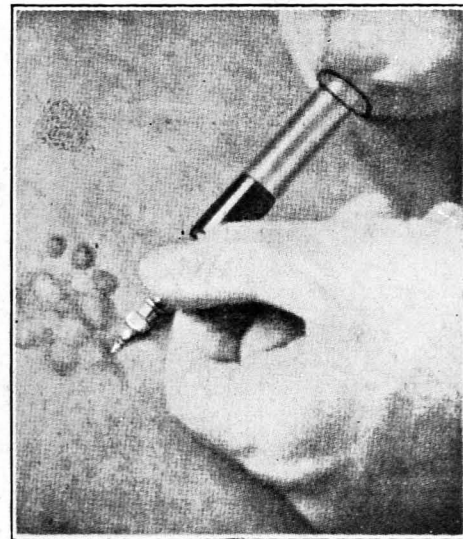




NO. 1.—INFILTRATION OF SKIN OF
FOREHEAD ; NOTE WHEELS.



NO. 3.—INFILTRATION OF THICKENED
SKIN ; NOTE SKIN MARKINGS
STANDING OUT.



NO. 4.—INFILTRATION OF SKIN OF
BACK ; NOTE WHEELS.

By kind permission of Dr. E. Muir.

gardening, games, &c. Girls are more inclined to sit about and need encouraging to exercise. Games need to be taught, and other interest aroused. In this cause great benefit can be obtained through the formation of a Girl Guide company, the activities graded according to the ability of the girls. This branch of the work could certainly be undertaken by a general or educational worker, but in a home where only trained nurses are on the staff of women workers it is a detail not to be overlooked.

Note on the Treatment of Leprosy by Intradermal Infiltration.

E. MUIR.

(Reprinted from "Leprosy in India," July, 1932.)

OF all the methods of administering hydnocarpus oil and its preparations the intradermal is in our experience the most effective. The purpose of this method is to infiltrate the lesions themselves which are principally in the corium of the skin. Sometimes lesions are found in the subcutaneous tissue, in which cases deeper injections should be given.

In some ways the esters are more convenient for infiltration than the oil as they are less viscous and therefore pass more easily through the intercellular spaces without disrupting the tissues. Pure hydnocarpus oil on the other hand with 4% creosote added, if heated to the highest temperature tolerated (*i.e.*, about 45° C.), loses its viscosity and can be infiltrated intradermally with ease. It is important that the oil used should be prepared from ripe, fresh seeds, and should be extracted from the seeds by pressure in the cold. It should be stored in a cool place and in air-tight containers. In India the great advantage of the oil is its cheapness, an important consideration when large numbers of poor patients have to be treated. When bought in bulk it can be had for 14 annas a pound. As to the comparative efficacy of the oil and esters when given intradermally, it is difficult as yet to make a definite statement. Certainly the oil does not appear to be any less effective than the esters in clearing up local lesions. We find that the oil when first injected is slightly more irritating than the esters, but that

the irritation passes away more rapidly than when the latter is used.

Sodium hydnocarpate (or the proprietary preparation "Alepol") can be given in a 1, 2, or 3 per cent. solution intradermally; but, whatever its comparative general therapeutic power may be when given intravenously, intramuscularly, or subcutaneously, we find that its local effectiveness in clearing up lesions is inferior to that of the esters and oil. This is probably due to its being quickly absorbed into the general circulation, whereas the esters and oil are taken up by the local cells and there continue to exert a beneficial effect in the infiltrated area for several weeks or months. Almost all skin areas showing either visible lesions or deep analgesia are suitable for intradermal infiltration. Areas, however, should not be infiltrated in which deep analgesia is due to blocking or destruction of the nerves supplying the part, and not to local invasion of the skin by *M. lepræ*; such a condition is commonly found in the distal parts of the extremities. On the other hand infiltration of the skin covering a thickened, superficial nerve trunk, such as the ulnar, is sometimes found to cause marked improvement, the thickening and tenderness clearing up with relief of the signs and symptoms in the parts supplied by the nerve.

Technique.

A 2 c.c. or 5 c.c. syringe with closely fitting needle is used. The quantity to be injected is drawn up or poured into the syringe. If oil is used its temperature must be at least 45° C. as mentioned above. An area of suitable skin is selected, marked off with a grease pencil and sterilised with spirit of iodine. Infiltration is made through a number of punctures from 6 to 10 mm. apart. At each puncture about half a minim is injected which raises a wheal about 10 mm. in size. If the skin is thick, instead of a wheal rising the skin markings stand out in greater relief than those of the surrounding skin. If a large area of skin surface has to be covered the punctures may be spaced more widely apart. In making the injections the needle should be sloped to an acute angle with the skin surface and should not enter the skin more than 2 or 3 mm. If the appearance of a wheal or more evident skin markings is not produced it is a sign that the needle has been inserted too deeply. Where, however, the lesion is deeper than the skin, *i.e.*, in the subcutaneous tissue, or where thick nodules are found, deeper injections should be given. For every

cubic centimetre of the drug injected some 32 punctures are necessary. Some patients will tolerate a larger amount injected at each point, but, at least to begin with, the above rule should be observed in every case.

The dose will vary according to the tolerance of the patient from 0.5 to 5 c.c. given once or twice a week. In patients with good general health and firm muscles, and who are taking a fair amount of daily exercise, the larger doses are tolerated; but it is well to begin with the lower doses and gradually work up to the higher ones. The larger the dosage the quicker the progress, provided it is not above the patient's tolerance. On the other hand injections which are either larger or more frequent than the patient can stand tend to lower the general resistance and may lead to an exacerbation of the disease. It is often necessary to wait for weeks or months before beginning injections if the patient is in poor health or shows signs of "lepra reaction." Likewise, special treatment may have to be intermitted for similar reasons. Meanwhile, every effort should be made to improve the patient's general health. The sedimentation test is invaluable in estimating the tolerance of the patient and in regulating the frequency and amount of injections.

Choosing Sites for Infiltration.

When infection is widespread over the body it is often well to begin with the back of the trunk as it is less sensitive and the process of injection cannot be seen by the patient. The face and other more sensitive regions are reserved for later when the patient has become more accustomed to the treatment. The physician should keep a note of the dates of treatment and of the parts infiltrated on each date, so that he may proceed systematically and gradually cover all the areas affected. It must be remembered that microscopic examination will often show the skin to be markedly affected in parts where there is no outward appearance of a lesion. Therefore, if deep analgesia is present, one should not necessarily consider the absence of a visible lesion as a contraindication for infiltration. In patients with marked nodules, especially if these be hard and fibrous, it is sometimes well to begin by infiltrating these nodules, the more diffuse lesions being treated later. An ordinary hypodermic needle is inserted till the point reaches the middle of the nodule and 2 to 4 drops of the oil or esters are slowly injected. The nodules will swell up at first and later shrink either with or without liquefaction and discharge of the contents.

Reinfiltration.

Lesions should as a rule not be infiltrated a second time till after a month has elapsed. In cases with widespread lesions it may take six months before the whole body is covered. It should be remembered that the oil and esters remain in the cells of the skin for a considerable period, and that progressive improvement goes on in the parts once infiltrated. If there are few lesions it may be possible to cover them all at one or two sittings. In such cases intramuscular injections into the gluteal region or subcutaneous injections may be given on the days that skin lesions are not available ; or, if the patient's resistance is high (especially towards the end of treatment) he may be injected at two or four weekly intervals.

General Considerations.

If skilfully carried out, intradermal infiltration does not cause excessive pain and we seldom find patients objecting to it. Analgesia, though not complete, is sufficient in most cases at the beginning of treatment to make the injections bearable. Reinfiltrations are often more painful but seldom beyond the tolerance of any but the most sensitive patients. If, however, a lesion is reinjected before the induration caused by the previous infiltration is absorbed, much pain results and even ulceration may occur. Other causes of pain and ulceration are : injection of too large a dose at any one point ; injecting too superficially into the epithelium ; injection of irritating and impure oil or esters ; injection of oil which is too viscous due to its not being sufficiently heated.

Extract from Current Literature.

(*Indian Medical Gazette*, April, 1932.) Dr. John Lowe reviews the present position of Leprosy in India, of which the following is an extract.

There is at present much confusion and doubt among medical men and among the lay public regarding the present position of leprosy work, the results of treatment and methods of prevention. Very sweeping statements have been made particularly in the lay press regarding the wonderful results of treatment and the possibility of eradicating leprosy by the methods of treatment and prevention that are now being used.

During recent years the organisation of leprosy work on the basis of treatment, often out-patient treatment, has brought under observation many cases of leprosy at a very early stage. A study of such cases has greatly increased our knowledge of the early signs and onset, and has modified our ideas on prognosis.

Some important facts concerning leprosy and its prognosis apart from treatment are here summarised.

(1) It is now generally agreed that the disease is acquired by contagion and is rarely if ever hereditary.

(2) The disease is not highly infectious and many people exposed to the

infection do not develop the disease. Instances are quite common of highly infective lepers living for many years in close contact with healthy people, the contacts remaining healthy. Infection of the contacts must have occurred but clinical leprosy did not develop.

(3) The disease shows a marked natural tendency towards healing and cases healed without treatment are now found to be quite common. The spontaneous healing may occur at any stage of the disease, especially in the early stage. We have seen dozens of cases with depigmented anæsthetic patches of very long standing with a history of no increase or decrease for ten or fifteen years and with no signs of active leprosy at the time of examination.

(4) Many cases of leprosy either show no lepra bacilli on examination, or else do not discharge any bacilli, so they are apparently non-infective.

(5) Leprosy is a disease of bad social and hygienic conditions.

(6) Strong healthy people living healthy lives, taking a good diet and living under good conditions rarely develop leprosy, and when they do they often get a mild form of it.

(7) Some cases of leprosy continue for many years with little evidence of increase or decrease and with little suffering.

(8) Most cases of active leprosy progress very slowly with little constitutional disturbance but with gradually increasing deformity and disability.

(9) Leprosy rarely causes death. Death if it occurs is practically always due to secondary infection or intercurrent disease.

Thus the new knowledge has shown that in India at any rate leprosy is as a rule not nearly as infectious, virulent, intractable and dreadful a disease as it was thought to be.

There is another fact which has been brought to light by this greater knowledge of leprosy in its earlier and slighter forms. Leprosy is found to be very much more prevalent than was ever imagined.

It is difficult to give statistical returns on an annual basis which reflect accurately the results of treatment. This is because the ordinary period of treatment necessary in the average case of leprosy is much more than one year. Only very early cases are likely to be arrested within one year, and consequently the more severe cases only appear in the annual returns year after year while the early cases only appear once. A leprosy hospital tends to get silted up with the very bad cases, while the early cases leave comparatively quickly. The annual statistics suffer accordingly.

Bacteriological Examination Before and After Treatment.—Bacteriological examination includes bacteriological examination of skin clips usually from the lobe of the ear, and bacteriological examination of the nasal mucous membrane. The latter is of little importance for diagnosis but is an index of the severity of the infection and of the infectivity of the patient.

Before Treatment.

| | | | |
|---|----|----|-----|
| Showing bacilli in nasal mucous membrane and skin | .. | .. | 309 |
| Showing bacilli in the skin only | .. | .. | 84 |
| Showing no bacilli | .. | .. | 71 |

After Treatment.

| | | | |
|----------------------------------|----|----|-----|
| Showing bacilli in nose and skin | .. | .. | 88 |
| Showing bacilli in skin only | .. | .. | 240 |
| Showing no bacilli | .. | .. | 136 |

It will be seen that after treatment the nasal mucous membrane of most patients become negative, 221 out of 309. All these have not become negative during 1929. Some have become negative in previous years. The skin has become negative in a very much smaller number of cases, 65 out of 393, but all these 65 became negative during 1929. Most of these 65 have been slighter cases of skin leprosy (C1 and C2 stages). A few only in the C3 stage have after prolonged treatment become bacteriologically negative. This has been our general experience for several years. *It is extremely difficult to render a C3 case bacteriologically negative. In many C3 cases, however, the disease becomes inactive* but some bacilli persist. We have in this institution patients who have been under treatment for six, seven and eight years in whom

bacteriological examination still shows the lepra bacillus. In most of these cases the disease is practically, if not entirely, inactive and we think that these residual bacilli if few are not necessarily of much clinical importance. In about 100 cases still showing a few bacilli on examination, the disease appears to have been inactive for a year or more.

The results of treatment may be summarised as follows :—

- (1) In almost every case the disease ceases to progress.
- (2) In some cases (mostly early) the disease is arrested and there remain no bacilli on examination and no signs of activity.
- (3) In more advanced cases which form the bulk of our patients, the progress of the disease is arrested, the existing lesions become less, the nasal discharge can be rendered free of bacilli, thus much diminishing the infectivity, and after prolonged treatment the disease apparently becomes inactive, although some acid-fast bacilli can be found in the skin.

Thus it appears that in early cases we can hope to render the disease inactive and possibly overcome the infection, but in most cases it is sounder medically to talk of "Controlling" the infection and arresting the disease rather than of eradicating it.

Our opinion is that special treatment is of very considerable value, but it is far from being completely satisfactory. It is painful, it needs to be given for a very long time, special training is necessary for those who are to administer it, and the results of treatment are so slow in showing themselves that many out-patients cease to attend for treatment.

The Organisation of Leprosy Work.

In India with its million or more cases of leprosy the voluntary system is the only possible one.

The propaganda element in this work is undoubtedly of great value. One of the great difficulties in leprosy work is the lack of any enlightened public opinion.

The survey element of the work is also of great value. Much valuable information has been gained about the prevalence of leprosy and the common types of leprosy, and information gathered in survey work may be of great value in the organisation of preventive work.

The treatment side of P.T.S. work is less satisfactory. The common experience is that, in the beginning, a large number of patients come for treatment, but when the survey is finished the number of patients tends to drop, many cease to attend altogether, and many others attend so irregularly that efficient treatment is difficult or impossible. We recently collected some statistics regarding the attendance of out-patients at clinics in India. It was found that the number of patients attending more or less regularly for six months treatment varied between 20 per cent. and 50 per cent. of the total. On an average the figure was about 30 per cent. In cities where patients do not have to travel far, where there are transport facilities, the figures tend to be higher. In backward rural areas they are lower. The percentage of patients attending for one year is usually considerably lower than 30 per cent.

Leprosy is a disease which needs prolonged treatment. In the earliest case at least one year's treatment is advisable and many cases need several years' treatment. The finding that on the average 70 per cent. of cases cease attendance in the first six months and that a still larger number fail to attend for one year is a serious one.

The reasons for this state of things are numerous, but one of the principal reasons is that, from the patient's point of view, our treatment is not good enough, and does not give the results he hopes for. We should not shut our eyes to this fact.

Other difficulties connected with out-patient clinics are the following :—

(1) That small clinics scattered over a wide area are difficult to organise and to run efficiently, and a sufficient standard of work in diagnosis and treatment is difficult to maintain. Laboratory work is often entirely neglected and the work suffers in consequence.

(2) That for efficient work the efforts of the different clinics need to be co-ordinated. This is often difficult.

(3) The segregation of infective cases in their homes is very rarely carried out.

(4) That many patients at certain times need far more careful treatment than can be given in an out-patient clinic, where the patients only attend once or twice a week.

In our opinion these difficulties will not be really overcome until we have a more efficient treatment. This can only come as the result of experimentation and research. In the meantime we must use such treatment as we have to the greatest advantage. Out-patient treatment must be the basis of the work, but we believe that it would gain greatly in efficiency if it were associated with in-patient work on a limited scale. In-patient leprosy work on a voluntary basis is carried on in various institutions in India, and in such work the difficulties encountered in out-patient work are lessened. The patients are segregated and remain under treatment as a rule for a much longer period than do out-patients. Special treatment can be given and patients can be seen every day if necessary. All necessary laboratory examinations can be made, and the regime, diet, &c., of patients can be supervised.

If our leprosy work in India is to be really effective it must be based on accurate knowledge obtained by really scientific observations made under good conditions in an area which is more or less typical of India as a whole. At present our knowledge is very incomplete and our attempts to deal with leprosy are based to some extent on pious hopes rather than on scientific facts. We know that we can benefit many patients by treatment. We hope, but we do not know, that in many cases the results of treatment are permanent. We hope, but we do not know, that treatment as given at present will in time reduce the incidence of leprosy. We know little about the epidemiology or the mode of transmission of leprosy.

We believe that for the future of leprosy work in India, it is most important that really intensive work in a limited area be undertaken and that for this purpose there be established at least one leprosy investigation centre in a suitable rural area. The main objects of such a centre would be investigation of the epidemiology of leprosy in the surrounding district of the efficacy of various forms of treatment, of the permanence of results of treatment, of the effect of treatment on the incidence of the disease, and of the efficacy of methods of prophylaxis. This would best be done by a combination of in-patient and out-patient work, propaganda and survey work, examination of contacts and re-examination of discharged patients, &c. Another important object would be the training of leprosy workers, especially in field work. At the end of one or two decades of such work efficiently carried out there should be available facts and statistics which should be of tremendous value in organising leprosy work in India as a whole.

Leprosy is one of the great problems of India intimately connected with most of India's other problems. It is a social and economic problem, not merely a medical one. The great predisposing causes of leprosy in India are poverty, ignorance, bad social and hygienic conditions, bad diet and debilitating disease. Leprosy will not finally disappear from India until these evils are mitigated, but it is greatly to be hoped that as the result of research work methods of prevention and treatment will be discovered which will bring leprosy more easily under control. In the meantime, however, even with our present limited knowledge we can do much.

Avoiding unreasoned optimism and pessimism, let us critically and scientifically study the facts and, realising the difficulties, do what we can to overcome them.