

LEPROSY  
IN  
INDIA



CENTRAL HEALTH EDUCATION BUREAU  
Directorate General of Health Services,  
Ministry of Health,  
Government of India,  
NEW DELHI.



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# LEPROSY IN INDIA

BY

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## INTRODUCTION

Leprosy creates big and difficult problems in many parts of India. Till recently it was a neglected subject, and did not receive general and widespread interest proportionate to the magnitude of the problems. Fortunately in the post-independence period increasing interest has been taken in the solution of these problems both by government and non-government agencies. It is true that the problem is a huge and multi-faceted one, that so far only the fringes have been touched, and that much yet remains to be done. However, the increasing momentum of anti-leprosy work in all parts of the country cannot but inspire the hope that the goal of eradication of the disease from the country may be achieved in not a very distant future.

For the success of anti-leprosy programmes the active co-operation of the general public is essential. For this purpose it is necessary to remove the wrong and superstitious ideas often current in the people about the disease. It is essential that these wrong ideas be replaced by correct knowledge about the disease, so that the people can develop the right and rational attitude towards it. This knowledge should be based on scientific facts but should be presented in a non-technical form for the benefit of the general public. The present brochure is being written to meet this need.

This brochure is based on the author's "Lecture Notes on Leprosy" under publication for the training of the medical officers in leprosy and anti-leprosy work. The brochure is a selective condensation of the Notes—some of the purely technical subjects such as diagnosis, differential diagnosis, pathology and histopathology etc. have been completely omitted; the subject of treatment has been briefly discussed without going into details about the different remedies and doses etc.; chapters on subjects like history and present distribution of the disease, its cause, spread and forms, have been suitably condensed; some of the chapters dealing with the control of the disease and social welfare of the patients have been literally copied from the Notes.

In this brochure attempts have been made to present an account of leprosy and anti-leprosy methods in non-technical language as far as possible for the use of the general public. It is hoped that this publication will be instrumental in promoting a new and rational outlook on leprosy and in stimulating general interest in the disease. As already stated both these things are essential prerequisites for success in any anti-leprosy scheme.

**DHARMENDRA**

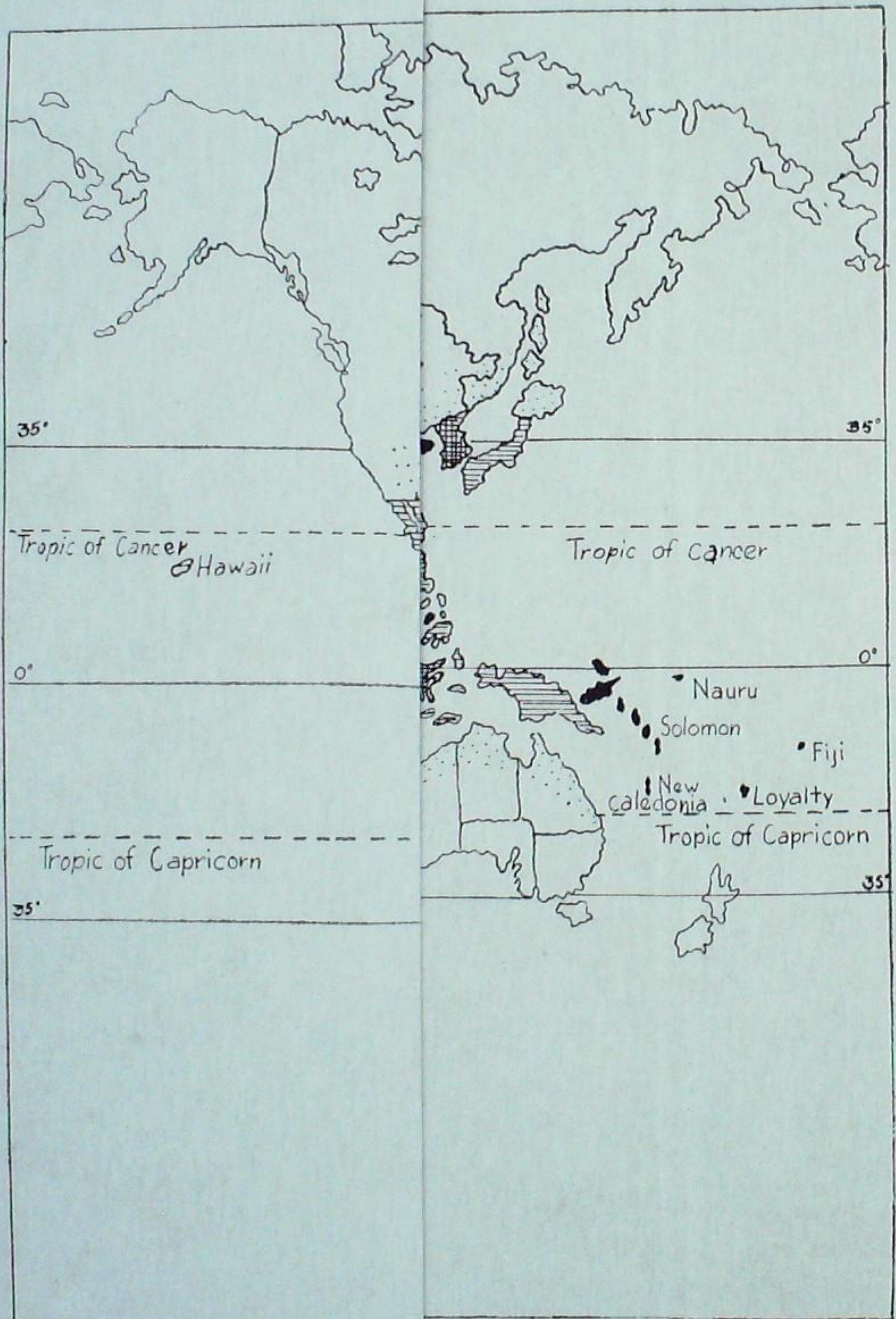
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TIRUMANI, CHINGLEPUT;  
The 25th August, 1958.



# DISTWORLD





## 1. HISTORICAL

### Origin and early spread

Leprosy is a disease of great antiquity. Its origin and early spread is largely a matter of surmise. Possibly it originated in Africa, spread to India very early, and later from India to the Far East and from Africa round the eastern end of Mediterranean to Europe. It appears to have been prevalent in India and Africa from pre-historic times. Before the beginning of the Christian era leprosy was introduced into Europe, and during the next several hundred years it spread throughout the continent, reaching its height about 1200 A.D. Later it was introduced into America and the Pacific Islands. In some of these countries the disease has died out, but in others it still persists.

Although leprosy has been prevalent since ancient times in India, China and Africa, authentic reference to this disease is found only in the ancient literature of India. The ancient Hindu physicians recognised and described the disease fairly well. In Sushruta Samhita (600 B.C.) one finds a reasonably good account of the clinical features and treatment of the disease. Sushruta described the different forms of leprosy, and these forms fit in fairly well with the forms of the disease as recognised at the present time. In this ancient book references to leprosy are made under Vat Rakta or Vat Shonita, and Kushta. Vat Rakta or Vat Shonita is characterised by presence of loss of sensation and deformities etc. without any skin patches. The term Kushta is used for the skin diseases in general, but one variety (Arun Kushta) corresponds to leprosy. Two kinds of skin diseases have been described under Arun Kushta; in one, the prominent symptoms are loss of sensation and deformity, and in the other, ulceration, falling off of fingers etc. Sushruta described the treatment of the disease with Chaulmoogra Oil, which till recently was the mainstay in the treatment of the disease. In this book are also discussed the causes of the disease; it is considered to be passed on by leprous parents to their children, and also by patients suffering from leprosy coming in contact with healthy persons. According to Sushruta, the disease can be carried from a patient to a healthy person through touch and breath, partaking the same bed, eating and drinking out of the same vessels, and using the wearing apparel etc. used by the patients. All these modes of transmission of the disease mentioned by Sushruta imply close contact with leprosy patients. This corresponds to the present day opinion that leprosy is conveyed to healthy persons from a case of leprosy by close contact.

Leprosy is believed to have been common in ancient Egypt, but there is no authentic record to this effect. In the literature of ancient China also there does not appear to be any clear evidence of the existence of leprosy; definite reference to leprosy is found only in the Chinese writing of the 3rd century A.D., and it is only in the literature of the 7th century A.D. that the clinical symptoms of the disease are found.

### Spread to Europe

The disease appears to have spread to Europe from Africa before the beginning of the Christian era. Movements of armies and increase in maritime commerce appear to have played a great part in the introduction and spread of leprosy in Europe.



It appears to have been first introduced into Greece about 350 B.C. The next European country to be affected was Italy about 60 B.C. With the Roman conquests the disease spread all over the Roman Empire including France, Britain, Germany and Spain. Later, other parts of Europe were also affected, and the disease spread widely in all the European countries. Leprosy was at its height in Europe in the 12th century A.D.

From the 13th century, however, leprosy began to decline in Europe, and by the 17th century it had almost died out with the exception of a few persistent foci where it exists till today. It appears that the preventive measures adopted in the Middle Ages, and improvement in diet and living conditions played an important role in this connection.

### Spread to America

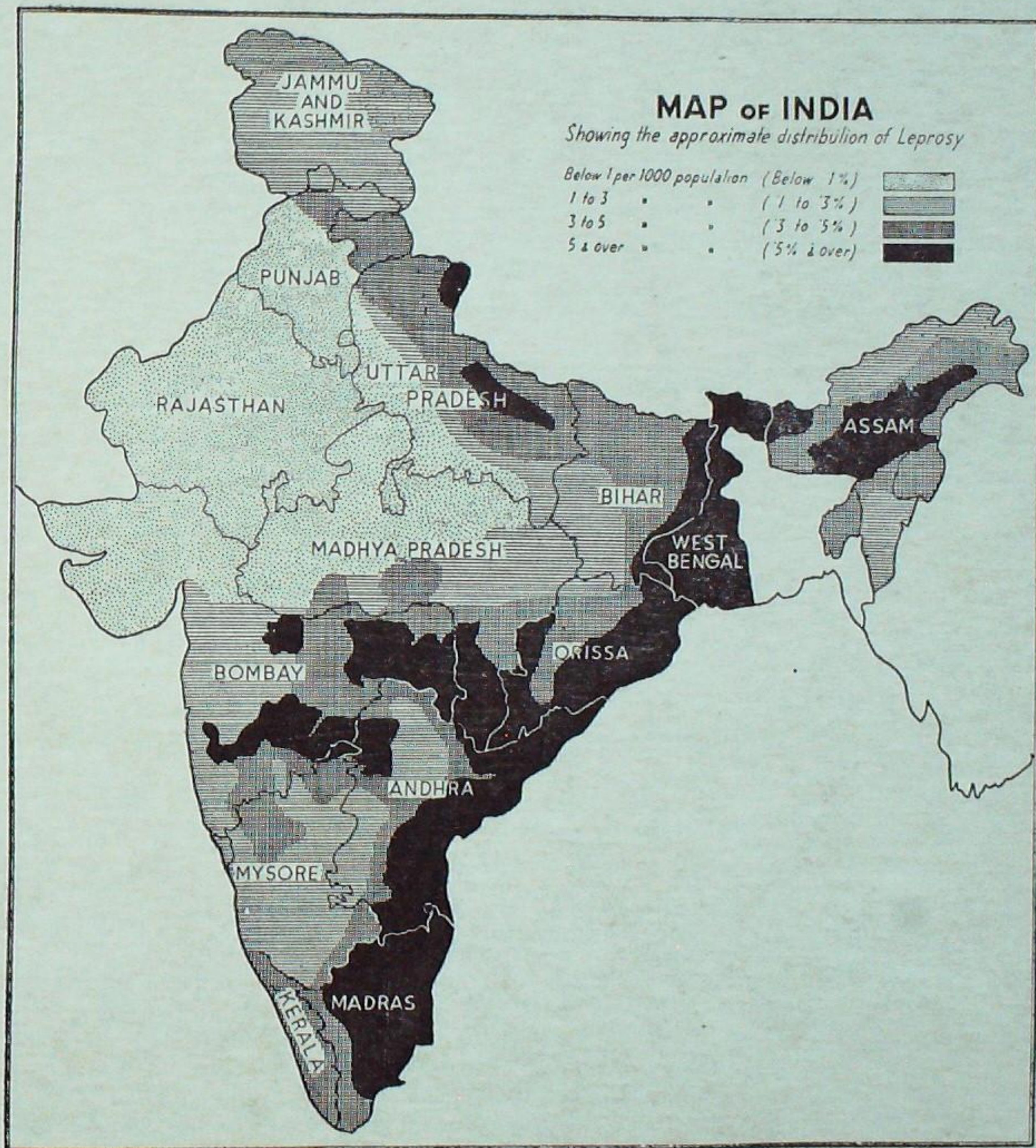
While leprosy died out in Europe, it was introduced into America. It was first introduced in the middle of 16th century by the immigrants from Europe; later by imported slaves from Africa; and still later by Chinese immigrants who have been responsible for the introduction of the disease on the Pacific Coast.

Although leprosy was introduced into various parts of America the subsequent history has been different in different parts. It has not flourished in Canada where at present there is practically no leprosy except for a very small number of cases in a particular area. In the United States of America foci have been established only in some of the Southern States in which the disease has shown strong tendency to persist. In Central and South America, however, the disease has steadily increased and is now found in every State, being very common in certain areas.

### Recent spread

More recently, during the last 100 years, leprosy has been introduced into several of the previously uninfected islands in the Pacific. Chinese immigrants have played an important role in the spread of leprosy in this area. After the introduction, the disease spread slowly for 10 to 15 years, and after that very rapidly, affecting high proportions of the population. In most of these places, the disease has now been decreasing considerably.







## 2. PRESENT DISTRIBUTION OF LEPROSY

### Leprosy in the world

It is not possible to state correctly the total number of persons suffering from leprosy in the world. This number is roughly estimated at about 50 lakhs. Of this total, over 10 lakhs each are attributed to India, China and Africa. Some other areas with high incidence of leprosy are South America (about 1 lakh), some of the Pacific Islands and Japan. To a lesser extent the disease is found in some other countries also. The present distribution and prevalence of leprosy are shown in Map No. 1. It will be noted that at present leprosy is mostly a disease of tropical and sub-tropical countries, although there are some foci in the temperate and even in the cold countries. Most of the areas with high prevalence rates of 5 per 1,000 or over are situated in the tropics and most of these areas have a high rainfall with the result that the climate in these parts is very hot and humid.

A rough idea about the prevalence of leprosy in the various continents will be found in the following table.

WORLD DISTRIBUTION OF LEPROSY BY CONTINENTS

Continent	Estimated number of cases of leprosy	Average incidence per thousand
Africa .. .. .	13,00,000	8.0
Asia .. .. .	27,00,000	3.0
Australia & Oceania .. .. .	90,000	1.0
Europe .. .. .	20,000	0.04
North & Central America .. .. .	40,000	0.14
South America .. .. .	90,000	1.0

It may be said that at present about 95% of the total world leprosy is found in Asian and African countries, about 4% in South America and Oceania, and only about 1% in all the countries of Europe and North America taken together. The highest average prevalence rate is found in Africa (8 per 1,000); the rate for Asia as a whole is much less (3 per 1,000), but because of the much greater population, the total number of cases in Asia is about double of that in Africa. The average prevalence rate in Oceania\* and South America is about 1 per 1,000; in Europe and North America it is much lower, being 1 in 30,000 and 1 in 10,000 respectively.

\*In some individual islands in Oceania, such as Fiji, Nauru, and New Caledonia etc., the incidence is very high (10 to 40 per thousand), but the population of these islands and therefore the total number of cases, is small.



Though the exact number of leprosy cases in India is not known, it is estimated that there are over 15 lakhs of persons suffering from this disease in this country. Though cases of leprosy are found throughout India, the disease is not equally distributed in the different parts of the country. The distribution of leprosy in India is roughly shown in Map 2.

According to the prevalence of the disease India can be divided into three regions viz., areas with high, moderate and low prevalence.

The areas of high prevalence rates (5 or more per thousand) are mostly found in the eastern parts of the country though there are some foci in the central and southern parts and on the western coast. These areas of high incidence include Assam, West Bengal, Bihar, Orissa, Madhya Pradesh, Madras, Andhra Pradesh, Kerala and limited areas in Uttar Pradesh and Bombay. In these areas there are whole districts with rates as high as 20 to 40 per thousand, and individual villages or groups of villages with 100 per 1,000 or above.

The areas of moderate prevalence (1 to 5 per 1,000) are found in the central and western parts of India and in the Himalayan foot-hills. These areas include parts of Bihar, Uttar Pradesh, Madhya Pradesh, Bombay, Himachal Pradesh and the hilly parts of the Punjab and Uttar Pradesh.

The areas of low prevalence (below 1 per 1,000) are found mostly in the north-western part of the country. These areas include plains of the Punjab and western parts of Uttar Pradesh, Rajasthan, etc.

A rough idea about the prevalence of leprosy in the various States of India is given in the following table. No definite information was available from some of the States and they have, therefore, been excluded from the table.

INCIDENCE OF LEPROSY IN INDIA

State						Estimated number of leprosy cases	Average incidence per thousand
Andhra Pradesh	..	..	..	..	..	85,000	4.6
Assam	..	..	..	..	..	40,000	4.4
Bihar	..	..	..	..	..	1,25,000	3.0
Bombay	..	..	..	..	..	1,05,000	3.3
Himachal Pradesh	..	..	..	..	..	8,000	7.8
Madhya Pradesh	..	..	..	..	..	90,000	3.0
Madras	..	..	..	..	..	3,00,000	8.5
Mysore	..	..	..	..	..	13,000	0.7
Orissa	..	..	..	..	..	85,000	7.5
Punjab	..	..	..	..	..	1,500	0.11
Uttar Pradesh	..	..	..	..	..	80,000	1.4
West Bengal	..	..	..	..	..	3,40,000	14.1



### 3. CAUSE OF LEPROSY

#### LEPROSY BACILLUS

##### **Leprosy is not the result of sin**

Like other diseases leprosy is a disease, and is not the result of a curse or divine displeasure. The wrong belief that leprosy is a punishment for sins committed in the present or some past incarnation is greatly responsible for the scornful attitude shown by the general public towards patients with leprosy.

##### **Leprosy is not hereditary**

Leprosy is not a hereditary disease, that is, children of patients with leprosy do not get the disease simply because their parents suffer or suffered from it. If the child is taken away at birth from a diseased parent and brought up by a healthy person and is not allowed to come in contact with any diseased person, the child will not develop leprosy. However, if the child is allowed to remain with the diseased parents, it is very likely to get the disease.

##### **Leprosy is not caused by any article of diet**

Some people believe that leprosy is the result of eating fish, decomposed fish, or fish in combination with some other particular articles of diet such as milk. This is not correct. The fact that leprosy may be found in people who never eat fish is definitely against this belief.

Some other articles of diet also have from time to time been accused of pre-disposing to the disease. There is no evidence to incriminate any particular article of diet. However, bad and deficient diet in general lowers the resisting power of the people and is likely to pre-dispose them to all diseases including leprosy.

##### **Leprosy is caused by a germ**

Like all other communicable diseases leprosy is caused by a very minute germ known as the leprosy bacillus (Fig. 1). Germs are like seeds of the disease. Just as seeds of paddy differ from seeds of peas and potatoes, etc., the germs of leprosy differ from germs of other diseases. They however, closely resemble the germs of tuberculosis.

From ancient times leprosy has been regarded as a communicable disease. For instance, Sushruta, the ancient Indian physician, writing in 600 B.C. considered the disease to be carried from the diseased to the healthy person by methods which entailed close contact with the diseased person. The views about infectiveness of



(Fig. 1.) Leprosy bacilli



leprosy are also very well illustrated by the severe measures taken against the spread of the disease during its prevalence in Europe in the Middle Ages when leprosy was rife there. At that time there existed in several European countries a custom of reading the burial service over a patient with leprosy after which he was considered to be dead for social and legal purposes. Thereafter, he was not allowed to live in towns and villages, but was taken to an asylum where he was to spend the rest of his life. He was supplied with special garments and clappers so that he could warn healthy people of his approach. He was not allowed to touch infants or young persons and was not allowed to eat with healthy people.

It is now generally believed that leprosy is an infective disease caused by the leprosy bacillus which is also known as Hansen's bacillus after the name of its discoverer.

### **Leprosy bacillus**

The leprosy bacillus or the causative germ of leprosy is a member of the acid-fast bacteria grouped under the genus *Mycobacterium*\*. A well known member of this group is the tubercle bacillus.

Although the leprosy bacillus was discovered as early as 1874, and although most workers believe that this germ is the causative germ of leprosy, it has not been possible so far to produce definite scientific proof to the effect that the disease is caused by the bacillus bearing this name. The lack of scientific proof regarding the causative relationship of the leprosy bacillus is due to the facts that it has not been possible to grow the leprosy bacillus outside the body of the diseased person, and that it has not been possible to produce the disease in any laboratory animal.

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\*The organisms in this group are called acid-fast because of the property of resisting decolourisation by dilute acids, once they have been stained with strong dyes.



## 4. SYMPTOMS OF LEPROSY

### Main forms

All cases of leprosy are not alike. As the ancient Hindu physicians recognised, leprosy may occur in different forms and show itself in different ways. In general the disease may be divided into three forms, namely (a) with patches in the skin in which there is loss or diminution of sensation, (b) without any patches in the skin but with numbness and loss of sensation in one or more limbs, and (c) with thickening of the skin of face and ears, and nodules on the face, ears and other parts of the body. The first two forms of the disease are the less serious forms, and together constitute about three-fourth of the total number of patients in our country; the disease in these patients is usually mild, though in a few it becomes marked and produces great deformity and disablement. The third form of the disease is much more serious, because of its tendency to get steadily worse; moreover this is the form of the disease which is mostly responsible for conveying the disease to the healthy persons.

Thus according to the severity of the disease the patients with leprosy in general, may be divided into two groups : (1) the mild or the so-called 'benign', and (2) the severe or 'malign'. In technical language the severe or 'malign' group is known as 'lepromatous', and the mild one as 'non-lepromatous'.

As already indicated, apart from producing more severe symptoms, the lepromatous leprosy is dangerous from the public health point of view, because patients suffering from this type of leprosy are mainly responsible for the spread of the disease to healthy persons. Enormous number of germs of leprosy are found in, and discharged from the skin, nose and mouth etc. of these patients.

A general description of these two groups is given below, followed by a little more detailed description of the symptoms seen in the different kinds of the disease.

The lepromatous or the malign form of the disease is characterised by thickening of skin of the face, ears, and other parts of the body; thickening of eye brows and loss of their hair; presence of thick patches and nodules which may ulcerate; affection of the eye which may lead to blindness; and presence of ulcers in nose and throat. From these ulcers millions of germs of leprosy are discharged and infect the persons who come in contact with these patients. In other words the cases of this kind are infective.

The non-lepromatous or the benign form of the disease is characterised by the presence in the skin of flat or thick and raised patches with loss of sensation, or/and loss of sensation in the limbs, weakness and wasting of the affected parts, and deformities. If the patches or the affected parts are touched lightly with a thin piece of paper or feather, the patient does not feel the touch. When pricked with a pin, pain is either not felt, or else less than in the unaffected skin. The loss of sensation in the limbs and deformity are usually found in association with the skin patches, but they may occasionally be found independently without any skin patches. In the non-lepromatous cases the leprosy bacilli are very scanty and are



not likely to be discharged from the patient's body. These patients are, therefore, generally believed to be non-infective. They are usually considered not to be a source of danger to healthy persons coming in contact with them.

A brief description of the 'Lepromatous', and the 'non-lepromatous' forms of the disease is given below :

### Lepromatous type

*General*—In this type the disease is widespread throughout the body, the chief lesions being found in the skin and mucous membranes. Leprosy bacilli are present in large number and smears from the affected skin and nasal mucosa are moderately to strongly positive. These cases are, therefore, known as 'open' or infective cases.

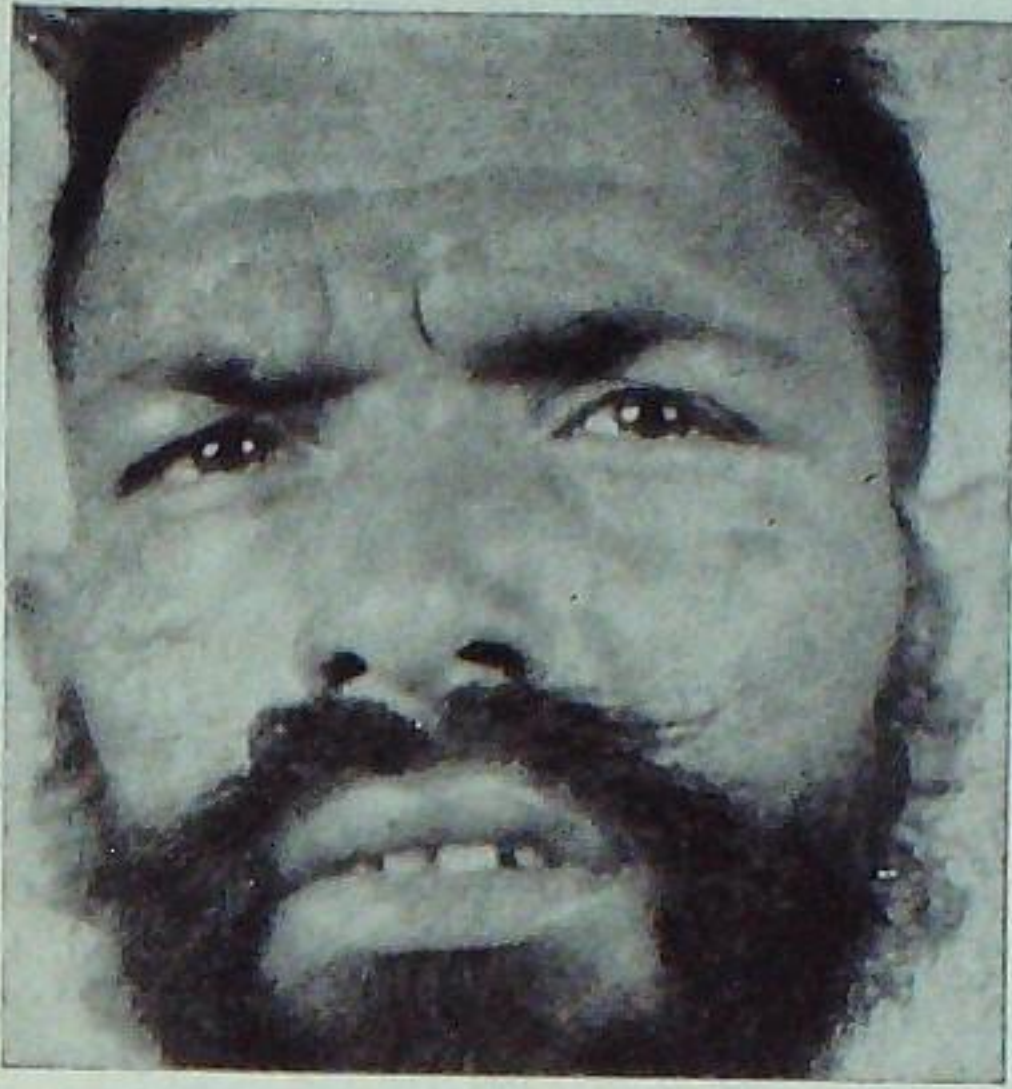
*Lesions in the skin*—The disease is usually widespread and generalised. The lesions are specially marked on face, ears, back, buttocks, knees, elbows and dorsal aspect of the hands. The affected skin shows loss of hair specially noticeable on the face (eye brows, chin and lips). The following changes are seen in the skin either singly or in combination :

- (1) *Diffuse thickening of the skin*—Because of the diffuse thickening and redness, the affected part appears smooth and shiny. The diffuse thickness may be very slight, (Fig. 2) of moderate Degree, (Fig. 3) or very marked (Figs. 4 & 5) producing considerable thickening and corrugation of the skin. The advanced degree of thickening produces characteristic corrugation of the skin resulting in the 'leonine' or lion like appearance of the face often seen in advanced cases of leprosy. Slight degree of diffuse thickening may, however, be difficult to detect and is, therefore, specially dangerous from the point of view of spreading the infection, as unsuspected the patients move about freely amongst the healthy population.
- (2) *Circumscribed Patches*—These consist of circumscribed areas of skin with colour changes. The patches may be flat and a shade paler than the surrounding skin, (Fig. 6) or else, they may be thick, red and raised above the surface of the skin, (Fig. 7). These patches are usually of wide distribution. They may show slight or no loss of sensation.
- (3) *Nodules*—A nodule is a definitely thickened, rounded, circumscribed mass found in or under the skin. Nodules vary markedly in size and number (Figs. 8 to 13). These nodules are most commonly seen on face and ears, elbows, knees, but may be found anywhere on the body.
- (4) *Ulcers*—Due to injury or during a phase of acute exacerbation of the disease (commonly known as lepra reaction), the nodules may suppurate, break down and produce ulcers (Fig. 12). These ulcers discharge pus which contains enormous number of leprosy bacilli.

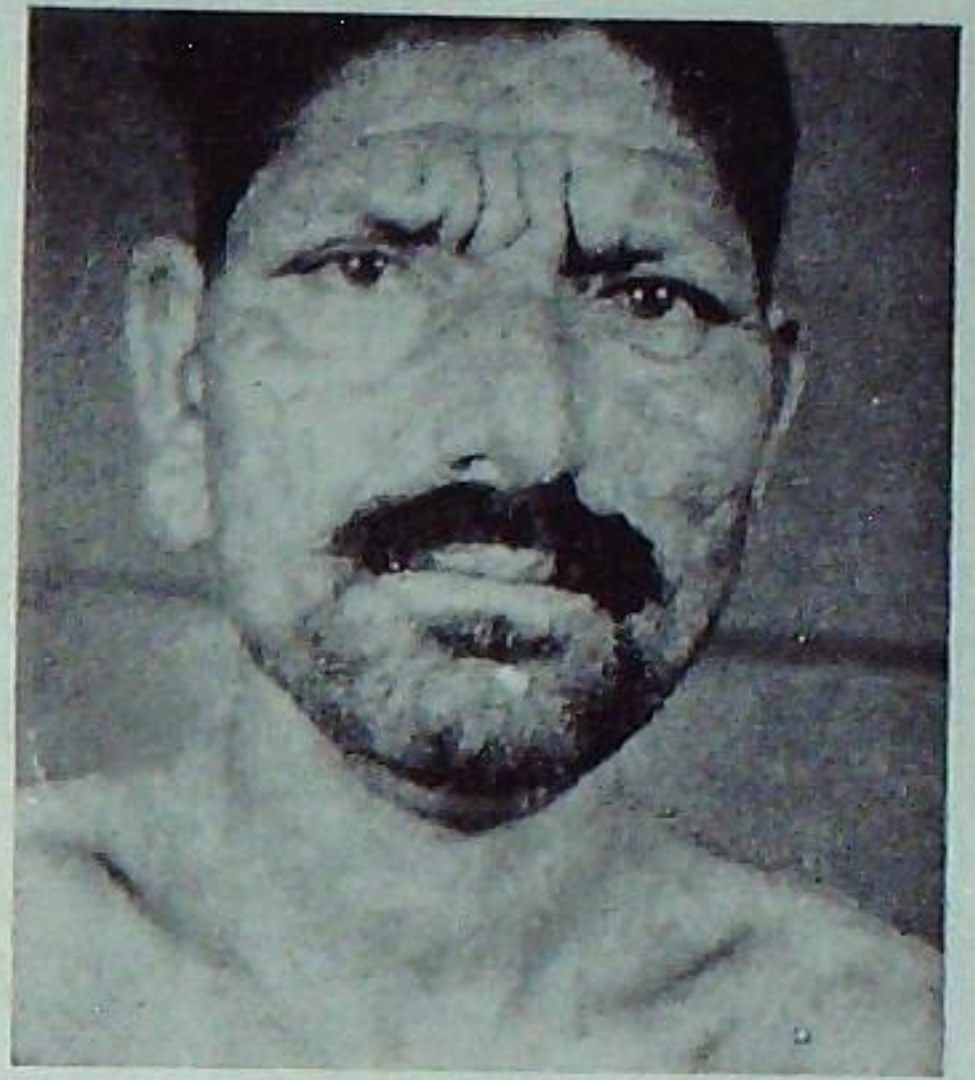
*Lesions in the mucous membranes*—Leprous lesions in mucous membranes are found in the nose, mouth, throat and eyes. In the nose ulcers



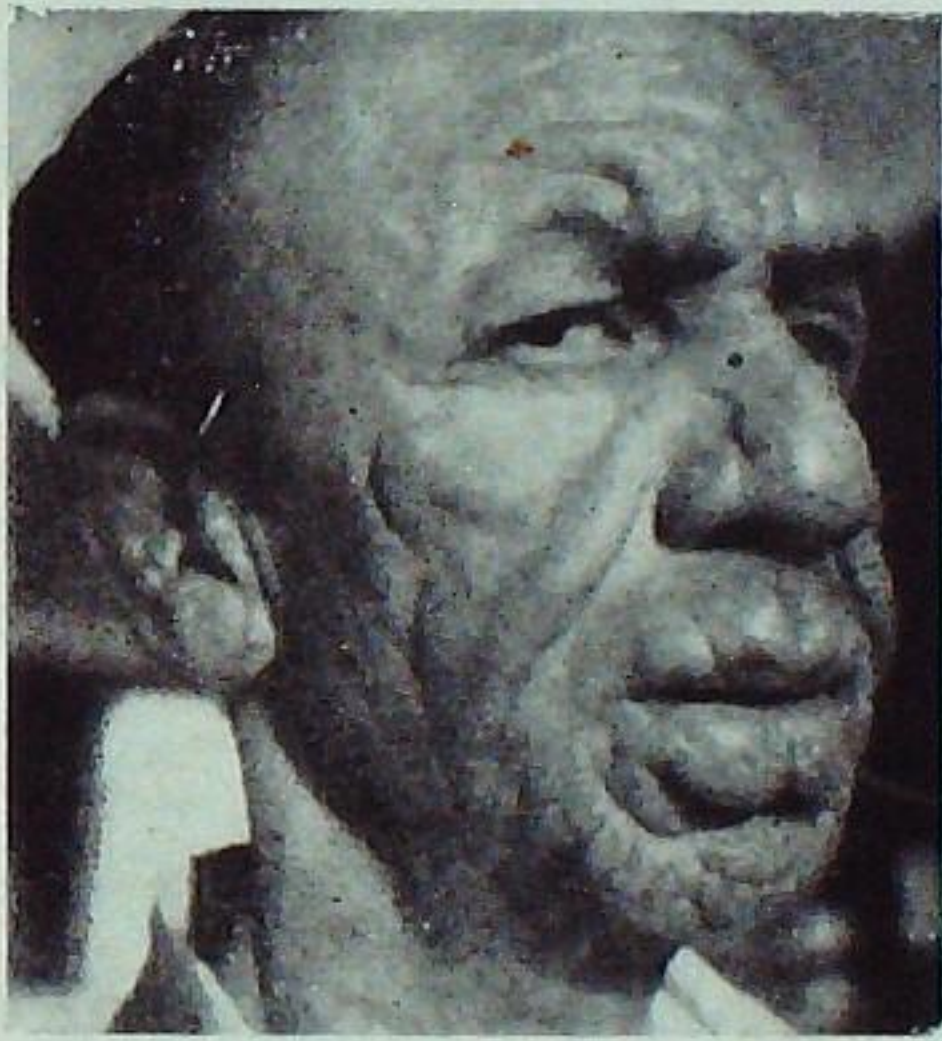
## Lepromatous Type—Diffuse thickening and patches



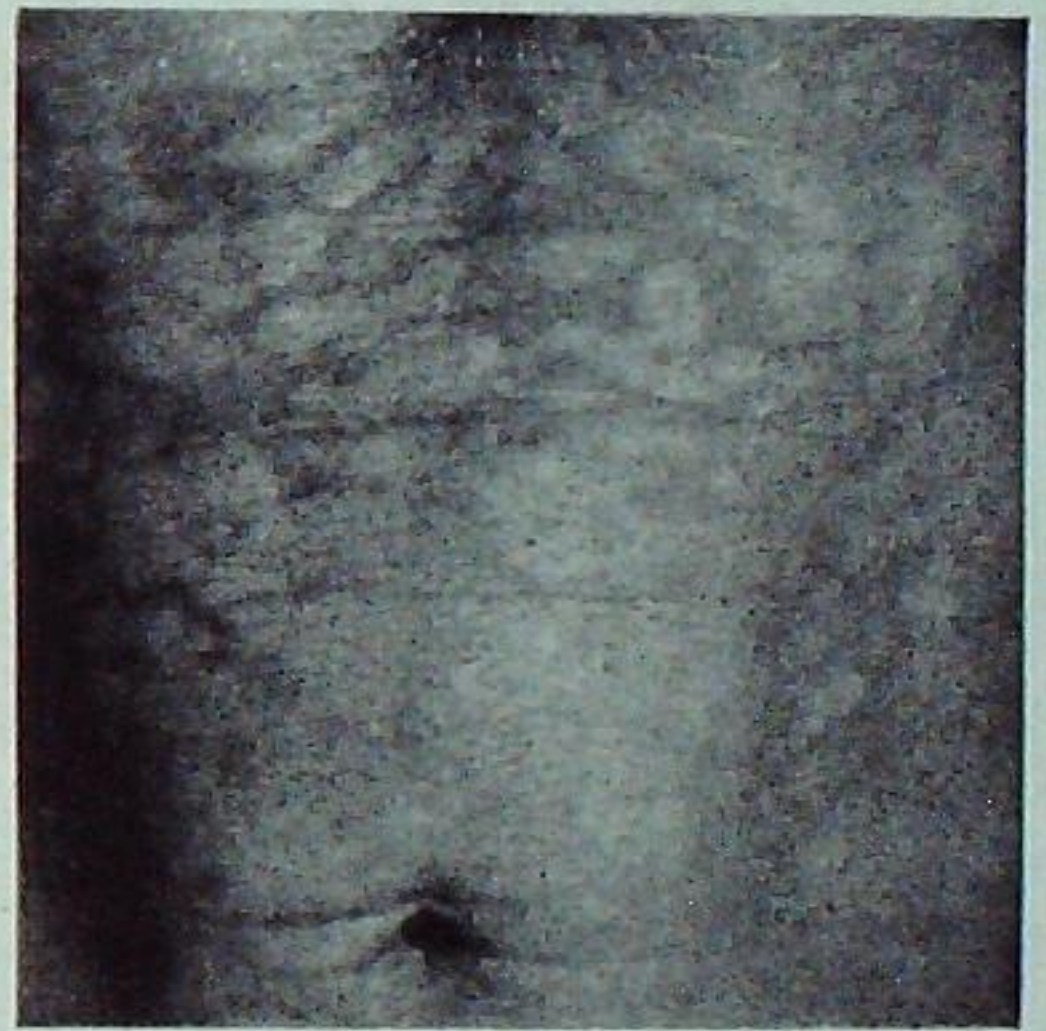
*Fig. 2.* Slight diffuse thickening of face.



*Fig. 3.* Moderate diffuse thickening of face.



*Fig. 4.* Marked diffuse thickening of face.



*Fig. 5.* Marked diffuse thickening—abdomen.



*Fig. 6.* Multiple flat patches—back.



*Fig. 7.* Thick patches—back.



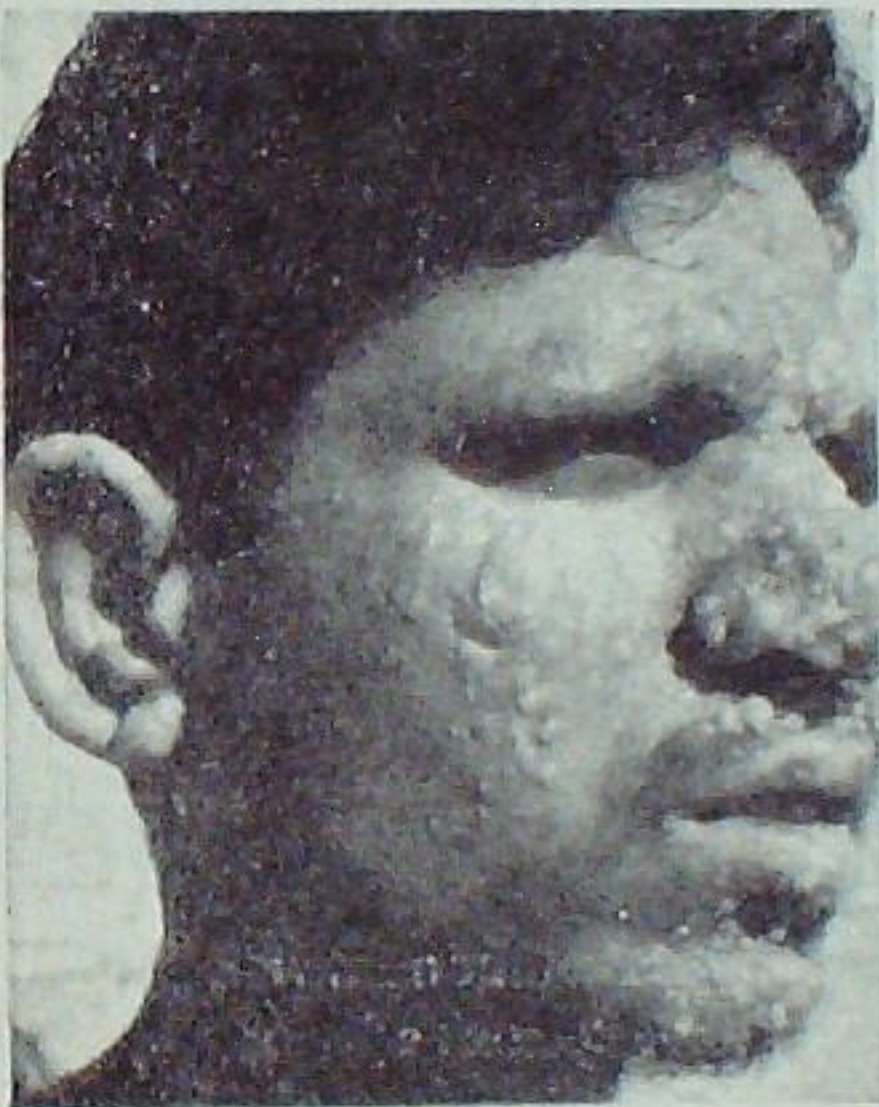
## Lepromatous Type—nodulation



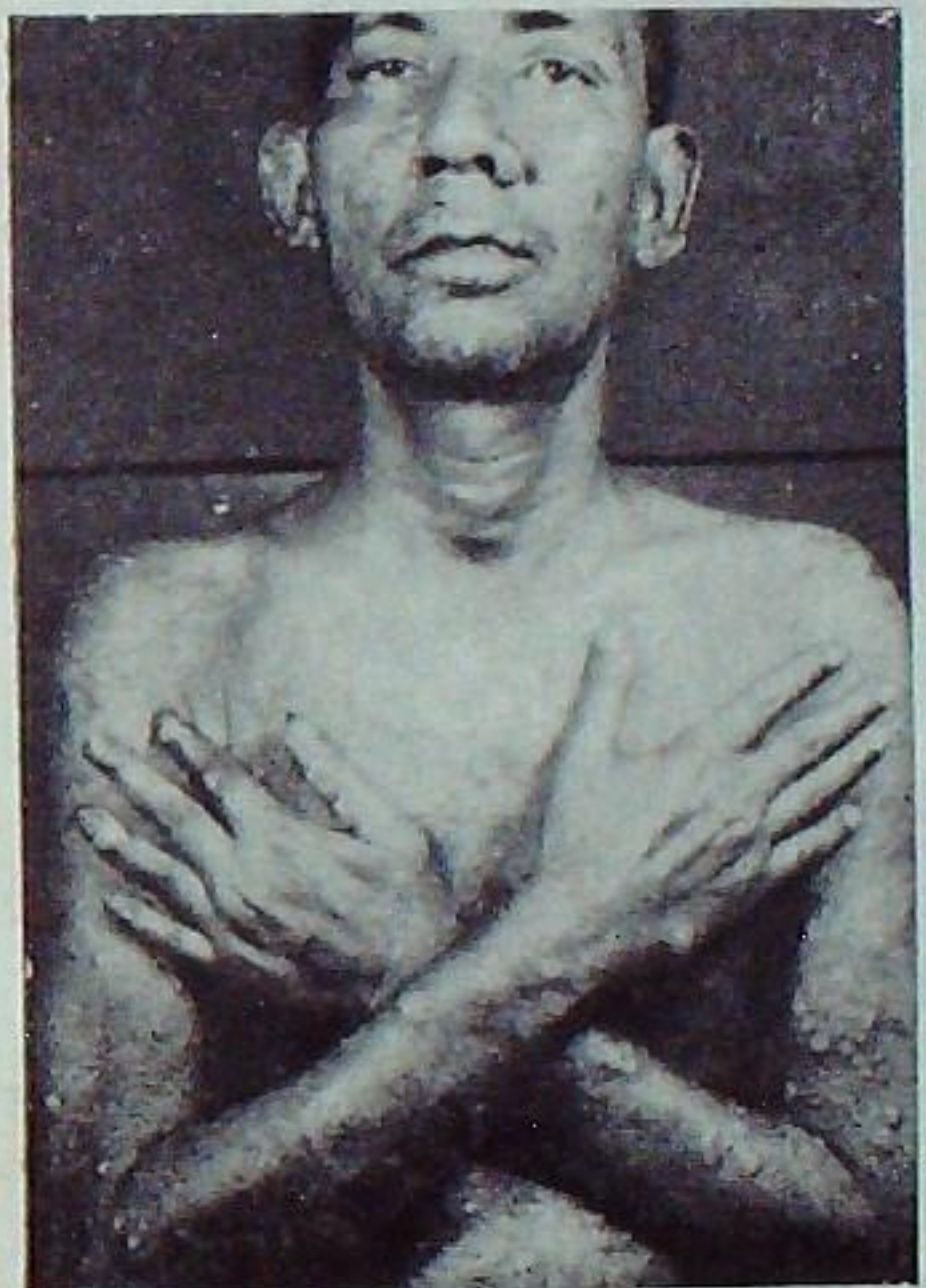
*Fig. 8.* A few nodules on the ear.



*Fig. 9.* A few nodules on nose & chin.



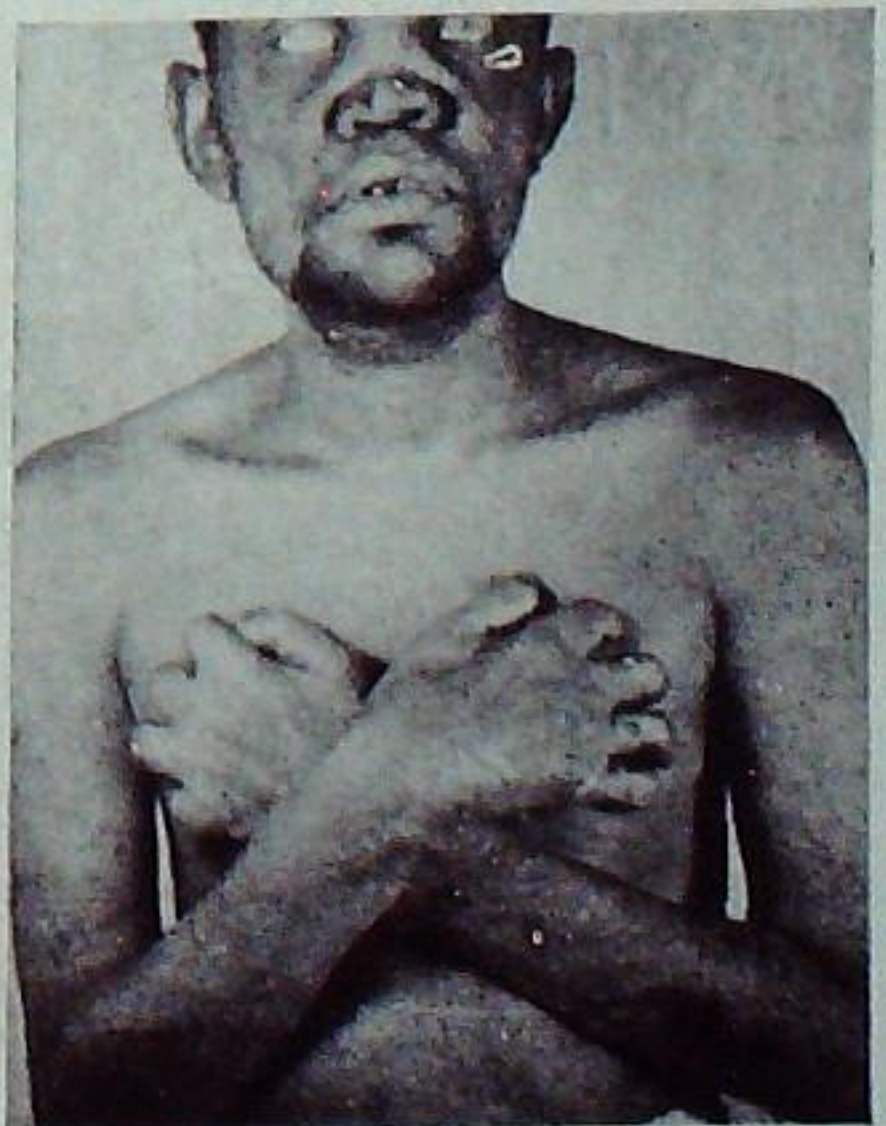
*Fig. 10.* Several nodules covering the face & ears.



*Fig. 11.* Generalised nodulation all over the body.



*Fig. 12.* Generalised nodulation, some of the nodules ulcerating.



*Fig. 13.* Affection of the nose & eyes & small nodules on arms, forearms & hands.



of the septum are very common and may give rise to perforation of the anterior part of the septum. This part of the septum may be destroyed and the tip of the nose may fall in, giving rise to a characteristic deformity of the nose in leprosy (Fig. 13). Mouth and throat may be affected, and the affection of the throat may produce hoarseness of voice.

When the infection spreads to the eye, both the superficial and deep structures of the eye are affected. Vision is grossly interfered with and may be permanently lost (Fig. 13).

### **Non-Lepromatous type**

In this type the disease is localised to skin and the associated nerves. Routine smears from the skin patches generally show no leprosy bacilli, and the cases are, therefore, known as 'closed' or non-infective.

In India this mild form of the disease is responsible for about three-fourths of the total cases. In the non-lepromatous form of leprosy the following three kinds of lesions can be described :

- (1) Pale and flat patches in different parts of the body with loss or diminution of sensation. This form is generally known as Maculo-anaesthetic, *i.e.*, flat patches with loss of sensation.
- (2) Thick and red patches in different parts of the body with loss or diminution of sensation. This form is known as Tuberculoid.
- (3) Loss of sensation in hands, face, feet, arms, legs; wasting of muscles and loss of strength of the affected part; deformities of hands, feet and face; chronic ulcers, and loss of fingers and toes. This form is known as Polyneuritic\*. These changes are usually found in association with the patches, but may sometimes be found independently.

A brief description of these forms of non-lepromatous leprosy is given below :

### **Maculo-anaesthetic type**

This is a benign form characterised by the presence of pale, flat patches (Figs. 14 and 15) with diminution or loss of sensation. The patches vary in size, number and location. In colour the patches are pale; the loss of pigment is only partial and not so marked as in the white patches of leucoderma. The patches usually have a well defined margin; the surface is uniform, usually dry due to impairment of sweat function, and may show loss of hair. The characteristic feature which distinguishes them as patches of leprosy is the loss of sensation. Occasionally the cutaneous nerves supplying the area in which the patches are situated may be thickened, but this is more commonly seen in the case of the thick 'tuberculoid' patches. Routine smears from the patches usually show no leprosy bacilli.

\*The symptoms of this form of the disease are caused by the affection of the big nerve trunks of the limbs.



### **Tuberculoid type**

This is a non-lepromatous or benign form of the disease with localised thick patches (Figs. 16 to 20) and affection of the nerves which may produce the symptoms as described in the polyneuritic type.

The skin lesions consist of slightly to markedly thickened red patches with loss of sensation. The patches vary in size, number and location. They may be found anywhere in the body but are more common on the face, outer aspects of the limbs, buttocks and back. They are red in colour, thickened and raised above the surface of the skin, and have a very well defined outline; the whole patch may be thickened or the thickening may be confined to the margin or the outer part of the patch. The surface is usually dry due to impairment of sweat function and there may be failure of hair growth.

Similar-looking patches may be found in other skin diseases, but as in the case of the flat patches, the feature that characterises these patches as those of leprosy, and distinguishes them from similar-looking patches of other diseases, is that they show definite diminution or loss of sensibility. Another special feature of these patches is the thickening of the cutaneous nerves supplying the area in which these patches are situated. The thickening may travel up to the nerve trunks in the extremities, and may result in the production of loss of sensation in the extremities, and deformities etc. Routine smears from the patches usually show no leprosy bacilli, but in some cases a few bacilli may be found specially in the thickened margins.

### **Polyneuritic type**

The symptoms in this form of the disease are caused by leprous involvement of the nerve trunks. The affected nerve is usually thick and sometimes thickening is very marked. The involvement of the nerve trunk produces loss of sensation, weakness of the muscles followed by deformities, and chronic ulcers in the distribution of the nerves.

Loss of skin sensibility starts peripherally and extends up the affected limb. Along with loss of sensation there may also be present a feeling of heaviness, numbness or tingling in the affected part.

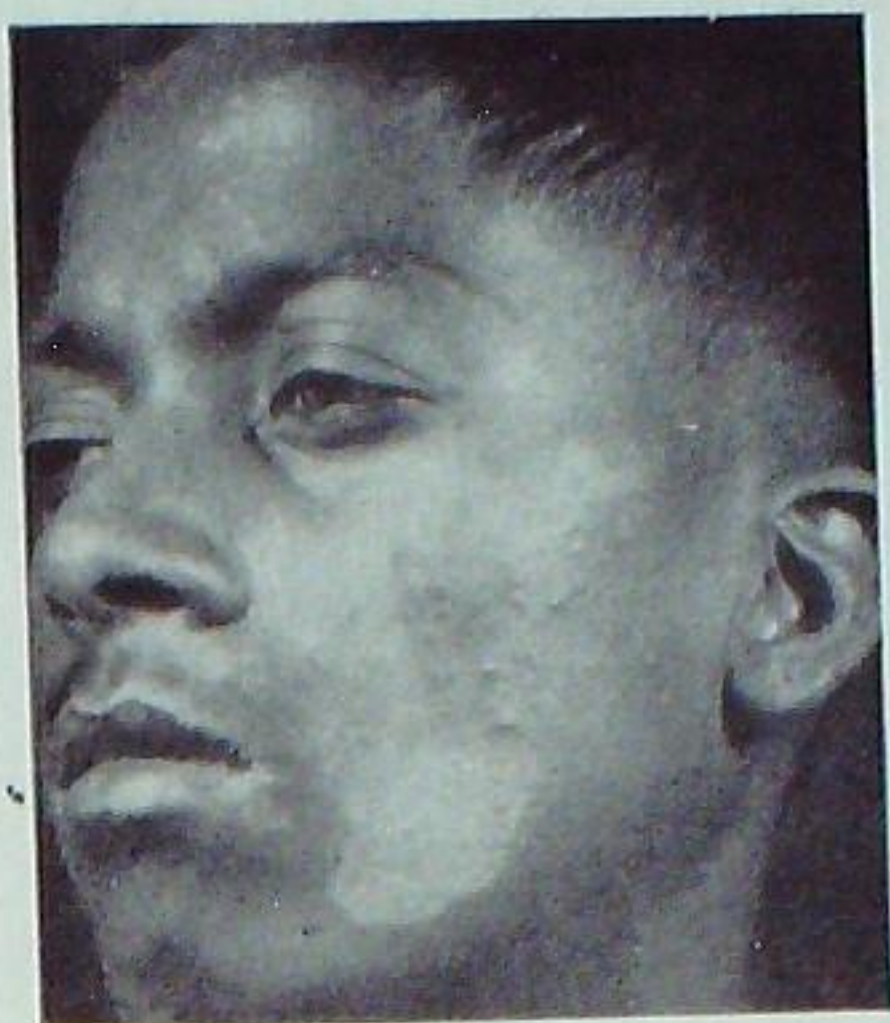
The muscles supplied by the damaged nerve become weak and wasted. Small muscles of hands and feet are affected first and to a marked extent; later the weakness and wasting may extend to the muscles of the forearm and leg, but to a lesser extent. The paralysis of muscles lead to the development of certain deformities.

The affected parts may show (i) diminution or suppression of sweat and consequent dryness and scaliness, (ii) glossy skin with loss of hair, (iii) formation of blisters, and (iv) chronic ulcers caused by injury and pressure on anaesthetic and devitalised tissues.

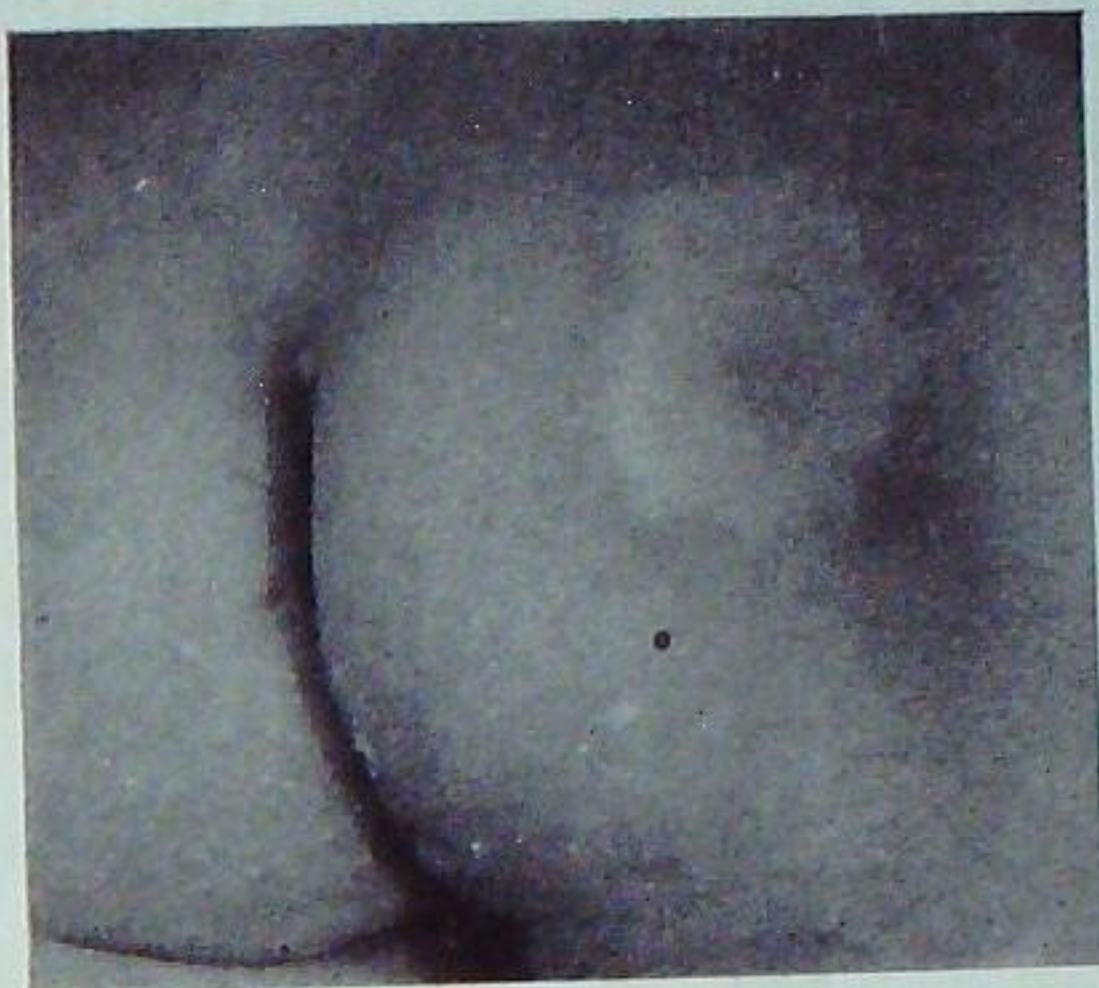
*Symptoms caused by the commonly affected nerves*—The above described changes are generally found in association with the patches in the skin, but they may sometimes be found independently. A brief description of the symptoms caused by the commonly affected nerves is given below.



# Non-lepromatous Type—patches with loss of sensation



*Fig. 14.* A flat patch on face.



*Fig. 15.* A flat patch on the buttocks.



*Fig. 16.* A partly thickened patch on the abdomen.



*Fig. 17.* Partly thickened dry patches on the back.



*Fig. 18.* A thick patch with the margin marked.



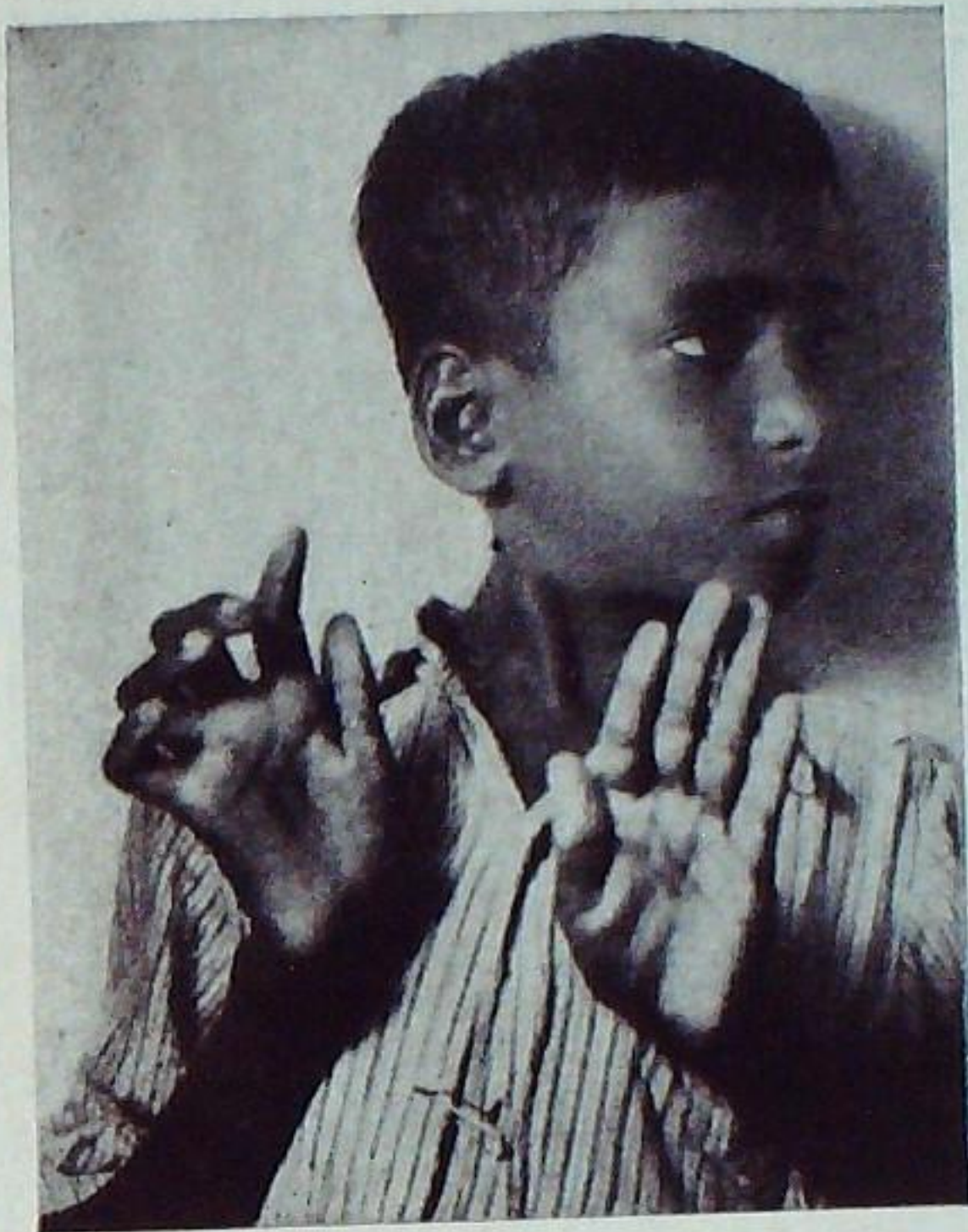
*Fig. 19.* An uniformly marked patch on back of elbow.



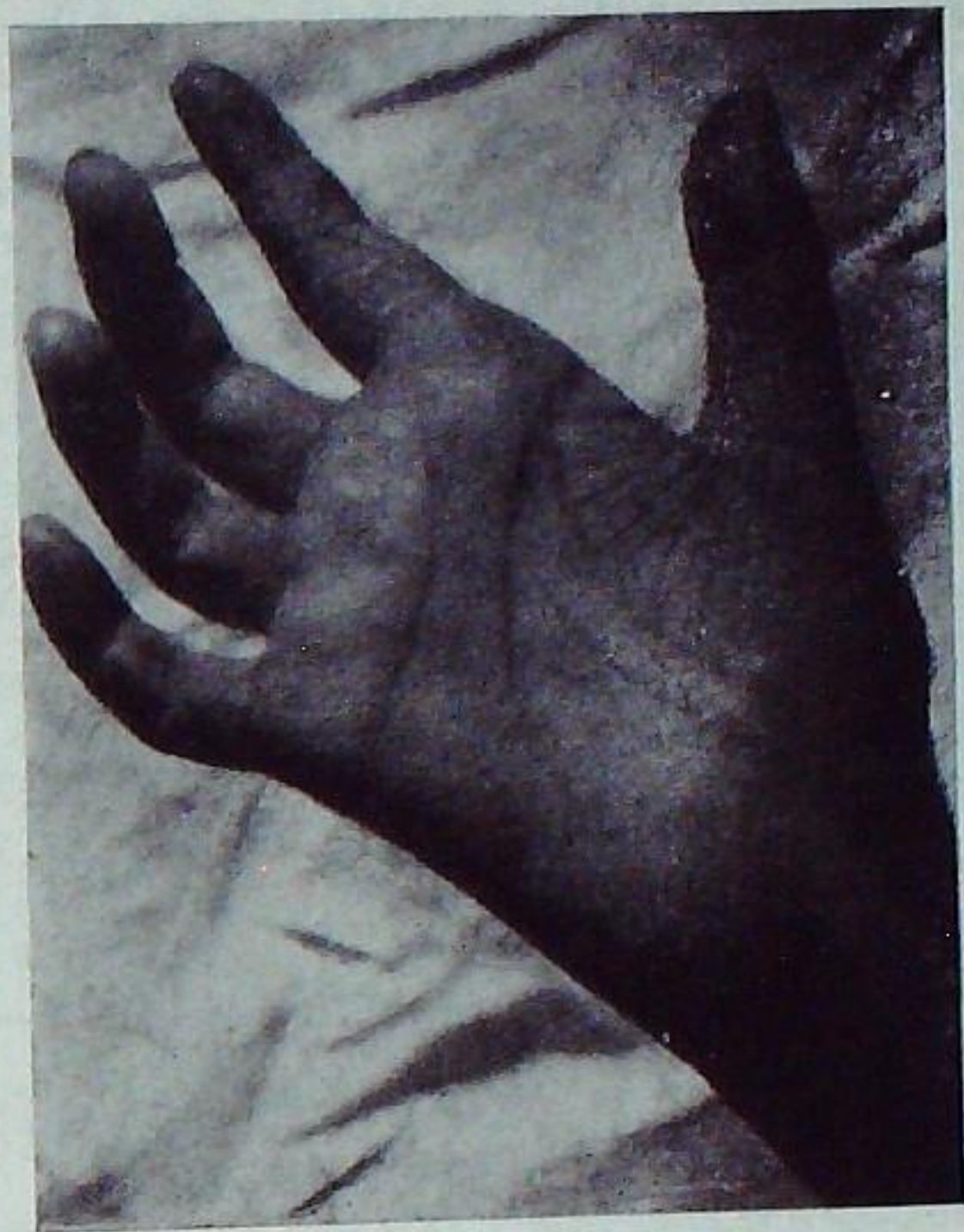
*Fig. 20.* Thickened patches on thighs & knees.



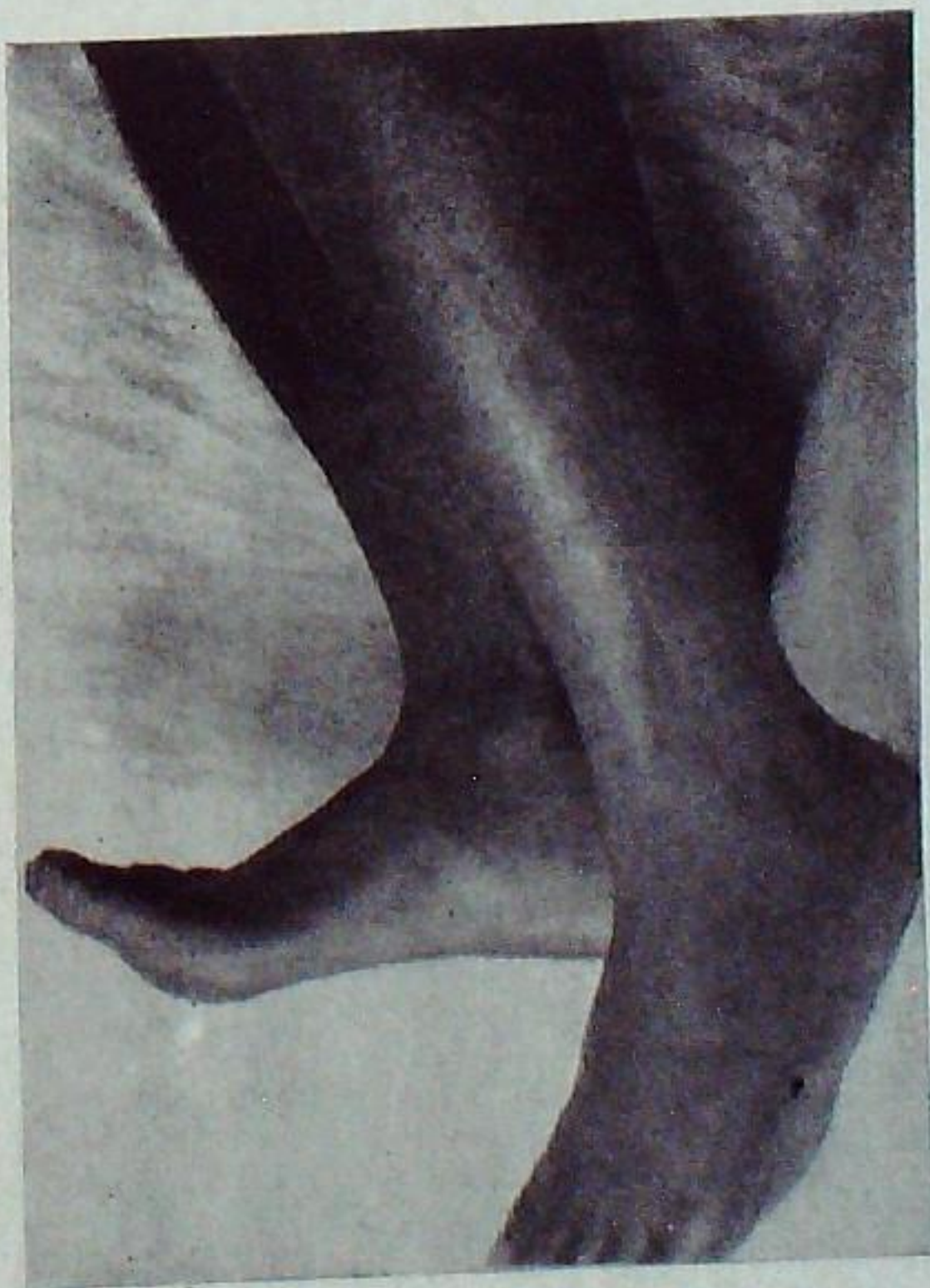
**Non-lepromatous Type—deformities with loss of sensation  
in affected parts**



*Fig. 21.* Claw hand right side,  
left side normal.



*Fig. 22.* Claw hand.



*Fig. 23.* Foot drop on the left side,  
right normal.



*Fig. 24.* Trophic ulcer foot.



In the upper limb the most commonly affected nerve is the one which passes in the groove behind the inner side of the elbow. This is the ulnar nerve. The involvement of this nerve produces loss of sensation of the little finger and half of the ring finger, and of ulnar side of the hand. There is wasting and weakness of the small muscles of the hand supplied by the affected nerve, and this may produce deformity of the hand with clawing of the fingers (Figs. 21 and 22).

In the lower limb the nerve commonly affected lies behind the knee on its outer side. This nerve is known as the lateral popliteal nerve. The affection of this nerve produces loss of sensation of the dorsum of the foot and the outer side of the leg, and weakness of the muscles supplied by this nerve, which may produce a condition of drop foot (Fig. 23); in this condition the foot cannot be raised upwards at the ankle.

Another nerve affected in the lower extremity is the one lying on the inner side of the ankle; this nerve is known as the posterior tibial nerve. The affection of this nerve produces loss of sensation of the sole of the foot and thickening of the skin of that part and chronic ulcers known as trophic ulcers (Fig. 24). These ulcers are not caused by breakdown of leprosy tissue, but are caused by pressure of the body and repeated injury to the tissues, the vitality of which has been impaired by destruction of the nerve supply. Discharges from these ulcers do not contain leprosy bacilli and are, therefore, not infective.

The nerves supplying the eyes may be affected, and this may interfere with the protective mechanism of the eye. The muscle which is responsible for movements of the eye lids is affected with the result that the eye lids cannot be brought together, and the eye remains exposed to irritating particles from outside. The surface of the eye becomes dry. The constant irritation and dryness produce inflammation of various tissues in the eyes, and this may sometimes lead to loss of vision.



## 5. SPREAD OF LEPROSY

While discussing the causation of the disease it has already been stated that leprosy is caused by a minute germ known as the leprosy bacillus or Hansen's bacillus after the person who first described these germs. In a discussion regarding the spread of the disease, three main things have to be considered, viz., (1) Wherefrom do the bacilli come, (2) How do they reach the healthy persons, and (3) Why do some people get the disease while others escape? Put in a scientific language, these three factors may be described as: (1) Source of infection, (2) Modes of transmission, and (3) Susceptibility of the exposed person. These three factors are considered briefly below:

### 1. Source of infection

*A case of leprosy*—The only known source of infection in leprosy is the person suffering from this disease. In practice, however, it is not possible to trace the source of infection in a considerable proportion of the cases. This difficulty in the tracing of infection in leprosy is due to several reasons. After infection it takes a number of years for the signs of the disease to develop, and the patient is likely to forget any contact that he might have had with the case of the disease years ago. Another difficulty in the tracing up of infection in this disease is caused by the tendency of the affected person and relatives to conceal the disease; because of this they may deny the knowledge of any other case in the family or neighbourhood.

*The infective case*—All cases of leprosy are not equally dangerous from the point of view of spreading the disease. The cases described as infective are much more dangerous, and they are the cases of malign or severe form commonly known as the lepromatous type. In such cases enormous number of germs of leprosy are found in and discharged from the skin, nose and throat, etc. The lining membranes of the nose and throat in these patients may be ulcerated; these ulcers may not be visible from outside; but millions of germs of leprosy are discharged from these ulcers. These discharges are a very potent source of infection.

In the cases described as non-infective the leprosy bacilli are so few that they are not found by routine methods of examination. The likelihood of these bacilli being discharged from such patients is, therefore, remote and markedly less than in the infective cases.

It is, therefore, generally believed that only infective cases are the source of infection. These infective cases are also known as 'open', as leprosy bacilli in large numbers are easily found in smears taken after making a cut in the skin. The non-infective cases are known as 'closed', because in such cases bacilli are not found by such a method.

*The common sources*—The most common sources of infection are found in the household of infective patients. Blood relations such as father, mother, brothers, sisters, uncles, aunts, cousins etc., are the most common sources of infection because of the frequent and prolonged association. The domestic servants and visitors who are not family relatives have often been traced as sources of infection.



Infection may take place outside the home also. In such cases the source of infection may be a neighbour, a playmate or a workmate, etc. Instances are on record where a diseased barber, milkman or washerman conveyed the infection. Common meeting places and overcrowding in conveyances may sometimes provide opportunity for spread of infection from the diseased to the healthy. These extra familiar infection play an important role in the spread of the disease.

## 2. Methods of transmission

*Contact with an infective case*—The most important, if not the sole, method of spread of the disease appears to be the contact between the infective case and the healthy persons. This contact is usually direct, but may possibly be indirect, for example through infected clothes and bedding etc. Close and continued contact is most favourable for transmission; in highly susceptible persons, however, contact of even short duration may result in the disease.

Through contact with infective case, leprosy bacilli get deposited on the bodies of healthy persons. The mode of entrance of the bacilli into the body is, however, not definitely known. It appears that the most important mode of entry of the bacillus is through cuts, wounds, scratches and insect bites in the skin. Presumptive evidence in favour of entry through the skin is provided by a number of carefully observed cases, in which the disease developed after a slight wound with a needle or other sharp instrument which had been used for a leprosy patient. Several such instances of suspected infection through skin inoculation are recorded in literature.

*Other methods*—There is no definite evidence regarding the spread of the disease by methods other than contact with infective cases. There is no evidence to show that leprosy is transmitted through infected food or water. Transmission through infected air also does not appear to be the common method of spread. There does not exist sufficient evidence to indicate that insects play an important role in the transmission of leprosy, although the domestic fly, as also other insects, have long been under suspicion of being carriers of the disease. The biting insects may play an indirect role by causing breaches in the skin surface, and the irritation caused by the bites leading to scratching; both these factors would facilitate the entry into the skin of any bacilli that might have been deposited on it.

*Conditions favourable to the spread of the disease*—The conditions that favour close and intimate contact between infective patients and healthy persons are the conditions that favour the spread of leprosy. Therefore, insanitary conditions in general and overcrowding in houses in particular contribute greatly towards the spread of leprosy among families.

The attitude of indifference towards the disease also favours its spread. This attitude of indifference and the absence of fear of leprosy in a community leads to neglect of precautions against the spread of the disease, and to social customs which permit free mixing of the people. These conditions are, therefore, very favourable to the spread of the disease. The fear of the disease, on the other hand, leads to active precautions against contact with patients. However, if overdone, it defeats the pur-



pose, because it leads to concealment of the disease which is harmful. Thus both the attitudes of indifference and excessive fear are wrong and favour the spread of the disease.

### 3. Susceptibility of the person exposed to infection

*Differences in susceptibility*—All persons exposed to leprous infection do not get the disease. In only a small percentage of the exposed population does the disease develop; the remaining show no signs of it, in other words they are resistant or immune to leprosy. Again, of those who develop the disease, some get it in a severe and generalised form, while others suffer from a mild and localised form. Thus there exist different degrees of susceptibility varying inversely with the degree of resistance or immunity to the infection.

*Cause of the differences*—The degree of resistance or immunity appears to be determined by several factors, but our present knowledge about them is very imperfect. In this connection the following important factors may be considered :

#### Natural resistance

The fact that a majority of people do not get the disease even after infection would point to the existence of a natural resistance or immunity against the disease in such persons. This natural resistance is not wholly explained by the general resistance of the body since people in excellent health may get the disease, and debilitated persons may escape. These differences in natural resistance may run in families so that on exposure to leprous infection members of certain families may be more liable to get the disease than members of certain other families.

#### Duration and closeness of contact

The duration and closeness of infectious contact, by determining the dose of infection, is likely to play an important part in deciding whether an exposed person would develop the disease or not. Big doses of infection resulting from close and prolonged contact are likely to favour the development of the disease; on the other hand, small doses of infection resulting from casual contact, may be often repeated, are likely to develop a state of resistance in the individual against infection. It is known that the most dangerous type of contact is the household contact, the contact in the same bed and in the same room. Moreover household contacts of infective cases are more likely not only to get the disease but also to get it in the more serious form.

#### Age of the exposed person

There is general agreement that in countries where leprosy is highly prevalent, the disease is acquired more commonly during infancy and childhood than at a later age. In other words after contact with an infective case, children and young people get the disease more readily than adults. The signs of the disease may not, however, appear until puberty or later. If a mother is suffering from leprosy of the infective type, her children often get the disease but the husband often escapes. Similarly if a father is suffering from leprosy of infective type, his children often get the disease, but the wife often escapes.



**Nutrition**

There is some evidence that ill-balanced diet and under nourishment are likely to make persons susceptible to infectious diseases in general, and leprosy should not be an exception. Moreover, there are some indications in this direction: The defective diets of countries where leprosy is common, the correlation between deficient diet and incidence of leprosy in different parts of such countries, and the reported increase in the incidence of leprosy in an area following famine, flood etc., are the facts which suggest a relationship between deficient diet and susceptibility to leprosy.



## 6. TREATMENT OF LEPROSY

### General considerations

The belief often prevalent in the public that leprosy is an incurable disease is not correct. This is specially so in view of the recent introduction of more effective drugs for the treatment of the disease. As in any other chronic diseases a very important part of the treatment consists in improving and maintaining the general health of the patient. This is done by means of nourishing diet, regulated life, suitable mental and physical occupation, and treatment of any complicating diseases that may be present.

One thing essential for success in treatment is the need for changing the psychological outlook so often present in the leprosy patient. The disease is frequently associated with dismay, depression, despair and a feeling of helplessness on the part of the patients. It is of utmost importance to try to change this outlook, to infuse hope, and to win their confidence. For this purpose the physician needs to use sympathy, understanding and patience.

The drug treatment of leprosy falls under two main heads, viz., (1) Special treatment aimed against the disease, and (2) Treatment of special symptoms and complications. Regarding the special treatment it may be said that many different forms of treatment have been advocated in leprosy, but that the only two methods which were valuable enough to receive general adoption have been the age-long treatment with Hydnocarpus Oil, and the recently introduced new remedies. Hydnocarpus Oil and its preparations, till recently the mainstay in the treatment of leprosy, have now been generally discarded in favour of the recently introduced drugs, which have brought about a revolution in the treatment of the disease and have infused new hope into the patients.

Apart from the drug treatment it would be necessary to use physiotherapeutic measures such as massage, exercises, and application of heat, etc., for prevention and correction of deformities. In the case of well-established deformities surgical operations will be necessary for their rectification. Physiotherapy and surgery are very important from the point of view of the welfare and rehabilitation of the patients.

In a book designed for the use of general public any detailed discussion of the methods of treatment will be out of place. A brief reference to the subject is, however, made below for general information, without entering into technical details, dosage, etc.

### Hydnocarpus Oil

Hydnocarpus Oil or Chaulmoogra Oil is an age-long remedy, and till recently was the mainstay in the treatment of leprosy. It is interesting to note that the Chaulmoogra Oil, which was introduced into western medicine towards the middle of the 19th century, had been used in India since ancient days. It is mentioned in Sushruta Samhita written more than 2,500 years ago under the name '*Tuvarka*'. Originally the seeds and the oil were used by mouth and the oil by external application; with the development of modern medicine, however, the oil and its preparations were used by injection.



With the introduction of more potent modern drugs the general use of the Chaulmoogra Oil and its preparations in the treatment of leprosy has been discontinued. However, local injections of these drugs may be indicated for special purposes in certain cases.

### Modern drugs

*The Sulphones*—Of the modern drugs the sulphone group of drugs are the most commonly known and the most widely used. There are available some other drugs also which can be used in combination with sulphones or in place of them. The sulphone drugs are different from, though allied to, the well known 'sulpha' drugs used in the treatment of acute infective diseases. The parent compound of the sulphone drugs is a substance known as diamino-diphenyl-sulphone (DDS or Dapsone). There are also available a number of derivatives obtained by introducing various chemical changes in the parent compound. The parent compound, which is being increasingly and widely used, is available in the market under several names such as dapsone, avlosulphone, novophone, sulphadione etc. Of the derivatives the most commonly known are promin, diasone, sulphetrone, and novotrone. All the sulphone drugs are potentially toxic, and should, therefore, be taken only under medical advice, and in the prescribed doses.

Given in the prescribed small doses the sulphone drugs are practically free from toxicity. They can be given by mouth, and injections are not necessary; the cost of the drugs is very low; they are efficacious in all types of leprosy. Sulphones, therefore, offer a safe, simple, effective and inexpensive treatment for leprosy.

*Results of the treatment*—The sulphone drugs are effective, but it takes long to produce results. For any appreciable improvement to be seen it usually takes about six months, though after a few weeks of treatment the patient begins to have the feeling of well being. The first signs of improvement are observed in the healing of ulcers in the skin and nose, gradually all the symptoms begin to subside and in time the whole appearance of the patient and his outlook towards life are changed. There is also considerable improvement in his health. This marked all round improvement is usually seen after treatment for about one to two years. A much longer period is usually necessary for a complete cure; for advanced cases this period may be roughly put at 4 to 5 years and in less advanced cases 2 to 3 years.

The bacteriological improvement is even slower than the visible improvement in the signs of the disease. Appreciable reduction in the number of leprosy bacilli is not seen before one year and it takes about 2 to 5 years for complete bacteriological clearance. In a small percentage of cases the bacilli may persist even after five years of treatment.

*Toxic effects*—If the treatment is started with a small dose which is gradually increased, and unnecessarily high doses have been avoided, there are usually no serious toxic effects. Minor toxic effects are, however, commonly met with especially at the start. The most common of them are anaemia, a feeling of fatigue and general weakness, and sometimes a burning sensation in the extremities. These symptoms are specially



noticeable at the beginning of the treatment and tolerance for the drug is usually acquired when the symptoms disappear. The appearance of these mild symptoms should, therefore, not call for the discontinuance of the treatment.

However, if unnecessarily high doses are used or when the dose is suddenly increased, there may appear serious toxic effects. There may result an acute exacerbation of the disease which is commonly known by the name of "lepra reaction". During this condition the existing signs of the disease increase and fresh patches and nodules appear; this is accompanied by fever, and there may be acute pain and swelling of the joints, bones and nerves, and serious affection of the eyes. In a severe case of reaction the patient is seriously ill and has to be confined to bed.

It is, therefore, very essential that the instructions of the doctor regarding the dose are strictly followed and the prescribed doses not exceeded. It should be clearly understood that higher doses are no more effective, but that on the other hand, they may produce serious ill effects.

*Limitations of treatment*—The sulphone drugs have no doubt marked a great advance in the treatment of leprosy; all the same there are several limitations to it. The period of treatment has still to be a prolonged one; it is necessary to continue treatment for years together. Again there are some patients who improve up to a certain extent and then the lesions become stationary without showing any further subsidence. Moreover, there are a small percentage of patients who cannot tolerate adequate doses of the drugs and who fail to respond to this treatment; such cases are usually met with in persons with very poor and run down general health.

Another limitation to the treatment is that a very long time is required for the complete disappearance of the leprosy bacilli from the body. In the severe (lepromatous) type of cases it takes about 2 to 5 years for the bacilli to disappear from the skin, and in not a few cases the bacilli may persist even after 5 years of treatment.

Still another limitation is that when the treatment is stopped after an apparent cure there is a tendency for the disease to relapse in a proportion of cases. It is, therefore, necessary that after an apparent cure of the disease a small maintenance dose of the drug should be continued for a long period.

*Bearing on the control of the disease*—Apart from being of value in the treatment of individual cases, the sulphone drugs have a bearing on controlling the spread of the disease. By reducing the number of the bacilli and ultimately making the cases free from bacilli, these drugs have made available a new approach to controlling the spread of the disease. Although there are limitations in this direction because of the long time taken for complete disappearance of the bacilli, all the same even with this limitation, extensive use of sulphones is likely to prove an important measure towards the prevention of spread of leprosy. This matter will be dealt with later under the prevention of the disease.



## 7. PREVENTION OF LEPROSY

### GENERAL PRINCIPLES

#### **Leprosy is a preventable disease**

Like other infective diseases, leprosy is a preventable disease. It has been eradicated from some countries where it used to be prevalent some centuries ago, although it continues to thrive in some other countries, in many of which it creates a huge problem. The fact that it has been eradicated from some countries would indicate that this could be done in the other countries also, especially because we are now equipped with better weapons to achieve the end. On the other hand, the fact that it has not so far been possible to control its spread in a large number of countries, should clearly indicate that it is not a light task. It is a huge task beset with great difficulties. For achieving the goal, well-planned, determined, and sustained efforts are needed on the part of both the State and all sections of society.

The prevention of leprosy may be considered in the light of the measures available for the control of other infectious diseases, although several of these measures are not available in case of this disease.

#### **General principles of prevention of infective diseases**

In the control of other infective diseases, there are available a number of measures which aim at dealing with the different aspects of the problem, *i.e.*, controlling the source of infection, eliminating the conditions that favour transmission, and protecting healthy persons exposed to infection.

The source of infection is dealt with mainly in two ways: (i) the patients suffering from infective diseases are kept separate from healthy people, and (ii) these patients are treated effectively so as to cut short the period of infectivity. In case of certain diseases, healthy persons known to have been exposed to infection are kept under quarantine, *i.e.*, isolated under suspicion till the incubation period of the disease is over. The conditions that favour the spread of infection from the patient to the healthy people are dealt with by improving the sanitary conditions including the supply of pure water, improved methods of disposal of refuse, and improved housing etc. Lastly, attempts are made to increase the resistance of the general population. This is done in two ways; the general resistance is increased by improving general health through an improvement in diet; secondly, resistance to a particular disease is raised by protecting against the disease with injections of a preparation from its causative organism; such a procedure is adopted in the case of several diseases, such as cholera, plague, typhoid etc.

#### **Application of these principles to leprosy control**

In the control of leprosy some of the above measures cannot be applied, and some others are of limited value. For example, no method is available for increasing the resistance to leprosy of healthy persons by injections of the leprosy bacillus or any preparation from it. The question of quarantine is obviously out of question in the case of a disease with such a long and variable incubation period.



Treatment has also its limitations, because even with the recent introduction of the sulphone drugs, it is not possible to render non-infective many of the highly infective cases within a short time. All the same, the sulphone drugs do reduce the infectivity of the patients, and are likely to contribute towards the control of the disease, if used on an extensive scale.

Because of these limitations in the use of the usual preventive methods, some other measures are resorted to in the control of leprosy, particularly measures relating to the protection of children, since in countries where leprosy is highly prevalent infection occurs mostly in childhood. The question of preventive treatment of healthy contacts with sulphones, and of building up resistance to leprosy of these contacts by means of B.C.G. vaccination is also being investigated.

It may be said that the main things in the prevention of leprosy are :

- (i) the raising of the economic, social, and sanitary standards of the population;
- (ii) isolation of infective cases;
- (iii) large-scale treatment of leprosy patients with the sulphone drugs (or with other better remedies when available); and
- (iv) protection of children of infective patients.

With further knowledge on the subject, it may be possible to add other measures to the above list, such as B.C.G. vaccination and preventive treatment of healthy contacts with sulphones. The protective value of these measures against leprosy has yet to be proved, and it appears to be too early to advocate them as routine anti-leprosy measures.

Regarding improvement of economic conditions, it may be said that this step is not specifically an anti-leprosy measure, though leprosy may be used as a lever for the general drive for social and economic uplift. The improved economic conditions will help towards leprosy control through the resulting improvement in diet and housing; better diet builds up body resistance, and improved living conditions restrict the chances of spread by removing overcrowding. It is a striking fact that the present time cases of leprosy are imported into England and France, are often not isolated, but rarely infect others.

As regards isolation, a distinction has to be made between the infective and the non-infective cases. In the early days of prevention against leprosy, no such distinction was made, and the isolation of all cases of leprosy was advocated. The importance of this distinction is now well recognised, and it is now a generally accepted principle that for the control of leprosy, isolation of only the 'open' or infective cases is needed, and that there is no necessity for isolating the 'closed' or non-infective cases as a control measure, although some of them may be suffering from deformities and mutilations, because of which they may need institutional care.

### **Need for an anti-leprosy campaign**

To put into practice the general principles outlined above, a comprehensive anti-leprosy campaign is needed. As stated above, the question of effecting improvement in economic conditions has to be taken up on the general plane. A specific anti-leprosy campaign will be concerned with the



implementation of the other measures outlined above. The steps necessary for the campaign may be listed as under :

- (1) An investigation into the extent and severity of leprosy in the area concerned. This is done by carrying out a *leprosy survey* in the area.
- (2) Education of the people so that a rational attitude towards leprosy can be developed. This is done by *publicity*.
- (3) Arrangements for *treatment* of cases of leprosy.
- (4) Arrangements for *isolation* of infective cases.
- (5) Arrangements for *protection of children*.
- (6) Organisation of *social services* for the patients and needy dependents.
- (7) Enactment of necessary *legal powers*.
- (8) Arrangements for *training personnel*. To carry out the above activities, there will be need for a large number of personnel, both medical and para-medical, and it will be necessary to make suitable arrangements for the training of such personnel.

If the protective value of B.C.G. vaccination and/or the value of preventive treatment of healthy contacts with sulphones are proved, these measures will become very important in the anti-leprosy campaign. The various steps for the anti-leprosy campaign outlined above will be discussed in the following pages.

### LEPROSY SURVEYS

The term "Leprosy Survey" is applied to the investigations undertaken in order to find out the extent of prevalence and severity of the disease in a particular area. Where some anti-leprosy activity is being carried out, a very important function of the survey is that of detecting all cases in the area concerned, specially in early stages of the disease. In such circumstances a survey can be defined as a 'case finding programme'.

It has to be emphasized that a leprosy survey should not be an end in itself, but that it should be a means to an end, namely, the control of leprosy. The purpose of the survey should be to determine the extent and nature of the leprosy problem in the community or area under investigation, and to collect information which will be of help in formulating the necessary anti-leprosy measures.

### Types of Surveys

Different kinds of activities are included under the term leprosy survey. The survey may be of the nature of a preliminary investigation in an extensive area where little is known about leprosy to find out the approximate prevalence rate of the disease and its rough distribution in the area. In areas where leprosy is known to occur in an appreciable amount, a little more detailed investigation is carried out in order to obtain more accurate data regarding the disease. Then there is the detailed investigation consisting of a complete and accurate study of leprosy in a population.



These different kinds of activities are often known as Surveys of Type I, II and III respectively.

*Survey Type I*—This is a preliminary investigation undertaken in large areas where little is known about leprosy, in order to find out the approximate prevalence rate of the disease and its rough distribution in the area. A large area, say, a district or a sub-division is selected, and owing to the big size of the area selected, parts of the area are surveyed, and the results applied to the whole area. In other words, the activity is of the nature of a sample survey. It is important that the selection of sample areas should be properly done in such a way that the findings may be applicable to the whole area. This type of survey should include at least two parts, one in which leprosy is said to be common, and another in which leprosy is said to be rare. A mistake to be avoided in preliminary surveys of this type is to confine surveys to parts where leprosy is said to be common and to apply the findings to the whole area.

In this preliminary activity investigations are concentrated on the examination of known cases of leprosy and their contacts. The population as a whole is not examined but certain groups may be usefully and easily included, such as school children, and industrial population.

*Survey Type II*—This is also a preliminary investigation but a little more detailed than the Type I survey. In this type of activity the size of the area is smaller and the whole area, that is not only samples from the area, are surveyed. For example, it may cover all the villages within a radius of five miles from the centre of anti-leprosy work. As in the Type I survey, in this type also attention is concentrated on cases of leprosy and their contacts, but it will be possible to include for examination a large proportion of the population.

*Survey Type III*—This is the survey proper. It consists of taking the census and examination of the entire population. A survey of this type is a complete and accurate study of leprosy in a population, and is based on the examination of every man, woman and child in the population to be studied.

This kind of activity is undertaken in an area in which the incidence of leprosy is fairly high, and in which a centre of anti-leprosy activity already exists. A complete census of the villages is necessary with a list of every man, woman and child, family by family, with details regarding age, sex, caste, etc. The whole census may be made before the actual examination of the people is started; or else, both the census and the examination may be taken at the same time, house by house, a list of inmates being made, each person being examined, and records made. The work is not really complete until every inhabitant of the village has been examined; in practice, however, a small number of persons cannot be found even on repeated visits to the village.

Apart from the above three types of surveys, there may be a more intensive study of some special aspects of leprosy. Work of this nature is a piece of special research work and the study and its records have to be carefully planned. The area selected should have a sufficiently high prevalence of leprosy and a sufficiently large population to produce significant results.



## Methods of survey

It is not proposed to describe here in detail the methods of carrying out the surveys, keeping records and interpreting the findings. The following general remarks on the subject are included as a matter of general interest.

*Some preliminary steps*—Before a survey is undertaken it should be carefully planned. As a preliminary step to the survey, all available information regarding leprosy in the area should be collected. It is also important to secure the confidence of the people before the work starts; this could be done in various ways, by formal talks or if possible by organised publicity.

*Aids to survey work*—The inclusion in the survey team of local workers from the area will very much facilitate the work. A difficulty to be encountered is examination of women by men workers; it is therefore, necessary to include women workers in the party. If there is no permanent woman worker in the party, assistance may be sought from some women in the area.

*Records of the survey*—The records of survey should include : (a) general information regarding the villages and area surveyed and (b) information regarding the number of persons examined and cases of leprosy detected. In Types I and II surveys, only a list is made giving information about the name, age, and sex of the patients, and type of the disease etc. In the Type III survey and in the special investigations, records are kept for the whole population examined as also a list of cases giving the necessary information.

*Reports of the survey*—The survey reports should be based on the recorded information and should contain an analysis of the findings. This analysis should give information about the prevalence of leprosy, the proportion of the different types of the disease, *i.e.*, the type-distribution, and about the age distribution of the cases. The report should include an assessment of the seriousness or otherwise of the leprosy problem in the area concerned.

In case of surveys of Types I and II the prevalence rate should be calculated on the basis of the number of cases recorded and the total population of the area concerned, and not on the number of persons examined. In surveys of Type III, however, the prevalence rate should be based on the number of cases detected and the number of persons examined, which should be practically the whole population. In neither case should the suspected cases be taken into account for the purpose of calculating these rates. In the Type III survey the prevalence rate of the disease may also be calculated separately by age and sex of the persons examined.

The *type-distribution* indicates the percentage of cases which are of the severe and more infective (lepromatous) type. This figure is commonly known as the 'lepromatous rate'. On the average, the proportion of lepromatous cases in most parts of India is about 20 to 25 per cent.

The *age distribution* of the cases is also important in assessing the importance of the leprosy problem in an area. The simplest method is to divide the cases into two age-groups : up to 15 years and above that age.



The figure for the percentage of cases below the age of 15 is sometimes known as the 'childhood rate'. In most parts of India, the prevalence of the disease in children below 15 is lower and sometimes much lower than in adults, the 'childhood rate' varying from 5 to 25.

*Interpretation of the survey*—When the survey is completed and the findings analysed, the question of the assessment of these findings arises. Opinion has to be expressed whether or not the findings indicate leprosy to be a serious and important public health problem in the area studied. A more difficult question, and one which is not easy to answer with certainty, is whether the disease is on the increase or decrease in the area concerned.

The prevalence rate of the disease in an area provides the simplest indication of the seriousness of the problem. It may be said that in countries where leprosy is endemic prevalence rates of 0.5 to 1% or over indicate a fairly high incidence, necessitating special anti-leprosy measures. Figures over 1% indicate the increasing seriousness of the problem. Information regarding type-distribution and age-distribution of the cases provides additional and confirmatory evidence on the subject. Because of their highly technical nature these matters are not discussed here.

While the above findings may provide an indication regarding the probable increase or decrease in leprosy in the area, the only way in which definite and accurate information in this matter can be obtained is the re-survey of an area previously surveyed, the re-survey being done at an interval of about 5 years.

## ISOLATION OF INFECTIVE CASES

### Need for isolation

Prevention of contact between the infective patient and the healthy people is very important in the control of the disease. This can be partly attained by giving attention to principles of personal hygiene, by improving the living and housing conditions etc. The only sure method, however, of preventing contact is isolation. Isolation is the term applied to the removal of infective cases of leprosy from amongst the healthy persons. The contact may be prevented in another way, *i.e.*, by removing the susceptible persons, for example children, from the vicinity of the infective cases.

### Isolation is an age-long practice

The need for keeping the diseased persons away from the healthy has long been recognised. Isolation of cases of leprosy has been practised in one form or another in most countries and for many centuries. Such practices as forcible turning out of leprosy cases from the villages, and making arrangements for them to live in outskirts of villages, have been prevalent in many endemic areas. Inhuman practices of drowning the leprosy patients, shooting them dead or burning them alive, have also been known.

The necessity for isolation in the control of leprosy has been realised in India since ancient times. This is evident from the ancient customs of out-casting persons suffering from leprosy, of avoiding contact with them, of providing huts for them on the outskirts of a village etc.



### **Differentiation between infective and non-infective cases**

In the earlier days no distinction was made between the infective and non-infective cases for the purposes of isolation. This difference is now well recognised, and forms the basis of the guiding policy in most countries. It is now generally accepted that from the point of view of controlling the spread of the disease, isolation of only the infective cases is needed, although institutional care of some of the non-infective cases may be needed on social, economic or other grounds.

### **Practical difficulties in isolation**

Even in the case of acute infective diseases, isolation presents certain difficulties, such as the provision for the necessary accommodation and facilities, and convincing the general public regarding the necessity of isolation. These difficulties are multiplied manifold in the case of isolation in a chronic disease with such a long course and long latent period as leprosy.

The isolation has to be maintained for a long time. On the one hand, it makes the isolation very costly and, in most countries where leprosy is endemic today, it is impracticable for a large number of patients for want of accommodation and facilities. On the other hand, the patient and their relations find it difficult to reconcile themselves to the idea of isolation. The recent improvements in the institutions and in the treatment of the disease have no doubt made a great improvement in the attitude of the patients and their relations.

Another difficulty is caused by the fact that the results of isolation cannot be dramatic; fresh cases of leprosy will continue to appear for a considerable time in a locality from which all infective cases have been removed. These fresh cases arise amongst persons infected previous to the isolation of the infective cases, but their occurrence makes it difficult for the people to be convinced regarding the value of isolation.

### **Value of isolation**

In principle, isolation of infective cases, by breaking the chain of infection, provides a sure method of control of the disease; in practice, it has not always produced the desired results, even when rigorously applied. A very probable reason appears to be the tendency of the patients to conceal the disease in its early stages, to avoid isolation; by the time they are detected and isolated, they have already spread the disease to their contacts. Under favourable conditions, isolation is known to have wiped out leprosy from a country. For example, in Norway, where there were about 3,000 cases of leprosy about a century ago, the efficient isolation policy has made the country almost leprosy free, the number of cases at present being about a dozen. In the Hawaii Islands also active measures have led to a considerable decrease in the number of leprosy cases. There were about 1,200 patients in Hawaii in 1890 (the peak year); at the end of 1950, the total number of known patients was 475, of whom 256 were active.

### **Compulsory Vs. Voluntary isolation**

In the early days of prevention against leprosy reliance was placed on the compulsory isolation of cases of leprosy. Frequent failure of this method of compulsion in stamping out the disease have led in general to a relaxation of compulsion where it existed. It is now generally recognised



that the success of anti-leprosy measures depends for the most part on the willing co-operation of the patients and of the general public. There are only a few countries where compulsory isolation is in vogue at present.

There are two main difficulties in the successful use of compulsion in the isolation of infective cases. Firstly, it is not practicable in most countries where leprosy is prevalent today, because of the limited financial resources and the consequent limited accommodation for the patients. Secondly, compulsion leads to concealment of the disease and before the patient is detected and isolated, he would have spread the infection to a large number of healthy persons.

In general, work on a voluntary basis yields much better results than work on a compulsory basis. Only in special circumstances compulsion may sometimes be justified. The special circumstances which may call for the use of compulsion include the presence of dangerously infective patients in conditions very likely to spread the disease in general community, and refusal of the infective cases to isolate themselves voluntarily at places provided for the purpose.

### Methods of isolation

The most efficient method of isolation, from the point of view of both the general public and the patient, is the isolation in a leprosy institution. This may, however, not always be possible. The alternative to isolation in institution is isolation of all the patients of a village or a group of villages in huts made on the outskirts of a village. In suitable cases where facilities exist, a patient may be isolated at his own home. Thus three methods of isolation may be considered; the isolation in institutions, the isolation at home, and village isolation.

These different methods of isolation are discussed below :

*Isolation in Institutions*—From the point of view of controlling the spread of the disease, it is the institutions for the isolation of the active and infective cases of leprosy that matter. Other kinds of institutions will be required to meet the needs of crippled and disabled patients, and for the rehabilitation of cured and able-bodied patients.

For the purpose of isolation of the active infective cases of leprosy, the ideal type of institution is one that combines the functions of a home, hospital and colony. Although the idea of a life-long stay in the institution has to be discouraged, and efforts made to keep down the period of stay to a minimum, the patients will have to spend quite a long time in the institution, much longer than in the case of an ordinary hospital; the accommodation has therefore to be of the type where the patients feel comfortable and at home. Most of the patients will be ambulatory, not needing hospital attention in the usual sense, but during their stay in the institution they may suffer from acute complications, because of which they may have to be confined to bed and need hospitalisation; each institution should, therefore, provide hospital accommodation to the extent of about 10% of its total strength. Because of the facts that most of the patients will be able-bodied, that their stay in the institution will be prolonged, and that some occupation is necessary as a part of treatment and for the purpose of rehabilitation after discharge from the institution, it is very essential that the inmates should lead a colony life in which each individual is engaged



in work according to his physical condition, capacity, and qualifications. This work will contribute to some extent towards the expenses of the institution, but its main purpose should be to provide occupational therapy and training for rehabilitation. The activities may include agriculture, gardening, poultry, soap-making, weaving, carpentry etc.

From time to time, various terms have been used to designate a leprosy institution. Apart from the terms 'asylum' and 'hospital' which can hardly be applicable to an institution of the kind described above, the terms in current use are Leprosy Home, Leprosy Home and Hospital, Leprosy Colony, Leprosarium, and Leprosy Sanatorium. Of these, the term 'leprosarium' is not in common use in India. For sometime the term 'leprosy colony' became very popular as this term indicated the association of agricultural activities with the institution. With the interest shifting in certain quarters from agriculture to arts and crafts, there is now a tendency for a preference to the term 'sanatorium'. It is to be emphasised that the particular term or designation is immaterial as long as the institution fulfils the real objectives of providing a home, hospital, facilities for suitable work, and training for rehabilitation.

The isolation of infective cases in the institutions is no doubt the most efficient way of isolation but this may not always be possible. In countries with a limited number of cases of leprosy, and with sufficient funds available for anti-leprosy work, the isolation of all the infective cases in institutions may be possible. Even under these conditions, there are difficulties such as the unwillingness of some patients to go into the institution, and the tendency to concealment during the early stages of the disease.

In countries with a large number of cases of leprosy and with limited resources, it is impossible to provide institutional accommodation for all infective cases, either at present or in the near future. For example, in India the number of cases of leprosy is roughly estimated at 15 lakhs; allowing that 25% of them are infective, the number of infective patients would be about 4 lakhs. The combined capacity of all the institutions in the country is at present for about 20,000 patients. Even if all the available accommodation could be used for infective cases, only a fraction of them could be isolated. More institutional accommodation is needed, but it is impossible to increase it in a reasonable time to such an extent as to accommodate all the infective cases. Some other methods of isolation are therefore urgently needed to supplement the institutional isolation.

*Isolation at Home*—Home isolation, if effectively carried out, is possibly the best form of isolation from the psychological and social points of view. However, under the present circumstances, maintenance of effective isolation is very difficult. Firstly a separate room with separate feeding vessels, clothes, beddings, towels etc., is required and it may not be possible to afford these with the limited space available, and the limited resources of the family. Secondly, the isolation has to be maintained for a long time, and both the patient and his relations are likely to relax the restrictions, with the result that the isolation does not usually remain effective, even if it were so to begin with. Though possible in intelligent families with good resources, home isolation is not at present applicable on a wide scale. However, efforts should be made to create conditions necessary for effective home isolation.



A patient isolated at home should have separate feeding vessels, bed linen, towels and clothes. The clothes should be washed separately or disinfected before being given for common washing. Isolation should not mean the patient's remaining confined to his room all the time. He should, on the other hand, be kept usefully employed in some work which does not bring him in contact with healthy people, such as looking after cattle, gardening, and agriculture etc. In home isolation protection of children is of the greatest importance; an isolated patient should be looked after and waited upon by some middle-aged or elderly person but not by children.

*Village Isolation*—A second alternative to institutional isolation is the isolation on the outskirts of a village of all the infective patients of a village or a group of villages. By this method of group isolation, most of the defects of home isolation are eliminated; the patient has not to lead a lonely life, and if he keeps away from village, he is not likely to come in contact with healthy people.

The purpose of these village isolation centres should be to provide cheap and effective isolation near the patients' own homes. A plot of land should be acquired little apart from the rest of the village, a group of the houses or huts built, and infective patients of the village persuaded to live there. One such centre may serve several adjoining villages. In these centres provision should be made for the feeding, clothing and treatment of the patients.

To make the village isolation an effective method of control of leprosy, the work should be so planned as to make it possible for all the infective patients of the village to be isolated, and to make some permanent arrangements for the maintenance of isolation. Before the centre is actually started, the local people should be educated through the right kind of publicity, and a strong public opinion in favour of isolation should be created. A local committee for each village or group of villages should then be formed, and the most important function of this committee should be to arrange for the isolation and to maintain it.

In such isolation centres, the patients should be given work, each patient according to his ability. This will provide the patients with physical and mental occupation which is very essential for keeping up their spirits and keeping them as fit as possible. In addition, this work can meet a small portion of the cost of isolation though the centres cannot be expected to become entirely self-supporting; at best they can be only partly self-supporting. Since the most common occupation in the villages is cultivation, in the selection of site for isolation, due regard should be paid to the availability of some cultivable land and water. The able-bodied patients can thus occupy themselves in agriculture and retain their normal routine of life. Some other kinds of occupations can also be introduced.

Another method of village isolation is night segregation as advocated by Dr. Cochrane in Madras. In this method the infective patients work in fields during the day, and have to come to a specially created centre for sleeping at night. If effectively carried out, this can eliminate the close room and bed contact, which is most common at night. However, experience so far does not indicate the practicability of the method.



## Conclusion

Above we have considered the value of isolation, as also the limitations in the application of this method in most countries where the disease is at present endemic. It would be apparent that in these countries, isolation is of limited application and value, and cannot be depended upon as the only or the main method for the control of leprosy. Till recently, the situation looked quite a hopeless one, as there was not available any alternative commonly applicable method for this purpose. However, with the recent advances in the treatment of leprosy, the position has changed for the better, making possible practical, alternative and supplementary methods. A reference to this has already been made, and the matter will be discussed presently.

With the new approach becoming available, views are sometimes being expressed in certain quarters that isolation of infective cases is no longer necessary, and that it can be dispensed with. This is quite erroneous. It has to be stressed that isolation has still a place in the control of the disease, and that only because of practical considerations is the emphasis being shifted from isolation to treatment. It is essential that the available accommodation for isolation be put to the best use, by means of selective and discriminate isolation.

The available accommodation should be used for highly infective cases; moreover, the turn-over of the patients should be increased by discharging the patients when they become less infective and taking in the highly infective case in their places. Arrangements should be made for follow-up and treatment of the discharged cases in out-patient's clinics.

## EXTENSIVE TREATMENT WITH SULPHONES

### A new approach to the control of leprosy

The difficulties and limitations of controlling the spread of leprosy through isolation of infective cases have already been discussed. A reference has also been made to the possible new approach to the control of the disease through treatment with sulphone drugs.

Bacteriological improvement under these drugs is no doubt slow and this fact reduces their value from the point of view of control. All the same, even with their limitations, extensive use of sulphones is likely to prove an important measure towards the prevention of spread of leprosy. The treatment no doubt takes long to make all the bacilli disappear from the patient's body, nevertheless considerable bacteriological improvement is evident after treatment for about a year. This improvement appreciably decreases the infectivity of the patient. Reduction in infectivity is brought about not only by an actual decrease in the number of bacilli, but also by the healing of leprosy ulcers, both in the nose and other parts of the body, resulting in a considerable decrease in the infective discharge from the patients. Discharges from ulcers in the nose and elsewhere being the most potent source of spreading the infection, any measure which minimizes this source is sure to have a restraining influence on the spread of the disease. It is now the considered opinion of leprologists that organised sulphone treatment constitutes one of the most important measures of control of the



disease. It is regarded as the most potent generally applicable weapon now available in the control of the disease. For achieving success in the matter, it is essential that the drug be used on an extensive scale, so that almost all cases of leprosy in the area concerned are brought under treatment, otherwise the cases left untreated will continue to spread the disease in the area. Another way in which the sulphone treatment can help is to make possible a quick turn-over of the patients in the leprosy institutions, leading to a better use of the available accommodation—a thing so badly needed in countries like India, where the in-patient accommodation is grossly inadequate to meet the needs. Under the sulphone drugs the infectivity of the patients is considerably reduced at the end of one year or so; at this stage the patients could be discharged from the institutions to continue their treatment as out-patients, to make room for other highly infective cases.

### Practical considerations

For the successful application of the new approach, there are three essential pre-requisites. These are : (i) Arrangements on a wide scale for making the treatment available near the homes of the patients; (ii) An adequate case-finding programme; and (iii) A follow-up service to ensure regular attendance of patients.

*Arrangements for treatment*—In a country like India where leprosy is highly prevalent in widespread areas, it is essential that in the endemic parts of the country, treatment for the disease be made available in all general hospitals, dispensaries, and health centres. In addition, in highly endemic areas, there is need for special leprosy clinics and control units. The object should be to provide a sufficient number of treatment centres, so that a patient has to walk not more than about five miles to get the treatment.

*Case finding programme*—To put under treatment all cases of leprosy in a particular area, it is necessary that all of them should be detected and registered. Efforts should be made to find out the cases as early as possible after the appearance of the signs of the disease. This purpose is fulfilled by leprosy surveys and re-surveys in the area, and by periodic examination of the contacts of known cases of the disease. The early detection of cases is generally helped by a campaign to educate the public regarding the true nature of the disease.

*Follow-up of patients*—In leprosy, treatment has to be a prolonged one. During the long course of treatment, patients tend to become irregular in their attendance, or to discontinue treatment after some time. There are several reasons for the irregularity or absence. In order to contact the irregular and absentee patients and to persuade them to attend regularly, there is a great need for follow-up of such cases in their villages and homes.

All the above functions have to be undertaken by the leprosy clinic. Such clinics should not, therefore, deteriorate into mere treatment centres. Their functions should include : detection and treatment of cases, home visitations and follow-up work, welfare work in families affected by leprosy, and promotion of education regarding leprosy. For the successful discharge of these functions, a leprosy clinic should have the services of a social worker.



## The new approach in operation

The new approach outlined above has been put in operation in several countries with big leprosy problems. In India also this method has been adopted. The Gandhi Memorial Leprosy Foundation runs a number of Control Units and the Central Government in collaboration with the various State Governments has also launched a control programme based on this approach. The object of the National Leprosy Control Scheme is to establish control centres in highly endemic areas of the country, with the object of finding out and treating all cases of leprosy in the area. Till the end of the March, 1958, sixty-six centres had been established under this scheme in the various States, and it is proposed to expand considerably.

The recommended staff of each centre consists of a medical officer, 4 non-medical assistants, one social worker, and one compounder. (In a limited number of centres, known as Study and Treatment Centres, there is separate staff for survey work). To ensure the mobility of the team, each centre is provided with a vehicle and a number of bicycles.

By the end of March, 1958, the existing centres had covered a population of about 51 lakhs, about three-fourths of which (about 39 lakhs) had been surveyed, and about 58,000 cases of leprosy detected of whom over 90% were registered for treatment. In addition, about 25,000 cases from outside the project areas have been registered for treatment at these centres. The number of healthy contacts under observation was about 1,12,000.

Since the centres under this scheme are expected to play an increasingly important role in controlling the spread of leprosy in India, the methods of work at these centres are briefly outlined below :

(a) *Size of the area*—To achieve the objects of detecting all cases of leprosy in the area, and of giving them regular treatment, it is necessary to concentrate the activities of centre to a selected area of reasonable size and not to spread them over a wide area in a diffuse manner. An area with a population of about 60 to 80 thousand appears to be about the right size for activities of this nature.

(b) *Selection of the area*—Selection and demarcation of the area for work is a necessary preliminary step. If there is sufficient previous information about the prevalence of leprosy in different parts of district, it may be possible to delimit such an area straightway.

In the absence of definite authoritative information on the subject, it will be necessary to carry out *Preliminary Leprosy Surveys* to be able to find out a suitable area for work. The selected area should have a fairly high incidence of leprosy (preferably 1% or over) so that it will provide about 500 to 1,000 cases of leprosy. It should have good means of communications so that the different parts and all the villages can be regularly visited by the staff. Normally the centre should cover a compact and contiguous area. However, in case of such an area not being available because of the patchy distribution of the disease, it may sometimes be necessary to include a number of separated parts provided there are good means of communications between them.

(c) *Sketch map of the area*—When the area for the work has been selected, it may be described as the project area. A sketch map of the project area should be prepared showing its limits, the number and location



of villages in it with their population, the means of communication, the location of any schools, clinics or dispensaries etc. This map should be used as a guide for planning and carrying out the activities of the centre. For the purpose of organising the work, the area may be divided into two or more sectors, and the division should be indicated on the map. Separate maps for each sector, on a larger scale, should be prepared giving the above as also additional information.

(d) *Activities of the centre*—The activities of the centre include :

- (i) A case finding programme through leprosy survey;
- (ii) Treatment of all cases of leprosy found in the area;
- (iii) Periodic examination of all healthy contacts of the patients;
- (iv) Health education regarding leprosy;
- (v) Welfare activities for the patients and dependents.

It is necessary to keep accurate records of all these activities, and to submit periodic reports of the progress of the work.

The subjects of health education and welfare activities are discussed later. Matters connected with surveys and treatment have already been discussed in detail. A few remarks about them are made here, with a special reference to the work of the centres.

*Surveys*—The survey should be of the intensive type, the entire population being enumerated and examined. For this purpose it will be necessary to pay several visits to a village. Complete surveys of the whole Project Area should be aimed at within the first year of the establishment of the centre, so that the data thus obtained could form a base line for assessment of the results of the work during the subsequent years.

*Follow-up of healthy contacts*—This is a supplementary method for the early detection of leprosy cases in the area. Healthy persons coming in contact with patients should be registered and examined periodically (say every 3 to 6 months). This will ensure the detection of new cases in the area soon after the appearance of the signs of the disease, and their early treatment.

*Treatment*—One of the most important activities of the centre is the treatment of all cases of leprosy. The treatment should be taken to near the patient's home, and for this purpose it will be necessary to run a number of clinics in the various sectors of the centre, the object being that no patient should have to walk for more than 3—5 miles for taking treatment. In addition to organizing these clinics, it may be necessary in some instances to make the treatment domiciliary and to take it to the patient's homes.

To maintain regularity of treatment it will be necessary to have a follow-up programme whereby the irregular and absentee patients are contacted and persuaded to take the treatment regularly.

The patients should be given treatment not only for leprosy and its complications, but also general treatment, whenever necessary. Moreover, members of the general public should also be treated for minor ailments, whenever necessary, specially if there is no general dispensary in the area. This will ensure better co-operation from the people of the area.



### Limitations of the new approach

In the early part of this century, the introduction of injection treatment with hydnocarpus oil gave rise to great hopes that it would be possible to control the spread of the disease by wide scale treatment of cases. However, these hopes were falsified, and it was found that while of value in individual patients, the hydnocarpus remedies did not contribute much towards the control of the disease. Hence, it was realised that by treatment alone one could not achieve the object of preventing the spread of the disease.

The hope of being able to control leprosy through wide scale treatment has been revived with the recent introduction of the sulphone drugs. These remedies mark a great advance on the hydnocarpus oil and they are likely to play a more effective prophylactic role. It has, however, to be emphasized that they too have their limitations, that their preventive role has yet to be proved, and that till then this matter should be considered to be in an experimental stage, needing accurate and unbiased observations.

It has already been stated that the sulphones take a long time for bacteriological clearance of the infective cases, and that this constitutes a great limitation in their use for checking the spread of the disease. Besides this, there are other limitations caused by difficulties in implementation of the programme of giving regular treatment to every case in the area. Some of the reasons for these difficulties may be enumerated as under :

- (i) Failure to detect all the cases in the area; this is caused by the tendency to concealment.
- (ii) Refusal of a proportion of the detected cases to take treatment. Experience has shown that of the detected cases up to 10% may refuse to register for treatment for various reasons.
- (iii) Irregularity or non-attendance of the cases registered for treatment. In a chronic disease requiring long period of treatment, this tendency is natural. In some cases the irregularity is caused by the clinical improvement seen under treatment, because of which they think, that treatment or regular treatment is no longer necessary. In some other cases the lack of satisfactory improvement may be the reason. To a wage earner, attendance for treatment may mean loss of wages on the Clinic day. There may be other reasons for irregularity or non-attendance. Even under favourable circumstances only about 60% to 70% of the patients registered for treatment have been found to actually attend for treatment;
- (iv) Intolerance to the drug on the part of a small proportion of the cases, because of which they cannot stand it even in very small doses. The fact that this intolerance is seen mostly in the lepromatous cases makes it all the more serious. Luckily the proportion of such cases is low.
- (v) Relapses in a proportion of cases, after the treatment is stopped.

Because of the above limitations, it is necessary to pursue the work with great care, vigilance, and perseverance, and to consider the undertaking



as an experiment. It is not the value of the treatment, as such, that is under investigation, because the efficacy of these drugs is well established and they are now beyond the experimental stage; the point under investigation is the possibility of controlling the spread of the disease through wide scale treatment with these drugs.

Another matter to be emphasised is that chemotherapy should not be considered as an exclusive method for the control of the disease, which makes it possible to dispense completely with the need of isolation of infective cases. In countries where adequate accommodation is available, chemotherapy provides a supplementary method to relax the rigours of isolation, and thereby to discourage the tendency to concealment. In countries where the hugeness of the problem is coupled with limited in-patient accommodation, it provides a practical alternative approach, and enables a better use of the available in-patient accommodation. In countries of the latter group priority is to be given to this new approach, in order to put the available resources to the best use.

### *Prophylactic use of Sulphones*

Some workers have expressed the view that the sulphone drugs may control the spread of leprosy not only by providing effective treatment for patients of the disease, but also by providing effective prophylactic treatment of healthy contacts of the patients. It is argued that the efficacy of these drugs as a control measure can be increased by treating both the patients and their contacts.

This point of view is worthy of investigation, but till definite results of such an investigation are available, the routine use of sulphones in healthy contacts cannot be advocated. A practical difficulty will be regarding the continued use of the drug for a prolonged period by healthy persons. It is common knowledge that even many patients with manifest disease do not persevere long with treatment. Another matter for consideration is the effect such a treatment will have on the resistance acquired through small cases of infection which do not produce the disease, but which are considered by many to play an important role in producing resistance to infection. The prophylactic dose and the necessary duration of treatment in healthy persons will also have to be determined. The question of the toxic effects of prolonged administration on healthy persons will also have to be investigated; this is more important in healthy persons, many of whom are not likely to get the disease, than in the patients, all of whom are suffering from manifest disease, and are likely to derive benefit from these drugs.

Sulphone therapy of the healthy contacts can therefore be recommended, not as a routine measure, but on an experimental basis. It should be undertaken in suitable circumstances where it is possible to get a sufficient number of healthy contacts willing to take prolonged treatment. These contacts should be divided into two comparable groups regarding age-distribution and exposure to infection; one of these groups should be given sulphone treatment and the other only a placebo of similar appearance. Both the groups should be kept under observation for several years, and the incidence of leprosy and its type should be recorded in both the groups.



## HEALTH EDUCATION AND LEPROSY

**Medieval outlook**

Leprosy is a disease of great antiquity. During all this time it has been shrouded by a thick veil of ignorance, misunderstanding and superstition. Many of the problems caused by the disease have been the result of the deep-rooted prejudice against the disease and its victims, growing out of ignorance of the true nature of the disease. Instead of considering it as a *disease*, and the person suffering from it as a *patient*, people have often associated the disease with a divine curse or punishment for sins committed in the present or some past incarnation. Because of this wrong notion, the persons suffering from the disease have been subjected to untold hardships, ostracism and stigma. The indifferent and apathetic attitude of the general public are also the result of the same wrong notions. There are also prevalent such wrong beliefs as that leprosy is a hereditary disease, and that it is incurable.

Of late, there has come about a welcome change in this matter, but in several quarters the medieval outlook still hangs on, and even where a change is visible, it usually turns out to be skin-deep.

**Some reasons for this outlook**

Leprosy and tuberculosis are two sister diseases. However, one finds a great and far-reaching difference between the reactions of the people and administrators in respect of the two diseases. The spirit of understanding and the sense of urgency seen in the cause of tuberculosis is largely lacking in the case of leprosy. Following are some of the reasons for this difference in outlook :

*Slowness in Scientific Progress*—The discovery of the leprosy bacillus preceded that of the tubercle bacillus by 10 years. But, because of certain handicaps our knowledge about the causative organism, and of the disease caused by it, is far ahead in the case of tuberculosis than in leprosy. This has greatly limited our progress in all directions.

*Unsightly Lesions*—In leprosy the lesions are mostly external and exposed to sight, while in tuberculosis the lesions are mostly internal and hidden from sight. Otherwise, a piece of gangrenous lung will not be less unsightly than an ulcerating nodule.

*Ineffective Treatment*—Till recently treatment in leprosy was not very effective and several advanced cases did not derive any benefit. This caused frustration which ultimately resulted in indifference.

*Lack of Mortality Figures*—Unlike tuberculosis, leprosy does not kill, but deforms. No high mortality figures were therefore available to impress the public health administrators regarding the importance of this disease. True, it does not kill, but it does even greater harm; it condemns a large number of people to living death; it takes an exorbitant toll in the shape of human suffering and economic loss.

*Exaggerated Fears of the People*—Leprosy is less infective than many other infective diseases, but because of its deforming and crippling effects people often have unduly exaggerated fears.



### Need for change in the outlook

There is an obvious need for change in this outlook, which is not justifiable on the basis of known facts. It is now known to be an infective disease, and the infectivity is rather mild. A person suffering from it is a patient, and should not be humiliated and stigmatised by being called a 'leper', just as nobody would now call a patient with tuberculosis as a 'consumptive'.

The indifference arising out of helplessness and desperation is also no longer justifiable. The recent advances in the treatment of leprosy have greatly changed the outlook in the field of both the treatment and the control of the spread of the disease.

Anti-leprosy work should not be considered as a matter of charity. Anything that the people do for the treatment and isolation of the patients does not benefit the patients alone, but also helps the people themselves, as by doing so they will be minimising the danger of infection to themselves and their children. It should be realised that leprosy is not a disease confined to the poor. Its incidence is no doubt higher amongst the poor, but no class of society is free from it; quite a considerable number of cases are found in the middle-class families, and even the most highly placed are not immune.

### Need for Education

In order to bring about the desired change in the outlook of the people, so that they adopt a rational attitude towards the disease, there is great need for educating the public through right kind of publicity. However, care has to be exercised to see that this publicity is based on scientific facts and that the opinions expressed are well-balanced, so that it does not go to the other extreme, leading to the relaxation of the necessary precautions, and thus resulting in the increased spread of the disease. The rational attitude is, on the one hand, to take all necessary precautions to protect oneself, one's family, and others; and on the other hand, to be kind and considerate to the patients, and not to treat them with abhorrence or harshness. Harsh treatment not only injures the feelings of the patient, but also leads to concealment of the disease by him, as long as possible. This concealment is very dangerous to the general public, since the patient, until his disease is too advanced for concealment, mixes freely with the people, and spreads the disease among unwary persons. Kindness to the patients, therefore, is needed not only in the patients' interest, but also in the interest of the general public.

*Methods of Publicity*—The publicity should be based on scientific knowledge, but the facts should be presented in popular non-technical language. Every available means of publicity should be used, such as press, platform, radio, books, pamphlets, posters, and cinema slides etc. In addition, the co-operation of educational authorities should be sought, and elementary knowledge about leprosy should be included in school textbooks, especially in the books on elementary hygiene.

The educational campaign should cover not only the healthy population, but also the patients of the disease. The patients should know what to do and what not to do in their own interest as also in the interest of the general public.



*Education of the general public*—Following are some of the points to be stressed.

- (1) Leprosy is a disease like tuberculosis and other infective diseases, and is not the result of curse.
- (2) It is not a hereditary disease.
- (3) It is caused by small germs similar to the germs of tuberculosis.
- (4) There are two types of patients, the infective and the non-infective.
- (5) It is only the infective patients that spread the disease to others by contact. Out of about 15 lakhs of cases in India, only about 4 lakhs are infective.
- (6) After contact with the infective cases, children get the disease more readily than the adults. The signs of the disease may however, appear till puberty or later.
- (7) Leprosy is curable, and in recent years there have been great advances in the treatment of this disease.
- (8) Leprosy is preventable. All necessary precautions should be taken for protection against infection.
- (9) While taking all the necessary precautions, the people should be kind and sympathetic to the patients. Kindness to the patients is needed in the interest of the general public itself. Harshness to patients will lead to concealment and consequent spread of the disease.
- (10) In addition to the rational and helpful attitude on the part of individuals, an organised and determined effort on the part of the whole community is required to eradicate leprosy from the country.

*Education of the patients*—Following are some of the important points to be covered in the education of the patients :

- (1) If anyone knows he has leprosy, or thinks he may have, the most important thing for him is to consult a doctor who has a good knowledge of leprosy. If there is a leprosy institution or leprosy clinic anywhere near, the doctor there will be the best person to advise.
- (2) If he is found to be suffering from leprosy, he should register for treatment at the nearest treatment centre, and attend regularly for treatment, for as long a time as the doctor thinks necessary.
- (3) He should take all necessary precautions for protecting his hands and feet against injury and burns, etc. Deformities in leprosy are mostly the result of such injuries, and are, therefore, preventable.
- (4) An infective patient should take care not to spread the disease to healthy persons. He should live separately and should not marry.

#### PROTECTION OF HEALTHY CHILDREN

*Need for care of healthy children*—In countries where leprosy is endemic, most infections take place early in life. It is well-known that a large



proportion of the children of infective leprous parents, if not removed from them get infected; but that, if removed soon after birth, they escape infection. Protection of these children from infection is, therefore, very important. The same considerations will apply to the children of healthy parents, exposed to infection in the home from a relation or non-relation, or outside the home from a neighbour, play-mate etc.

In the case of children of healthy parents, the situation may be easy to deal with. In endemic areas, an eye should be kept on domestic servants, and visitors etc., and if any of them is found to be an infective case, his or her entry to the house should be prohibited. As the children grow up, they should be taught something about leprosy, and should be warned against coming near or playing with an infective patient. The school teachers should have some knowledge of the disease, and they should teach their students about it. No infective case of leprosy should be permitted to remain in the school, either as a student or as a member of the staff. Non-infective cases should not, however, be discharged; they should be allowed to continue, but arrangements should be made for their treatment and periodic examination by a trained medical man to ensure that they continue to be non-infective.

In the case of children of leprous parents, the solution offers considerable difficulties.

### Some of the methods employed

Except in a few countries, it has not been possible to deal with the problem on an extensive scale and in an organised manner. This is quite understandable, because in most of the countries it has not yet been possible to organise anti-leprosy services for the patients themselves on an adequate scale.

In an effort to deal with the situation, special homes for healthy children have been established, either in association with leprosaria, or as separate institutions. Activities of both these kinds are useful and have done laudable work, but neither of them appears to be the ideal solution. In the case of homes attached to the leprosaria, the stigma of the association is too obvious, and it is difficult for the inmates to get over the stigma and disadvantages of this association in their later lives. In the case of separate institutions, the scope for any stigma is much less, but the mere fact that the children have been brought up in a home specially meant for children of leprous parents has its own psychological reaction, and interferes with the normal and healthy mental development of the children concerned. It is in Brazil that separate homes for the protection of children of leprous parents are best organised. In that country these homes were first known as Preventoria, but the name was later changed to Educandaria, because of the implications associated with the word 'Preventorium'. Each of the eighteen States of Brazil has one such home, and there are some States which have more than one, the total number being 27. In these homes more than 5,000 children are being taken care of. A Preventorium has a nursery, a kindergarten section, a regular school and a vocational school for training in agriculture and other arts and crafts. Although much is to be said in favour of these homes, the workers in Brazil are now realising that homes exclusively meant for children of leprous parents are not the ideal solution, because they interfere with the normal development of the inmates. It is being felt



that the stay of children in such homes should be for the minimum period, and that it would be better if these children could be kept in homes meant for the care of children in general.

### **Desirable methods of approach**

From the above, it would appear that homes for healthy children of leprosy parents, either in association with leprosaria or as separate institutions, are not the ideal solution. Separate homes are of course better than the ones in association with the leprosaria.

When practicable, the best solution appears to be for such a child to be taken care of by healthy relations, or to be adopted by some healthy couple. There will often be difficulties in adopting either of these courses, but it appears desirable to make efforts in this direction.

In case this is not possible, the next best thing would be to have common homes for the purpose of looking after children needing care for any reason whatsoever. In these homes, healthy children of leprosy parents should live in company with other children, needing care for various other reasons.

In order of priority, next comes a separate institution for children of leprosy parents, and last of all, a home for such children in association with a leprosarium. The existing facilities in these two directions should be utilised as best as possible, but when there is the question of future planning and development, preference should be given to the first two activities.

### **Marriage of leprosy patients**

A question that has a bearing on the protection of children is the one regarding the marriage of the patients and procreation by them. This question has another aspect also, namely the effect that the strain of child-bearing and lactation is likely to have in turning a mild case into a severe one, and in bringing about relapses in a quiescent and inactive case.

Persons with infective leprosy should be discouraged or prevented from producing children. An obvious method of serving this end is that marriage of patients with infective leprosy should not be allowed; and if the signs of leprosy appear after marriage, the husband and wife should be separated, or else abstinence should be practised by them. The practice in most of the leprosy institutions in India, not to allow married life, is in keeping with this view.

But there are often difficulties in strictly conforming to this principle. Patients with leprosy are human beings, and share with them the common human desires. Leprosy, moreover, is not a disease of weeks or months; it is a disease of years, and may be for life. If the patient has to live in isolation for the rest of his life, it will lighten his burden if he could get a life companion from amongst similarly affected persons. This could be done without increasing the risk to society and the burden on it if steps were taken to ensure that no children are born of such marriages. One of the easiest means to achieve this end is the sterilisation of the male partner before marriage is allowed. This can be done by means of the minor and harmless operation of vasectomy. This practice is in popular use in some other countries, and it is time that public opinion was



created for its introduction in India. Sterilisation of the female patients would be more effective, but the operation is not so simple as that of vasectomy; whenever feasible an operation for tying the fallopian tubes in the female patients could be undertaken.

Sterilisation of the infective patients of leprosy has a place in any scheme of prevention of spread of leprosy; it cannot, however, be advocated as a routine measure. Its discriminate use, with an understanding of the indications for this measure, can be of value, when the patients concerned desire married life.

Sterilisation as a preventive measure is indicated when one or both of the partners are cases of leprosy of the infective type, or living conditions of the patients are such that children born of even non-infective cases are likely to be exposed to infection from other infective cases, for example, in settlements of beggars with leprosy. On medical and social grounds it may be indicated in some non-infective case of leprosy, or in a non-leprosy male partner when the wife is suffering from non-infective leprosy, to save her from the strain of pregnancy.

It has to be emphasised that the measure should not be considered as a short-cut to the control of the disease, leading to relaxation of the other essential control measures.

### LEGISLATION DEALING WITH LEPROSY

Legal measures for the control of leprosy have been advocated and used for a long time. With growth in our knowledge of the disease and from experience of the working of such measures, there is now a general tendency to make them less rigorous. Limitations of controlling leprosy with the use of legislation are also becoming more and more clear, and this has also led to relaxation in the laws dealing with leprosy in many countries.

In general, the laws regarding leprosy include provisions for notification of cases, examination of cases and suspects, treatment, isolation in institutions, restrictions on occupations and movements, and on immigration.

The importance of leprosy as a public health problem, and the available facilities for dealing with it, vary markedly in the different countries. It is, therefore, not feasible to postulate any uniform legal measures for adoption in the various countries; only general principles in the matter can be considered. The following remarks are made with special reference to the conditions prevailing in India; they will, of course, apply to many other countries where leprosy is highly prevalent today.

#### Need for Legislation

Because of the danger of compulsion leading to concealment, and because of the fact that in most countries where leprosy is prevalent today, available facilities are inadequate, anti-leprosy work has in general to be done on a voluntary basis. The compulsion or the legal measures to make that possible are not therefore likely to play an important role in the anti-leprosy drive. However, there may arise special circumstances for the use of compulsion, and it is essential that the legal provisions should exist to meet such special circumstances.



### Existing legal power

In India legal powers for the control of leprosy are contained in the Lepers Act of 1898, the Railways Act of 1890 and the Local Self-Government Acts of the Provinces.

The Indian Lepers Act of 1898 provides for : (a) the segregation of beggars with leprosy, and (b) the control of leprosy patients following certain occupations or doing certain acts such as : (i) the preparation for sale or the sale of food, drink, drugs, or clothing, (ii) taking drinking water from or bathing and washing clothes in the public wells and tanks, and (iii) the use of public vehicles etc. This act is a permissive act which can be put into force in whole or in part by a notification by the Local Government.

Sections 47 and 71 of the Railways Act, 1890, debar persons suffering from certain infectious diseases, including leprosy, from travelling in the same compartment with other persons.

The Local Self-Government Acts of the States provide powers for the control of notifiable infectious diseases, and wherever leprosy is a notifiable disease, these provisions apply to leprosy also. The provisions of the Local Self-Government Acts for the control of notifiable infectious diseases provide for the notification of the disease, removal of the patient to a hospital when he is living under conditions likely to favour the spread of the disease, disinfection of the infected articles and buildings, and prohibition from the use of public vehicles, and following certain occupations by the patients.

### Defects in the existing legal powers

The one common defect of the existing legal powers for the control of leprosy is that they do not make any distinction between the infective and the non-infective cases of leprosy. This is a very serious defect since nearly three-fourths of the cases of leprosy in India are of the non-infective type for whom there is no need or justification for any legal action.

The Indian Lepers Act has additional defects. The provisions of this Act appear to be based on the assumption that leprosy is spread by indirect contact through clothes, water, food etc., whereas it is known that the most common mode of spread is the direct contact between the infectious cases and healthy individuals, specially children. Moreover, the Act deals mostly with the problem of beggars with leprosy, while such beggars do not constitute a real problem from the public health point of view; it is the infective case in the general population that constitutes a real problem from this point of view. The provisions of the Lepers Act have been applied only to very limited areas, and the only sections in the Act notified have been those relating to the beggars with leprosy. Even if the conditions were favourable to bring into force the Lepers Act in wider areas, effective control of the spread of leprosy cannot be expected by this measure, because of its defects explained above.

The provisions of the Local Self-Government Acts for dealing with the notifiable diseases appear to be adequate, specially in those provinces where they include powers to deal with even an infectious case living under conditions likely to spread the disease in his own family. These powers have, however, not been put into operation. These provisions are primarily meant



to deal with cases of acute infections, and the differences between acute infections and leprosy are so apparent, that it would be obvious that the legal powers designed to control acute infections cannot be applied in their entirety to the control of leprosy. Another limitation of the Local Self-Government Acts is that these powers exist only in urban areas (municipalities and notified areas), whereas leprosy is mostly a rural problem.

### Need for enactment of a new Legislation

A consideration of the defects and limitations of the existing legal powers, makes apparent the need for their amendment or else enactment of new legislation. This has also been the considered opinion of the Committee on Leprosy and its control in India (1941) appointed by the Central Advisory Board of Health. The Committee was of the view that the existing legal powers for the control of leprosy had not been of much practical value, and that the enactment of a fresh comprehensive Act incorporating the existing and the projected legislation appeared to be preferable to the modification of the various existing Acts.

The Central Advisory Board of Health at its 4th meeting (1942) considered the recommendations of the Committee, and passed a resolution agreeing with these views, and recommending the preparation of a Model Leprosy Act. The Board endorsed the principles recommended by the Committee for this Act, with one exception. This exception referred to the principles regarding the notification of the cases of leprosy. The Committee had recommended that the notification should be confined to infective cases. The Board, although agreeing that legal action will be needed only in infective cases, recommended that the provision of notification should apply to all cases of leprosy irrespective of their infectivity.

The First All-India Leprosy Workers' Conference, Wardha (1947), expressed the opinion that "there is an urgent need of amending the existing legislation in the light of modern knowledge of the disease since the present legal measures are of no practical value". However, it rightly stressed that "an indispensable preliminary to the success of any legislation will be the education of the public on a wide scale."

The Committee for the control of leprosy (1954) appointed by the Government of India also came to the conclusion that the existing legal measures have not been of much practical value, and that it was expedient to make better provisions for measures for the control and prevention of leprosy with a view to ultimate eradication.

### General Principles for the Act

The above Committee recommended that a Central Act on Leprosy should be enacted and that the law should differentiate between the 'open' and 'closed' cases of leprosy, the restrictions in the proposed Act applying only to the 'open' cases. The Committee suggested the following broad outlines for the purpose of framing the proposed Act :

- (1) *Notification of Cases*—The provision is to be enforced only when and where suitable conditions for its successful application existed. Because the notification is likely to lead to concealment on the part of the patients, and because of the



non-availability of the facilities for adopting the necessary preventive measures that should normally follow notification of cases, notification of the cases is not recommended as a routine measure.

- (2) *Facilities for the free examination*—Adequate facilities should exist for a free diagnostic service, and every person who is suffering or is suspected to be suffering from leprosy shall register himself for examination at a specified place. In the event of his failure to do so, the Medical Officer should be empowered to carry out the examination, and to enter the house for this purpose in a manner to be prescribed by rules. There should also be power for such a person to be apprehended for the purpose of examination.
- (3) *Facilities for free treatment*—Approved current methods of treatment should be available free to all persons found to be suffering from leprosy at all Leprosy Institutions and Treatment Centres, and at all general hospitals and dispensaries.
- (4) *Isolation of 'open' cases*—Open cases should be required to isolate themselves in the accommodations provided for the purpose. In case of non-compliance, the Medical Officer should be empowered to have them compulsorily removed to the accommodation provided for the purpose. Criteria should be set up for the discharge of inmates from such institutions and for their subsequent periodic examinations.
- (5) *Isolation at home*—When conditions suitable for home isolation exist or can be created to the satisfaction of the Medical Officer concerned, patients may be permitted to isolate themselves at their homes under medical supervision, subject to the fulfilment of certain conditions.
- (6) *Restrictions on persons suffering from 'open' leprosy*—Certain restrictions should be imposed on the 'open' cases of leprosy with regard to (i) engaging themselves in certain occupations, (ii) their presence in certain places where large number of people gather together, and (iii) the use of public conveyance by them.
- (7) *Restrictions on immigration*—There should be provision for restrictions on the immigration of leprosy patients from foreign countries, and for their repatriation to the countries they belong to.



## 8. SOCIAL SERVICES IN LEPROSY

### SOCIAL PROBLEMS IN GENERAL

In addition to the medical and public health problems, leprosy creates important social and economic problems. For success in an anti-leprosy campaign, it is essential to take these problems into consideration, since efforts to deal with leprosy as only a medical and public health problem will not succeed in achieving the desired end.

As has already been stated, the attitude of the public towards the disease and the persons suffering from it is at the root of most of the social problems arising in leprosy. The need has also been stressed for bringing about a change in the outlook of the people through right kind of education.

### Nature of social problems in leprosy

Apart from this attitude of the people, the social problems created by the disease may be summarised as below :

- (i) *Loss of employment*—The presence of the disease often leads to difficulty in earning a living, or may even make it impossible. This may be caused by the disease partly or completely incapacitating the patient, or by his being in an infective condition, but is often caused by exaggerated fear of the employers, because of which even non-infective and able-bodied persons suffering from leprosy lose their employment. Loss of employment in a person suffering from such a chronic disease as leprosy has a very unfavourable influence on the result of treatment and the course of the disease.
- (ii) *Family left destitute*—The patient has often wife and children, and the loss of employment affected not only the patient, but also his dependants. Admission of such a patient into a leprosy institution does not solve the difficulties of the dependants, who are all the same left destitute. This further complicates his psychological complex.
- (iii) *Care of children*—Healthy children of infectious parents need special attention as they are in great danger of contracting the disease if left with their parents.
- (iv) *Patients in the institutes*—The patients in leprosy institutions need more than medical treatment; they are in need of social help and welfare activities.
- (v) *Cured and able-bodied patients*—A leprosy patient discharged 'cured' or 'arrested' from an institution, creates another problem. As long as he was in the institution, he had his needs looked to; when he goes out, he is left to his own resources and often finds himself in environments which are hardly sympathetic. The healthy people still remain afraid of him, and still maintain the attitude of ostracism against him. Because of this attitude of healthy people, it is often difficult for him to earn a living, even if he is fit to work.



- (vi) *Crippled patients*—Finally, there is the problem of the patient who is cured of the disease but is left crippled, and therefore unfit to do any work or even to take care of himself.
- (vii) *Beggars with leprosy*—Unemployment, ostracism and crippling deformities often result in the persons concerned taking to begging. Beggars with leprosy present a special aspect of the socio-economic problems of the disease.

### Methods to solve the problems

In addition to the need for a change of attitude on the part of the healthy people, active social services of varying nature will be needed to solve the various problems outlined above. The needs and methods for the protection of healthy children have already been considered, and the question of beggars with leprosy will be discussed separately. To deal with the other problems, activities of several kinds will be required. The nature of these activities will vary according to the needs and circumstances, but in general, they will be on the following lines :

- (i) *Social work in leprosy institutions*—In the institutions the patients should be provided with useful occupations, and facilities for recreation and other amenities such as a reading room, library, musical concerts etc. In a big leprosy institution there should be a welfare officer, or a welfare section, to look after these matters. During their stay in the institution, the patients should be taught useful and suitable occupation, so that after discharge they can be easily rehabilitated.
- (ii) *Financial aid*—Destitute and indigent patients and their dependants, or dependants of patients isolated in leprosy institutions, may need financial help for their maintenance. The absence of such facilities brings untold hardships to the affected families. In countries with huge leprosy problems, and where the patients themselves are still not taken care of adequately, the care of the affected families does not appear to be a practical proposition for the present. All the same, the urgency of the need has to be kept in mind, and possible attempts made.
- (iii) *Rehabilitation*—Help will be needed for finding suitable employment for non-infective and able-bodied patients. The cases discharged from leprosy institutions as 'arrested' or 'cured' will especially need help in this matter. During their stay in institutions care should be taken to avoid or remedy deformities by appropriate means, and to train them in suitable occupations, so that on discharge they can engage themselves in some gainful work and earn a living.

The real rehabilitation consists in these patients being able to go back into their normal place in the society, and being able to follow their normal avocations if they are fit to do so. However much, one may wish and try to bring about this state of affairs, with the public prejudice so strong and deep-rooted, it will take time to bring about the desired change in the attitude of the public and to make this possible. In the meantime, for those who are not so absorbed into society, there



will be need for some kind of rehabilitation centres. These centres may best be in the shape of farm colonies, which could perhaps become self-sufficient after the initial expenses are arranged for, and provided all the inmates are able-bodied. (These remarks about self-sufficiency will not apply to the institutions for active cases of the disease, where only a proportion of the cases will be able-bodied, and capable of doing their full or normal quota of work).

- (iv) *Homes for crippled patients*—For the benefit of patients who are left crippled by the disease, and are unfit to do any work, there is need for special homes or infirmaries. These homes should better be separate from the institutions for patients with active disease.

### Role of non-official organisations

In the development of the social services, non-official organisations have to play a great role. Services of this nature are highly developed in Brazil, and a brief description of the methods of work in that country will indicate the pattern.

In Brazil there are a large number of private societies engaged in welfare work for the patients, their children and dependants. Their main work consists of: (1) taking care of healthy children of leprosy parents, (2) rendering aid to the needy dependants of the patients isolated in the leprosaria, (3) rendering social welfare service to the indoor patients, (4) helping the rehabilitation of the discharged patients, and (5) publicity for educating the people to develop the right type of attitude towards leprosy.

There are over 150 such societies in Brazil federated into the "Federation of Societies for Assistance to Lepers". The first society of the kind was organized in 1926 in Sao Paulo. In the following years some other societies with a similar purpose were formed in different parts of the country, and in 1932 the Federation of Societies was founded. Extensive educational and money-raising campaigns were undertaken which resulted in stimulating great public interest and in the collection of large sums of money. This greatly stimulated the work, and the number of societies multiplied quickly.

In the beginning of the work the societies had to depend mainly on public subscription, but later the Federal, State and Municipal Governments came to their help and are now giving regular financial help to supplement the resources derived from public generosity.

In the formation of these societies and carrying out the actual welfare work, the women of the country have played a prominent and pioneering role. Though the work is supported by different sources it is carried on mainly by ladies, of course, in co-operation with the public health and sanitary authorities.

In the leprosy institutions themselves, the welfare activities are looked after by a special organisation known as the Caixa Beneficente. Caixa Beneficente is an organisation of the patients, the President and the Secretary being elected by the patients themselves. This organisation is responsible for collecting gifts from the public in cash and in kind. Every colony receives a considerable amount of money and material from public donation, and this is spent for the purpose of welfare and entertainment of the patients.



Recreational facilities, such as cinema hall, dancing hall, indoor and outdoor games and Church are maintained by Caixa Beneficenta with the help of private organizations outside the colony.

In conclusion, it may be said that in the organization of social services in connection with leprosy, the non-official social organization with State help, have to play a very important role.

### CARE OF BEGGARS WITH LEPROSY

#### **Intricate nature of the problem**

Beggars suffering from leprosy present a special aspect of the socio-economic problem of the disease in several countries. In India such beggars in large or small numbers are found in most cities, towns, industrial areas and religious centres. The problem is a very big one, but its actual extent is not known, since except in a few instances and in limited areas, no census of such persons has ever been made.

Persons afflicted with leprosy may be deprived of all sources of livelihood and may be forced to take to begging. This is specially likely to occur in the presence of marked crippling and incapacitation produced by the disease; but in some persons, because of their psychological background, the mere presence of the disease serves to provide an excuse for taking to begging. There is another category, namely, the ordinary beggars and their children getting the disease.

Several of these beggars will be found to have been once inmates of some leprosy in-patient institution. They might have been discharged from the institution because of the disease having become 'arrested' and non-infective, but there will be quite a few who had been discharged for misconduct or indiscipline, or who had themselves left, preferring the free life outside to the disciplined though secure life in the institution. To some of them, begging is a lucrative profession and the presence of the disease becomes very handy.

There is considerable amount of inter-State migration of beggars with leprosy, big cities and religious centres being specially attractive for the purpose of begging.

The above remarks will serve to indicate the very intricate nature of the problem of beggars with leprosy.

#### **Some general considerations**

In order to appreciate the importance of the problem in its true perspective, it is necessary to keep in mind some general considerations about it.

(1) While recognising the importance of the problem of beggars with leprosy, it should be realised that the real problem of leprosy control is created by leprosy in the general population. Beggars with leprosy live mostly in separate settlements away from the cities and towns, where they come for the purpose of begging. This minimises the chances of their coming in close contact with the general public.

(2) It is necessary to differentiate between the different aspects of the problem: public health, socio-economic, and public sentiment. The



public health aspect relates to the danger of the infection being carried to the healthy population, and as stated above, fortunately this aspect of the problem is of a very limited extent. The socio-economic problem is concerned with the hardships and difficulties of the affected persons concerned. The public sentiment is concerned with the appearance of these persons in public places under circumstances which excite feelings of pity in some members of the public and that of disgust in others.

(3) As for the socio-economic problem, although it has some special features of its own, the problem of beggars with leprosy is a part of the overall beggar problem, and its solution should be linked up with that of the beggar problem as a whole.

(4) The question of public sentiment cannot be ignored, but it should not be given undue and disproportionate importance, as this may result in the neglect of the more important public health aspect of the leprosy problem in general.

(5) Since affliction with leprosy and its consequences may result in forcing persons to take to begging, steps for the solution of the problem have to be linked with the solution of the leprosy problem in general. It is essential that there should exist adequate and proper facilities for the treatment of all persons suffering from leprosy, and arrangements for the rehabilitation of those who stand in need of it, so that by sheer force of circumstances they may not have to take recourse to begging.

### Necessary Steps for Solving the Existing Problem

As for the existing problem, the lines of action seem to be more or less obvious; but the difficulty lies in the implementation of the necessary steps, because of financial and administrative difficulties, and because of the presence of special psychological background in many of the affected persons. The obvious thing to be done is to remove these persons from the streets to suitable institutions, to feed and treat them, and to try to rehabilitate them. For success in this work there are at least three necessary pre-requisites—knowledge about the extent of the problem, provision of sufficient accommodation, and suitable legislation. These requirements may be considered in a little detail :

(1) *Information about the number to be dealt with*—It is essential to find out the number of beggars suffering from leprosy in each State. For this purpose it would be necessary to take some sort of census, and to introduce registration of all beggars.

(2) *Suitable accommodation*—It would be essential to provide suitable accommodation for the beggars to be dealt with. In this connection, there will be need for institution of various kinds.

(i) *Institutions for able-bodied persons*—These institutions may be in the form of agricultural and/or industrial colonies. It would be no doubt difficult to make these persons work, but by a sympathetic and tactful handling this obstacle may be surmounted to a great extent. These institutions should preferably be separated from those for leprosy patients in the general public.



In these institutions the latest treatment for leprosy should be available. The objective should be to make the detained persons non-infective, cure them and reform them with a view to making possible their rehabilitation in due course.

It should be realised that they are being detained in the institutions primarily for the good of society, and their stay in the institutions should, therefore, be made as comfortable and pleasant as possible. One of the ways in which their burden could be lightened would be that instead of altogether banning married life it may be allowed after sterilization of the male partner by the simple operation of vasectomy. By this method they could be given the benefit of married life, without the complicating factor of production of children, which creates fresh problems.

- (ii) *Rehabilitation Colonies*—These will be necessary for persons who have been cured or made non-infective and have otherwise also been reformed in their habits during their stay in the institutions of the first type. In these rehabilitation colonies they should have greater freedom regarding their movements and actions, and should as far as possible be allowed to live as normal individuals.
- (iii) *Institutions for children*—It is essential to protect the children of the beggars with leprosy. It may be necessary to have separate institutions or separate sections in general institutions for their stay. The infants and young children should be vaccinated with B.C.G. which is likely to afford protection against leprosy.
- (iv) *Homes for crippled and disabled persons*—These homes could also take care of the imbecile and those with unsound mind.

(3) *Enactment of suitable legislation*—To achieve the desired object there will be need for a suitable legislation. This legislation should provide for compulsory registration and examination of all beggars, and necessary restrictions on those found to be suffering from leprosy. But the need for legislation will arise only after the necessary accommodation has been made available. It should be obvious that the mere enactment of legislation will not be of any avail.

### **Steps for checking inter-State migration**

This is a very difficult question. For checking inter-State migration, the following steps could be considered :

- (1) Provision of sufficient amount of institutional accommodation including rehabilitation centres in each State so that persons from a particular State need not have to go outside the State for maintenance or treatment.
- (2) The maintenance expenses of a person living in such an institution in a State but not belonging to that State to be a charge on the State of origin of the person concerned.
- (3) Formation of inter-State barriers to check the travel of such persons by rail or road in order to minimise their migration from one State to another.



This matter was discussed in detail by the Committee for Control of Leprosy, set up by the Government of India. The Committee reorganised the need for provision of sufficient institutional accommodation, but it was not convinced regarding the need, desirability, and feasibility of check and restriction on inter-State movements of the patients or of their repatriation. The Committee, therefore, expressed the opinion that it was not feasible to have a solution on a strictly State-wise basis, but that in addition to the institutions in individual States, there should be Regional Homes under the Central Government.

#### Some interim measures

The provision of a sufficient number of institutions and the necessary machinery to execute an adopted plan are bound to take a considerable time; till then some interim measures would be necessary. The beggars with leprosy live mostly in settlements of their own, usually outside and away from the towns themselves; it is desirable not to interfere with these settlements, till alternative arrangements can be made. In the meantime, however, all possible steps should be taken in these settlements to deal with the problem, as effectively as is possible under the circumstances. For this purpose, the following lines of action can be considered :—

- (1) Modern treatment of leprosy to be made available to all the patients in the settlements. This will not only help the patients, but will also decrease the infectivity of such of them as are infective.
- (2) B.C.G. Vaccination of all the infants and young children in the settlements.
- (3) Sterilisation of all the male inmates by the simple operation of vasectomy so as to minimise the chances of the production of children who create additional complications by falling an easy prey to the disease. This procedure will not be helpful in solving the already existing leprosy problem, but it will minimise the future problem by reducing the number of children in the settlements.
- (4) Discouragement of indiscriminate almsgiving to such persons in public places, festivals, *melas*, and ceremonial occasions and encouragement of organised charity. The organised charity could be utilised for the maintenance and treatment of these persons in their settlements, and this would minimise the sojourn of these beggars in the towns.



## 9. DEVELOPMENT OF ANTI-LEPROSY WORK IN INDIA

### History

*The prevalence of leprosy*—Leprosy has been prevalent in India since ancient times. There are, however, no figures whatever available regarding the number of cases of leprosy until the 1871 census. The decennial census returns which were started in 1871 gave some information on the subject, and the subsequent returns till 1931 also recorded this information. From 1871 to 1921, *i.e.*, for 50 years, the number of cases of leprosy recorded in the census for the whole of India was fairly constant, and in the neighbourhood of 1,00,000. The figures were, of course, very inaccurate being based on the reports of heads of families and villages and of census officers with no medical training. These figures probably indicated only the severe and obvious cases that were known, concealed and slight cases not being recorded. The 1931 census reported an increase in the number of cases suffering from leprosy of nearly 50% as compared with the 1921 census (1,02,000 to 1,50,000). This was the result of the leprosy surveys and publicity work started in 1925. Thus until 1925 the only evidence regarding the prevalence of leprosy in India as a whole was the figures given in the decennial census returns. Later this was supplemented by the information collected by leprosy surveys. Leprosy surveys carried out in different parts of the country showed the great inaccuracy of the census figures. A comparison of the census and the survey figures showed that the survey figures were on an average about 8 times higher than the census figures of 1931. It was, therefore, calculated that the number of cases of leprosy in the whole of India was over 10 lakhs (1 million). With further knowledge on the subject it now appears that the number of cases would be over 15 lakhs.

*Anti-leprosy activities*—Since ancient times leprosy relief work in the shape of providing shelter for sufferers from leprosy near temples and places of pilgrimage appears to have been widely practised. The necessity of isolation in the control of leprosy also appears to have been realised in India since ancient times. This is indicated by the ancient customs of outcasting sufferers from leprosy, of avoiding contact with them, of avoiding marriage into families in which there is leprosy, and of providing huts for isolation of cases in villages, etc.

It appears that in the late 18th and early 19th century there started a custom to make some provision for cases of leprosy in contagious diseases hospitals, and in poor houses which were established in many parts of India, sometimes by the Government and sometimes by private benefactors, but the number so provided was very small, and such places apparently served as temporary resting places for vagrants. The first known leper asylum was established in Calcutta\* early in the 19th century and about the same time or shortly after, an asylum was established at Banaras.

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\*It was the predecessor of the Albert Victor Leprosy Hospital which has recently been closed.



Organised work on a large scale was taken up by the Mission to Lepers. The founder of this organisation was a devout layman, Mr. Wellesley Bailey, who in 1869 came to India to enter Police Service and was stationed at Ambala (Punjab). He found there a leper asylum and numerous cases, and took great interest in them. Within a short time he devoted himself entirely to this work for the development of which he established the Mission to Lepers, and built the first leper asylum at Chamba, Punjab, in 1875. From this small beginning the Mission grew, and at the time of Mr. Bailey's death in 1937 at the age of 91, 32 institutions of the Mission in India had about 8,000 inmates. Thus the Mission to Lepers has become by far the biggest single agency in anti-leprosy work in India.

Besides the Mission to Lepers other Christian Missions have also established a number of homes in different parts of the country. The Governments, District Boards and Municipalities and local voluntary organisations began to take increasing initiative in the establishment of leprosy homes. In this connection a special mention may be made of such organisations as the Maharogi Seva Mandal at Wardha, and of the work in industrial areas, e.g., by the Asansole Mines Board of Health. In many of the large cities and towns of India institutions were also established to provide accommodation for beggars with leprosy.

The establishment of the Indian Council of the British Empire Leprosy Relief Association in 1925 provided a fresh impetus to organised anti-leprosy work in India\*. This was the period when in India and other countries great interest was aroused by the reports of very promising results of treatment of the disease by injections with Hydnocarpus Oil and its preparations. This led to a great wave of enthusiasm and to the foundation of the British Empire Leprosy Relief Association in London and its Indian Council in 1925. Under the Indian Council a research centre was established in the School of Tropical Medicine, Calcutta, and an all-India survey party was established, which carried out surveys in different parts of the country for several years.

The limitations of the treatment became apparent within a few years. Nevertheless the burst of enthusiasm had very useful results. As a result of the work of the Council knowledge of the various aspects of the disease greatly increased. Another result was a great increase in the interest taken by the public in the leprosy problem, and much increased interest and knowledge of leprosy on the part of the medical profession as a whole.

*Recent developments*—The attaining of freedom by our country in 1947 has resulted in a great upsurge in the national interest in the disease and its eradication. The personal interest taken by Mahatma Gandhi in the welfare of the sufferers from this disease has been greatly instrumental in bringing about this welcome change. Fortunately this upsurge in the national enthusiasm has coincided with the introduction of new and potent remedies against the disease, a fact which has infused new hope and which

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\*After the attainment of freedom of our country in 1947 the name of this organisation was changed into Hind Kusht Nivaran Sangh (Indian Leprosy Association).



has resulted in the heightening of interest towards anti-leprosy work throughout the world.

Leprosy is now being regarded as a national problem and increasing efforts are being made to successfully deal with the different problems created by it. During the post-independence years there has been rapid growth of anti-leprosy work all over the country through both Government and voluntary agencies. The Union Government in collaboration with the State Governments has adopted a control scheme with the establishment of control centres in places where leprosy is highly endemic with the object of finding out and treating all cases of leprosy in the area. An account of these centres and their work has already been given earlier.

A most encouraging and gratifying feature of the recent developments in anti-leprosy work in India is the steady growth of the voluntary agencies engaged in it throughout the country. There could not be a more fitting memorial to the Father of the Nation than the Gandhi Memorial Leprosy Foundation. This Foundation has actively taken up the new approach to the control of leprosy through mass scale treatment in endemic areas supported by a case finding programme and follow-up work. Many of the previously existing organisations including the Mission to Lepers have adopted the new approach as far as practicable. Several new agencies have sprung up, and they are so numerous that it is not possible to enumerate all of them here. A reference may, however, be made to a few such as the Kasturba Gandhi Leprosy Home in South Arcot in Madras; the Kusht Sevashram, Gorakhpur in Uttar Pradesh; the Jagadamba Kushtadhan, Amraoti in Bombay State, and the Santhal Paharia Seva Mandal, Deogarh in Bihar. Detailed information about these and other activities will be found in the Directory of Leprosy Work in India issued by the Directorate General of Health Services, New Delhi.

### Existing anti-leprosy activities in India

The extent of the leprosy problem in India and the existing anti-leprosy activities in the country have been reviewed from time to time with a view to making recommendations regarding the measures to intensify the anti-leprosy work. In this connection a special reference may here be made to the reports of the two committees appointed by Government of India to report on this matter. The first committee was appointed in 1941 by the Central Board of Health and its report entitled "Leprosy and its Control in India" was published in 1942 at the Government of India Press, New Delhi. The second committee was appointed in 1954 by the Health Ministry, Government of India at the recommendation of the Central Council of Health. The report of this Committee was published in 1955 at the Government of India Press, Calcutta under the title "Report of the Committee for the Control of Leprosy". Both these reports contain valuable information on the subject.

The question about the extent of the leprosy problem in India has already been discussed earlier in this brochure while dealing with the distribution of the disease in this country. It is interesting to note that while the 1941 report puts the approximate number of cases of leprosy in the whole



of undivided India at 10 lakhs, the 1954 report estimates this figure at 15 lakhs for India as it stands at present after the partition of the country in 1947 whereby some parts of the country have separated out into Pakistan. This increase in the number of cases by over 50% cannot, however, be interpreted to indicate that the disease is on the increase in the country as a whole. It is mostly due to the increased knowledge about the prevalence of the disease as a result of increasing general interest in it. The introduction of new and effective remedies for the treatment of the disease has also contributed considerably towards this, since increasing number of patients in the early stages of the disease are now presenting themselves for treatment.

A very brief account of the existing anti-leprosy activities is given below. A detailed account of them will be found in the proposed Leprosy Directory referred to above. The following account is based mostly on the information contained in the Report of the Committee for the Control of Leprosy—1954. It may be stated here that the Committee considered the existing activities grossly inadequate and stressed the great need for augmenting them.

(a) *In-patient institutions*—In the whole of the country there are a little over 150 in-patient institutions varying considerably in their size and available facilities. The total in-patient accommodation in all the institutions taken together is for about 20,000 patients. Presuming that all the available accommodation can be utilized for the isolation of the infective patients, only one out of twenty needing isolation can be actually taken care of. This provision is no doubt grossly inadequate, but it can be said that the situation has shown signs of improvement in the period between the two above quoted reports of 1941 and 1954. The 1941 report recorded the number of institutions as 95 with a total accommodation for about 14,000; in the 1954 report the corresponding figures were 152 and about 20,000. It is very likely that some further addition has been made in the institutional accommodation since the 1954 report, and definite information regarding this will be available in the proposed Leprosy Directory referred to earlier.

(b) *Out-patient clinics*—The 1954 report recorded the number of out-patient clinics as 1,200, and the number of patients treated at them annually as about 1,20,000. Since then there has been a considerable increase in this activity; and several agencies have been concentrating on bringing increasing number of patients under sulphone therapy. At the centres under the Government Control Scheme already over 75,000 patients are getting treatment, and the Belgian Control Unit has about 15,000 under treatment. The Control Units of Gandhi Memorial Leprosy Foundation have a large number of patients under treatment and several in-patient institutions are extending their activities in the surrounding areas to make treatment available near the homes of the patients. Moreover, treatment for leprosy is now being given in a large number of general hospitals and dispensaries in areas where the disease is highly prevalent. It can be safely said that the number of patients receiving sulphone treatment has nearly doubled itself since 1954, and that at present roughly about 2,50,000 patients are getting the benefit of this treatment. It is to be expected that with the increasing efforts more and more patients will be brought under



the modern treatment, and that ultimately it will be brought within the reach of almost all the patients throughout the country. The difficulties in the successful attainment of this objective have already been discussed. These difficulties are mainly concerned with the dearth of suitable personnel and the lack of co-operation on part of some patients.

(c) *Training of personnel*—To carry out the various anti-leprosy activities there is need for adequate number of personnel, both medical and para-medical, and it is necessary to make necessary arrangements for the training of such personnel. With the rapid expansion of these activities in recent years, this need has become all the more urgent. Fortunately this aspect of the problem has been receiving attention from the early days of anti-leprosy work ever since the establishment of the Indian Council of the British Empire Leprosy Relief Association in 1925. With the increase in anti-leprosy activities the question has been receiving increasing attention, and the Leprosy Advisory Committee of the Government of India has now under consideration the necessary arrangements on an adequate scale for the training of the various kinds of personnel required for the work.

*Post-graduate training*—Post-graduate classes in leprosy for medical men have been a distinctive feature of anti-leprosy work in India. Such a training course was first started at the Leprosy Department of the School of Tropical Medicine, Calcutta in 1925 under the auspices of the Indian Council of the British Empire Leprosy Relief Association. Till recently these classes were continued under the auspices of the Hind Kusht Nivaran Sangh which was the successor to the Indian Council after the independence of the country. Recently the activity has been taken over by the Indian Council of Medical Research which has also taken over the research activities of the Sangh. At this centre a very large number of doctors from all parts of India, as also some from other countries, have attended for post-graduate training in leprosy. Later, facilities for post-graduate training were also made available at other centres such as the Lady Willingdon Leprosy Sanatorium, Chingleput (the present Central Leprosy Teaching and Research Institute), Ackworth Leprosy Home in Bombay, and Leprosy Hospital at Dichpalli near Hyderabad, etc.

*Under-graduate training*—Till some years ago instruction in leprosy was often completely omitted from the medical curriculum and when given it was very poor and inadequate. Fortunately there has now been considerable improvement in the matter, though much remains to be achieved in this direction. In most of the States where leprosy is highly prevalent, lecture demonstrations in leprosy are now given to the under-graduate medical students. In most places, however, there is still great room for improvement in this matter. Attention of the authorities concerned has frequently been drawn to this need and it is hoped that steps will be taken to effect the necessary improvements.

*Training for non-medical personnel*—Apart from the post-graduate and under-graduate training of the medical men, it is essential to provide training in leprosy for a large number of para-medical and non-medical personnel needed for the expanding anti-leprosy campaign in the country.



This urgent and important matter is now receiving due attention from all concerned. Under the auspices of the Gandhi Memorial Leprosy Foundation arrangements have been made for training of non-medical personnel for a period of 9 months. Similar periods of training as also those of shorter duration are now under the active consideration of the Union and State Governments also. In certain States there exist arrangements for giving short courses of training in leprosy to such para-medical personnel as Health Inspectors and Sanitary Inspectors, etc.

(d) *Research activities*—Research in leprosy has been greatly handicapped by the facts that it has not been possible to grow the leprosy bacillus outside the body of the person suffering from the disease, and that it has not been possible to transmit the disease to laboratory animals. Because of these handicaps the progress in the leprosy research has been very slow. The leprosy bacillus was discovered about 10 years earlier than the tubercle bacillus, but because of the above handicaps, our knowledge of the leprosy bacillus and the disease caused by it lags far behind than about the tubercle bacillus and the disease caused by it.

Progress in leprosy research has no doubt been very slow; while much about leprosy is known there is a great deal that is still not known. However, a review of the last 30 years would show that our knowledge of the disease has greatly increased, and that real progress has been made. It can be said that there has been a steady growth of knowledge about the disease and it is gratifying to note that India has made a significant contribution towards this.

India can claim to have established over 30 years ago the first full-time leprosy research centre which has in several ways given a lead in leprosy research. This centre was established at the School of Tropical Medicine, Calcutta, following the formation of the Indian Council of the British Empire Leprosy Relief Association, the first object of which was stated to be to organise research into the causation, treatment and control of leprosy. At this centre research in leprosy has been conducted under the combined auspices of the above Association (the present Hind Kusht Nivaran Sangh), the Endowment Fund of the Calcutta School of Tropical Medicine, and the Indian Council of Medical Research (previously known as the Indian Research Fund Association).

Various other centres of leprosy research have been established in the country, and the Indian Council of Medical Research has been instrumental in initiating and financing most of them. The Council has been responsible for supporting several enquiries on leprosy at these centres on the various aspects of the disease. These centres of leprosy research include those at the Ackworth Leprosy Home and the Tata Cancer Research Institute at Bombay; the Christian Medical College, Vellore; the Schieffelin Research Laboratory at Karigiri near Vellore, recently started under the joint auspices of the American Leprosy Mission and the Mission to Lepers. In addition, several leprosy institutions have undertaken studies which have been of considerable value.



For several years research on the various aspects of leprosy had been carried out at the Lady Willingdon Leprosy Sanatorium at Chingleput and the associated Silver Jubilee Children's Clinic at Saidapet. These two centres which previously worked under the Madras State were taken over in 1955 by the Government of India to provide a nucleus for the establishment of the Central Leprosy Teaching and Research Institute. As indicated in the scheme for the establishment of this Institute its scope and functions will include : (a) To undertake research into the basic problems relating to the inception and spread of leprosy; (b) To promote field studies for the application of the results of basic researches into the problem of controlling leprosy in the community; (c) To train leprosy workers of various types in sufficient numbers and of the requisite quality; (d) To function as a Centre from which to give technical advice and guidance for the promotion of anti-leprosy work on sound lines; (e) To participate actively in the organisation and development of State leprosy institutions when such are established, and to make available its services for the investigation of special problems in all parts of the country.



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