

# International Congress of Leprosy

## REPORTS OF THE SUBCOMMITTEES

An international Congress of leprosy was held in Cairo from March 21st-27th, 1938. The Scientific Committee of this congress appointed four committees to report respectively on Classification, Treatment, Epidemiology and Control, and the Cultivation of the Leprosy Bacillus. The reports of these committees, which are given below, were unanimously adopted.

### THE CLASSIFICATION OF LEPROSY

#### *Report of the Subcommittee on Classification\**

The problems of classification of cases of leprosy should be viewed broadly, bearing in mind both (a) the requirements and circumstances of work of the practical field worker to whom classification is necessary for purposes of prognosis, treatment

time-consuming methods of differentiating types of the disease, and (b) the refinements of such differentiation that are possible to the specialist who employs special methods of investigation. The great majority of persons who deal with leprosy, work under circumstances that require that the basic or primary classification be as simple as possible.

Progress in knowledge of the forms of leprosy and of the nature of the leprous processes has been made since the classification that is now most generally used was adopted by the Leonard Wood Memorial Conference on Leprosy in 1931, and it is now possible to modify some of the terms of that classification to eliminate certain causes of misunderstanding. However, our knowledge of the matter has not yet progressed to a point where it is possible to attain unanimity of opinion on certain essential features.

It is recommended that for the present the basic division of leprosy into two types, along the lines laid down in the Memorial Conference classification, be continued until such time as further study of the matter permits attainment of unanimity. It is further recommended that future research be in the direction indicated by the questions raised by the minority of this committee, the main question being whether

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(\*) This committee consisted of Dr. H. W. Wade (*Chairman*), Dr. R. C. Germond (*Secretary*), and Drs. P. L. Balina, A. Dubois, J. M. M. Fernandez, V. Klingmüller, J. Lowe and Rabello, Jr.

or not the neural type of the Memorial Conference classification should be divided into two distinct main types, "simple neural" and "tuberculoid." For the present it is the predominant opinion that such divisions should be considered as subtypes or varieties.

Objections have repeatedly been raised to both of the current names of the two types (*i.e.*, "neural" and "cutaneous") because of confusion arising from the special sense in which they are employed in leprosy classification, because of difficulties of translating them into other languages, and for other reasons. However, no other words have been proposed which are free from similar objections. It is the opinion of the committee: (*a*) That for the time being, at least, the type to which it is now applied. (*b*) That because "cutaneous" has proved particularly confusing its use should be discontinued, and replaced by the term "lepromatous,"

It is proposed that the definition of the two types of the Memorial Conference classification be amended as follows :

#### PRIMARY CLASSIFICATION

*Neural (N) type.* — All cases of the "benign" form of leprosy, with disturbances of polyneuritic nature (*i.e.*, alteration of peripheral sensation, atrophies and paralyses, and their sequelae), nonlepromatous nature (*i.e.*, leprides, usually with localized sensory disturbances), relative resistance to the infection, prognosis as regards life although mutilation may take place, and usually react positively to leprolin. Bacteriologically the skin lesions are typically but not invariably found negative by standard methods of examination, though the nasal mucosa may be found positive. Many of these lesions are histologically of tuberculoid nature.

*Lepromatous (L) type.* — All cases of the "malignant" form of leprosy, prognosis, usually negative to leprolin, matous lesions of the skin and other organs, especially the nerve trunks. Bacteriological examination usually reveals abundant bacilli. Disturbances of polyneuritic nature may or may not be present; they are usually absent in the earlier stages and present in the later stages of primarily lepromatous cases, from the neural form.

## SUBCLASSIFICATION

## Subdivi

two points of view: (*a*) with respect to the degrees of advancement of the disease, and (*b*) with respect to the forms or varieties of cases within a type (*i.e.*, subtypes), based on the nature of the lesions. The former method of subdivision is that of the Memorial Conference classification and it has proved useful in the hands of many workers, especially in dealing broadly with large numbers of cases. The latter method of subdivision is generally employed in dealing more precisely with individual cases. Both methods have their uses and should be understood, but a generally applicable, practical formula for combining the two has not been arrived at. The two methods are dealt with independently.

1 — *General Subclassification*

(By degrees of advancement)

The following specifications are unavoidably somewhat crude but they indicate in a general way the basis of the division into three degrees of advancement of each type.

*Neural 1 (N1).* — Slight neural: (*a*) Cases with from one to several small macules, or a proportionally smaller number of large macules, whether flat or elevated, without indications of polyneuritic changes; or (*b*) cases presenting only polyneuritic changes of slight degree: disturbances, of peripheral sensation affecting one or two extremities, not of marked extent, with only minor trophic disturbances, muscular atrophy or paresis, if any; or (*c*) cases showing combinations of macular and polyneuritic manifestations in equivalent degree of total affection.

*Neural 2 (N2).* — Moderately advanced neural: (*a*) Cases with fairly numerous or large macules, or wide distribution, without evidence of polyneuritic changes, or with such manifestations of fairly slight degree; or (*b*) cases presenting only polyneuritic changes of moderate degree: peripheral one extremity, of less extent if affecting more than one; and moderate trophic changes, atrophy and paralyses, including beginning contractures if of limited extent; or (*c*) cases showing combinations of equivalent total degree.

*Neural 3 (N3).* — Advanced neural: (*a*) Cases with very numerous or very extensive macular lesions of the more marked kinds, with polyneuritic changes; or (*b*) cases

presenting only advanced polyneuritic changes: extensive peripheral anesthesia and more or less marked motor and trophic disturbances: paralyses, atrophies, contractures, trophic ulcers and mutilations; or (*c*) cases showing combinations of equivalent total degree.

*Lepromatous 1 (L1).* — Slight lepromatous: Cases with lepromatous skin lesions consisting of one or a few macular areas, or a few small infiltrated patches or small nodules, or diffuse lepromatous changes of slight degree; lesions of the nasal mucous membrane are usually absent.

*Lepromatous 2 (L2).* — Moderately advanced lepromatous: Cases with numerous macular areas or fairly numerous small or fewer large infiltrations or nodules, or diffuse lepromatous changes of moderate degree; lesions of the nasal mucous membrane are frequently present.

*Lepromatous 3 (L3).* — Advanced lepromatous: Cases with numerous and extensive or very marked lepromatous lesions which may vary in their stage of development or retrogression; lesions of the nasal mucous membrane are almost always present.

*‘Mixed’ cases.*—Recognition should not be given to “mixed leprosy” as a type. However, cases of the lepromatous type usually exhibit, sooner or later, varying degrees of polyneuritic involvement, and for precision such “mixed” or “complete” cases may be designated LN. The symbol L should be given precedence, regardless of the original nature of the case or the relative severity of the two elements, because of the predominant importance of the lepromatous element. In grading the degree of advancement of these cases the appropriate figure is placed after each symbol; *e.g.*, L2-N1, or L1-N3.

*Secondary neural cases.* — Cases that have previously been of the lepromatous type with polyneuritic features (mixed cases), but in which the lepromatous lesions have resolved leaving only the polyneuritic manifestations, are called “secondary neural.”

## 2 — *Special Subclassification*

(According to the nature of the lesions presented.)

1. *Lepromatous type.* — No varieties of the lepromatous type of leprosy have been established that are sufficiently distinct, frequent and general in occurrence to require recognition in formal classification. In some places (*e.g.*,

India) where many cases show, at least for a time, "diffuse" involvement of the skin, not localized in macules or infiltrations, there might be an advantage in distinguishing such cases (which might be indicated by the symbol Ld), but it is not certain that this division would be generally useful.

2. *Neural type*. — The neural type of leprosy may be divided into two main subtypes, namely, "macular." For some purposes such subclassification may be sufficient. However, variety should be divided into "simple" and "tuberculoid," and the latter may be further divided into "minor" and "major" forms. For such work, therefore, is proposed :

Neural (type)

Anesthetic (nonmacular, polyneuritic) (Na)

Simple macular (with flat macules) (Ns)

Tuberculoid macular (minor and major) (Nt)

*Anesthetic*. — This variety of neural leprosy presents evidence of involvement of nerve trunks only (polyneuritic changes and sequelae) without macular skin lesions.

*Simple macular*. — The simple macular cases, which comprise a considerable proportion of those encountered, present skin lesions (leprides) that have no or only very slight elevation or palpable infiltration. When elevation is present, it is often difficult to detect it in diffuse light, and the surface is smooth, elevation is usually limited to a narrow marginal zone. "Residual" lesions, fore are "simple" under this definition (though they may be affected by scarring) should not be considered as a separate variety.

*Tuberculoid macular*. — This subtype, as stated, may be divided into two groups,

(a) *Minor tuberculoid*: The lesions so designated are the less marked ones of the kind that has become generally recognised to be histologically tuberculoid and that is clinically recognisable as such with certainty. These lesions show definite elevation of characteristic appearance, there are considerable variations. They are usually marked by irregularity of the surface, due to the essentially marked nature and superficial location of the tuberculoid process. That condition may produce elevated bands or areas which

may be continuous or discontinuous even to the point of producing isolated papulations. Occasionally the process is relatively deep in the dermis, in which case the surface may be relatively smooth, and the appearance may therefore approach that of some of the major tuberculoid lesions, but the degree of the condition is less than in that form.

(b) Major tuberculoid: The lesions so designated are the more striking, grossly elevated ones to which recognition as tuberculoid has been largely confined in the past. They are "major" both in degree and nature of the pathological process. Typically the process invades the deeper layers of the skin to a marked degree, and also the subcutaneous tissue, and, by further extension in the cutaneous nerves related to the macules, it may produce gross involvement of them. Macules of this variety are those most liable to be mistaken for lepromata, especially when they are (a) small but thick, morphologically nodular, (b) in a "reaction" condition, reddish, turgid and smooth, or (c) bacteriologically positive. One feature that helps to differentiate them is their typically sharp demarkation and frequently asymmetrical distribution. Another occasional feature is the tendency to the development of marked enlargement of the local cutaneous nerves, which condition sometimes extends to the main trunks of an affected extremity, thus introducing a secondary polyneuritic element. A point of importance is the frequency with which these lesions start abruptly, as a "reaction" condition, and the relative rapidity—and, sometimes, the completeness—with which they may subside.

#### DEFINITIONS

For the purpose of amplifying certain features of these proposals, and of facilitating the attainment of uniformity in applying them, the following definitions are adopted.

*Leproma*. — The lepromatous condition, which is the distinguishing feature of the type of leprosy so named, is a granulomatous one in which the invaded tissues show maximal tolerance of the bacilli. The essential histological feature is an accumulation of "lepra cells," which may show little differentiation from their original form (the macrophage), or may contain globi, or may undergo multiple vacuolation to produce the so-called Virchow cells, which are often multinucleate. The lepra cells contain bacilli in considerable and often great numbers, though bacilli may also occur in cells of other types. Lepromatous lesions in the skin may

be so slight as to be imperceptible, ranging up to marked, extensive infiltrations or conspicuous nodular masses. As a rule they are more ill-defined and diffusely outlined than the leprides, and they do not exhibit the same tendency to radial extension or the same changes of color or sensation.

*Lepride.* — This term is applied to the discrete macular lesions that are characteristic of neural leprosy when the skin is involved. The leprides vary greatly in appearance, size and as regards elevation; they may be flat or markedly thickened; they may be smooth-surfaced or very irregular ("granular," "pebbled," or micropapulate); they tend to enlarge radially and to merge with adjacent ones, and to undergo central resolution. Disturbance of sensory perception, slight or marked, is a typical feature though its development may be delayed. The definitely elevated leprides, at least, are granulomatous, the essential feature being the nonspecific "tuberculoid" change, together with which there usually is banal chronic inflammatory infiltration of variable degree. Associated cutaneous nerves may be similarly affected and may undergo necrosis or even cold-abscess formation. Though these lesions result from the reaction of the tissue to the presence of the leprosy bacillus, ordinarily bacilli are not found in smears and only in very small numbers in sections. In occasional cases, however, especially during or after a reaction condition, bacilli can be found in smears and they may be numerous.

*Leprotic and leprous.* — These terms should be used only in their general sense, signifying pertaining to or affected with leprosy.

*Lepromatous.* — This term signifies of the nature or possessing the qualities of the leproma. In classification, as here proposed, it applies to cases with this form of lesion.

*Macule.* — This term is specifically applied to the leprides (neural type leprosy) but is sometimes used to designate lepromatous patches. It signifies a circumscribed area of skin of abnormal colour—varying widely in this character in different races but usually hypopigmented, occasionally hyperpigmented, and often erythematous—and commonly with other surface abnormalities, such changes being evident in the whole or only in parts of the area. In the terminology of leprosy it is used without regard to the presence or absence of infiltration or elevation.

*Infiltration.* — This name is often applied clinically in

a special sense to a diffuse thickening of lepromatous nature.

*Plaque.* — Ordinarily this term is applied only to large leprides in which central resolution is delayed or absent, and not to areas of diffuse infiltration.

*Papule* (\*)—A papule is a very small, more or less solid circumscribed, superficial elevation of the skin, usually but not necessarily circular, conventionally described as varying in size from that of a pinhead or less to five millimeters in diameter (splitpea size). Papules occur in both forms of leprosy and differ correspondingly in structure and often in appearance.

*Nodule.* (\*) — A nodule (synonymous with but preferable to “tubercle”) is a solid elevation of the skin, often similar to a papule except that it is larger; in practice the application of this term is not limited as regards maximum size. Ordinarily it is applied only to lepromata. Nodules are usually more deep-seated than papules, and often arise from localized subcutaneous masses.

*Polyneuritis.* — This term has been employed to designate involvement of the peripheral nerve trunks which results in sensory changes of the extremities that tend to spread centripetally (“acroteric” anesthesia), and in trophic changes of various kinds, and paralyzes and atrophies which may also involve the face. Polyneuritic manifestations do not include the sensory changes in the leprides, or lesions of superficial cutaneous nerves that develop by extension from leprides.

*Trophic changes.* — Under this head are included those changes that are ordinarily ascribed to disturbances of the vasomotor system and of nutrition: anidrosis, glossy skin, ichthyosis, pigmentary changes, loss of hair, perforating ulcers, atrophy and necrosis of bones with consequent mutila-

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(\*) The definitions of papules and nodules here given are those generally accepted by British and American dermatologists. It is to be recognized that these terms are employed in different senses in other countries. The members of the committee from South America submitted the following comment:

“Quelques auteurs, parmi lesquels se rangent les léprologues de l'Amérique du Sud n'admettent pas le terme “papule” dans la lèpre, parce que en dermatologie la papule est une efflorescence spontanément résolutive, et que dans la lèpre les lésions cutanées auxquelles les auteurs anglais et américains appliquent le nom de papule, ne s'effacent qu'en laissant après elles une lésion cicatricielle, au moins histologiquement. A la rigueur on pourrait employer pour les désigner le terme “papuloïde”. Quand à ce qu'est à propos des lésions granulaires de la lèpre tuberculoïde, pour les mêmes raisons les dermatologistes de l'Amérique du Sud préfèrent adopter la désignation de lésions “micropapuloïdes.”



tions and neuropathic joint lesions. Strictly speaking atrophy and paralysis of muscles, and contractures consequent on such changes, are not included, but in practice the distinction is often not made.

### SPECIAL SYMBOLS

*Indication of the original phase of the disease.* — If it is desired to indicate symbolically in a mixed case the form that occurred first, this can be done readily by placing the prime accent mark ('=primary) after the appropriate letter, as C'N or CN'. This would not interfere with the use of the customary figures to indicate the degree of advancement.

*Indication of secondary neural cases.* — If it should be desired to indicate a secondary neural case, that can be done as N''(''=secondary.)

*Indication of bacteriological status.* -- If for epidemiological or other considerations it is desired to indicate in a case symbol the bacteriological status of the case, that can be done by adding + or - (or, as suggested by Lie, B+, or B-) to the case symbol.

Professor Balina and Dr. Rabello, Jr., who took part in the deliberations on the subject of the classification of the clinical forms of leprosy, wish to point out that they have already published their personal views on this matter, either during or before the Congress. The definitions and descriptions here adopted are based on those articles by H. W. Wade in *Internat. Jour. Lep.* 4 (1936) 409—430 and *American Jour. Trop. Med.* 17 (1937) 773—801.

## THE TREATMENT OF LEPROSY

### *Report of the Subcommittee on Treatment\**

Hydnocarpus oil and its esters intramuscularly, subcutaneously, and intradermally remain, so far as our present knowledge goes, the most efficacious drugs for the special treatment of leprosy. Oils from *Hydnocarpus wightiana* and *H. anthelmintica* are most widely used.

The irritant properties of these drugs have been shown

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(\*) This committee consisted of Dr. G. A. Ryrie (*Chairman*), Dr. F. G. Rose (*Secretary*) and Drs. C. J. Austin, H. I. Cole, H. H. Gass, H. E. Hasseltine, B. Moiser, H. de Moura-Costa, E. Muir, L. de Souza-Lima and M. Vegas.

to be due to the decomposition products of their therapeutic constituents, *i.e.*, chaulmoogric, hydnocarpic, and gorlic acids. This decomposition takes place rapidly in the seeds and hence it is necessary to use only oils pressed from fresh seeds. The oil itself is quite stable and keeps fairly well under proper conditions of storage. The ethyl esters are much less stable than the oil, and should be prepared and sealed hermetically against air as quickly as possible. Distillation of the esters and elimination of the free fatty acids is of less importance in the reduction of irritation than the use of an oil prepared from fresh seeds. The use of ampoules, where possible, is recommended; when bottles are used they should be of such size that the entire contents may be used on the day that they are opened. Any remaining drug should be used for local applications. Reheating of esters should be avoided.

Many workers have recently used larger doses, up to 30 cc. or more, of esters or oil per week. If the drugs are made and handled as mentioned above, they are well tolerated, and the results are correspondingly satisfactory.

With regard to the subsidence of lesions in leprosy, the subcommittee is of the opinion that this may be due to one of two causes: (*a*) lowered resistance of the patient resulting from intercurrent diseases, metabolic disturbances, etc., which cause loss of reactive power, or (*b*) control of the infection as a response to treatment. In the latter case, the process differs essentially from that in the former case, and is to be regarded as wholly beneficial.

For the improvement and maintenance of the general health of the patient: (*a*) it is of very real importance that the diet should be liberal, well-balanced, and rich in vitamins; (*b*) healthy, moderate exercise in the form of occupational therapy and outdoor exercise important to eliminate intercurrent diseases.

The treatment of tuberculoid leprosy is more effective than that of lepromatous leprosy, and the beneficial results in the former are in direct proportion to the intensity of treatment. This opinion is unanimous. Doses up to 1 cc. per 10 lb. of body weight, or even more, twice weekly, administered subcutaneously or intramuscularly, have been used and recommended. Here again the purity of the drug is of the first importance. Except in acute phases, intradermal infiltration is a desirable method of treating tuberculoid leprosy.

The same general line of treatment should be recommended for the leprosy. Treatment with hydnocarpus oil and esters gives

beneficial results, though it is not generally as effective as in tuberculoid cases. Intradermal infiltration is of special value. The maximum dose possible should be given, having strict regard to the necessity of avoiding lepra fever.

Because of the danger of relapse, a prolonged period of after-treatment is advisable, particularly in cases of lepromatous leprosy.

During the last five years considerable attention has been directed to the employment of aniline dyes in the treatment of leprosy. The selective affinity of such dyes for leprotic lesions, combined, in many cases, with powerful bactericidal activity *in vitro*, raised considerable hopes for this form of treatment. These hopes have not, up to the present, been fulfilled, and dye treatment in leprosy cannot be considered to have reached a stage where recommendations regarding such treatment can be made. Further experimentation is very desirable, especially with fluorescin.

With regard to acute tuberculoid leprosy, it has been suggested that the best treatment of an acute reaction is to double or treble the original dose of hydnocarpus oil.

Treatment by hydnocarpus oil or esters should be discontinued at the onset and during the course of lepra reaction (lepra fever). The course of lepra reaction is so variable that it is difficult to assess the value of any drug in its treatment. The following drugs are suggested as having proved in different centres to be of value in selected cases: (a) fluorescin, freshly prepared, given intravenously; (b) mercurochrome, freshly prepared 1% solution intravenously (not more than 10 cc.); (c) potassium antimony tartrate intravenously. As regards general treatment of the condition an initial saline purge and light diet are recommended and alkalinisation may be of value. Great stress should be laid on the importance of rest and careful nursing.

With regard to acute neuritis in leprosy, general treatment, counter-irritation, local injections, the local application of heat, and diathermy are at present the only resources except operation which must not be too long delayed.

Lesions of the eye and nose occur with great frequency in leprosy. Pyorrhoea is also a common condition which it is of primary importance to eliminate. The services of an ophthalmologist, a nose and throat specialist, and a dentist should, therefore, be made available in all leproseries. Routine examination of the eyes should be made with a view to early treatment where necessary, particularly in countries where the incidence of eye lesions is high. Similarly, routine examination of the nose should be made in all cases.

The treatment of leprotic ulcers, in the present state of our knowledge, is unsatisfactory, and further investigation in hospitals and other institutions is recommended.

With regard to perforating ulcer, it is recommended that necrotic bone, where present, should be removed. Rest of the affected limb is a valuable feature of treatment of the condition.

No proprietary preparation of hydnocarpus oil or esters, or any other proprietary preparation at present on the market, is more effective than the pure oil and esters prepared in institutions. For this reason, and because of their greater cost, the preferential use of such preparations is not recommended.

With regard to treatment with potassium iodide, the use of this drug is frequently followed by disastrous results. It is therefore to be discouraged for the purposes of diagnosis, treatment, or as a test of recovery unless in very skilled and experienced hands.

In conclusion, the committee, realising that as yet no form of treatment can be regarded as wholly satisfactory, desires to stress the importance of therapeutic research, and would urge that interested bodies devote further funds to this purpose.

## THE EPIDEMIOLOGY AND CONTROL OF LEPROSY

### *Report of the Subcommittee on Epidemiology and Control\**

#### 1. RECOMMENDATIONS FOR EPIDEMIOLOGICAL INVESTIGATIONS

##### INTRODUCTION

*Incidence.*—The incidence of leprosy should be taken as the number of cases per thousand of the total population. It must be specified upon what information the incidence is based. (a) This must include the total number of persons residing in the area under consideration. (b) The total number of persons examined must be stated: any discrepancy between the total population and the number examined should be explained. (c) Cases in isolation should be assigned to the area in which they were living at the time they were isolated. (d) All cases of leprosy diagnosed as such by the examiner, including quiescent and arrested cases, should be recorded.

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(\*) This committee consisted of: Dr. Briercliffe (*Chairman*), Dr. R. Cochrane (*Secretary*), Drs. E. Agricola, A. V. Bernard, Mr. P. Burgess, Drs. Et. Burnet, M. Dalgamouni, F. Davey, J. A. Doull, G. Gushue-Taylor, P. H. J. Lampe, Prof. E. Marchoux, Mr. A. D. Miller, Dr. J. N. Rodriguez, Col. A. J. H. Russell, Drs. I. Santra, G. M. Saunders, S. de Simon and J. B. Sitanala.

*Age groups.* — The following age grouping should be used: 0—4, 5—9, 10—14, 15—19, 20—29, 30—39, 40—49, 50—59, and 60 or more years. A “child” is to be taken to mean any person falling within the first three age groups.

*Sex incidence:*—By the sex incidence of leprosy is meant the number of male cases per thousand and the number of female cases per thousand of the population examined.

*Types of survey:*—It is recognised that there are two main types of survey: (a) extensive or general, and (b) intensive or particular. (a) Extensive or general surveys: Such surveys may be based upon the incidental examination of known cases of leprosy by officials and others, or upon the examination of certain groups, as for example school children, prisoners, contacts of known cases. (b) Intensive or particular surveys: An intensive survey depends upon the complete examination of the entire population by trained personnel. In such a survey it should be stated whether the examinations were conducted in the clinic or in the persons' own homes.

#### MINIMAL EPIDEMIOLOGICAL DATA

The committee recommends that the information for standard epidemiological studies be recorded in two main groups: (1) general; and (2) individual. The latter concerns both (a) all of the individuals in the area surveyed, and (b) the lepers and leper suspects.

#### *General Information.*

The following general information regarding the region and the people required: (a) Climate, meteorology and soils. (b) Geography and topography. (c) Racial groupings. (d) General social and economic conditions. (e) Diet. (f) Housing and sanitation. (g) Hygiene-habits of the community. (h) Clothing. (i) Prevalent occupation (agriculture, fishing etc.) (j) Prevalent diseases (epidemic or otherwise). (k) Birth rate, death rate, and infant mortality rate when available. (l) Density of population. (m) History of leprosy in the community. (n) Native folk-lore, traditions, customs, and superstitions regarding the disease.

#### *Information concerning Individuals.*

*Information regarding all individuals examined.*—The following information is required for every individual in the area surveyed: (a) Serial number of individual. (b) House number. (c) Name. (d) Age. (e) Sex. (f) Race, caste, religion. (g) Relationship to head of family. (h) Physical

examination: malnutrition, skin diseases, other diseases including leprosy, definite or suspect (for lepers and suspected lepers see below). (i) History of contact with lepers as indicated below.

*Information regarding lepers and suspects.*—The following information is required concerning lepers and suspected lepers: (a) Previous illnesses. (b) Leprosy contact history: (1) intra-familial and/or household contact, (bed contact, room contact, house contact including joint-family system), stating family relationship; (2) extrafamilial (intimate or casual); (3) contact not known. (c) Contact period: (1) time since first known contact; (2) time since last known contact; (3) duration of contact; (4) contact continuous or intermittent. (d) Particulars about presumed source of infection. (e) Age at onset of first manifestation of leprosy. (f) Course of disease. (g) Present status, description and type of disease including site of initial lesion. (h) Laboratory findings, examination of smears and if possible of sections, and serological tests. (i) Conclusion: (1) leprosy, definite; (2) leprosy, suspected.

#### METHOD OF CONDUCTING AN INTENSIVE SURVEY

It is essential that the area chosen for a survey be sharply delimited, and if possible it should coincide with an administrative area. In brief, there may be said to be two steps in an intensive survey. First, there must be a complete enumeration or census of the chosen area by a sanitary inspector or assistant, preferably someone with sufficient preliminary training in leprosy work to enable him to recognise obvious lesions of the disease. The second step is the careful examination of every individual in the area by a leprologist, and the recording of data on appropriate forms.

*Preliminary Examination or Survey.*—The enumerator should conduct a house-to-house census of the area, recording his findings in some type of census book or on a family card. The houses are to be given numbers and a map of the area should be drawn, roughly to scale, indicating streets, lanes, houses (with numbers), streams, public latrines, etc. It should be made the practice that the inspector see every individual, and that he do not record data on hearsay evidence.

*Clinical Examinations.*—After the preliminary survey has been completed the leprologist proceeds to examine all persons in the area. It is probably best to have some build-

ing near the centre of the area set aside for use as a clinic, where as many as possible of the population should be examined. In the examination the whole body should be inspected, the clothing having been removed, and when that is not done record should be made of that fact. The examiner's findings in each case are to be recorded in the survey book, and in addition, when leprosy is present or suspected, a separate examination form should be filled in. The preliminary data recorded by the inspector should be checked, and more detailed information obtained. With nonlepers, as well as with those suffering from the disease, an effort should be made to determine whether or not there has been any previous contact with lepers. When there has been such contact its time and duration, as well as its nature should be ascertained. Such information is to be obtained by questioning and from the records after the completion of the survey. Its collection may present considerable difficulty.

#### DEVIATION OF RATES

Certain leprosy indices which may be valuable can be derived from the survey data. These are :

(1) The case-type rate which is the number of open cases per 100 cases of leprosy.

(2) The sex rate which is the number of male lepers per 100 cases of leprosy.

(3) The childhood rate which is the number of child lepers per 100 cases of leprosy.

(4) The contact rates which are: (a) the number of lepers with familial (household) contact per 100 cases of leprosy; (b) the number of lepers with extrafamilial contact per 100 cases of leprosy (c) the number of lepers with contact unknown per 100 cases of leprosy.

Further correlation, such as the ratio between case types and sex, etc., may be derived from these data at the discretion of the investigator.

#### GENERAL PRINCIPLES OF LEPROSY CONTROL\*

So long as the mode of transmission of leprosy is not known with absolute certainty, any method of prophylaxis

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(\*) The subcommittee received a proposal that it should "formulate a general scheme of leprosy control which may be modified according to the local conditions in regard to segregation in different countries." After careful consideration it was decided that it is preferable to set forth what are believed to be the more important principles governing the control of leprosy, rather than to formulate a general scheme.

is to some extent empirical. The present conception is that leprosy is an infectious disease spread principally by direct contact, and possibly by indirect contact, *e.g.*, the wearing of infected clothes. As with other infectious diseases, the aim is to discover cases as soon as possible in order to control the spread of infection in the community; and in order to give the patient the benefit of treatment.

#### METHODS OF DISCOVERING CASES

(1) *Examination and continued observation of regular contacts.*

(2) *Periodic examination of children of school age.*—Where this is done as a part of a school medical service, the staff should have adequate training in the diagnosis of early leprosy.

(3) *Dispensary diagnosis.*—In many tropical countries where leprosy is prevalent there is an extensive general dispensary system. The dispensary staff, whether fully qualified or not, if trained in the diagnosis of early leprosy, should be able to discover early cases of the disease.

(4) *Notification of cases* by medical men and also by responsible members of the public: for example, practitioners of indigenous medicine, school teachers, headmen. Such notification will be more effective if the general public has been instructed in the early signs of the disease.

#### PREVENTION OF SPREAD

(1) *Isolation of open cases.*—The present view is that the open case constitutes the greatest danger to the public health, and therefore such cases should be prevented from contact with healthy persons, especially children. This has been attempted in the following ways: (a) isolation in institutions; (b) isolation in the patients' own homes; (c) isolation in villages.

(a) *Isolation in institutions:* In a few countries compulsory isolation is being slowly replaced by voluntary isolation. This change is largely due to the fact that the conditions of isolation are now considerably more attractive and encouraging to the patient. In other countries with large leprosy populations compulsory isolation is out of the question because the expense would be out of all proportion to the financial resources. It is recognised, however, that in certain countries compulsory isolation is still practicable and advisable. Where this is the case the general conditions of the patient's life should approximate as nearly as possible



those of voluntary isolation, and reasonable periods of leave should be granted. Visitors to settlements should be discouraged from staying with patients, and rest houses away from the patients' quarters might be provided. In any country where segregation in institutions is compulsory, the establishment of multiple regional leprosaria instead of a single central institution is advisable in order that the patients may be as near as possible to their own homes. The establishment of agricultural colonies is also recommended. Whatever the type of institution, every effort should be made to make it, at least in part, self-supporting. In connection with the establishment of such regional leprosaria and agricultural colonies, there need not be any danger to the health of the surrounding population if proper precautions are taken. In countries where there is a system of voluntary isolation, it is recommended that the health authorities be empowered to compel the isolation of any case of leprosy which is considered of special menace to the public health.

(b) Isolation in the patients' homes: Isolation of a person with leprosy on his own premises may be designed to separate him from the public and from members of his own household, or from the public only. In neither case do we consider home isolation to be a generally effective method. This applies especially to isolation from the patient's own family. Exceptionally, or under favourable circumstances (for example, in the case of a wealthy patient), home isolation may be possible. Home isolation is not recommended as an alternative to institutional isolation.

(c) Village Isolation. Village isolation is designed to effect partial isolation of lepers in community units. This method would be applicable only in countries where sufficient funds are not available for a complete system of isolation in settlements. Complete isolation is the most effective method of control, and village isolation should not replace it except where the former system is impossible.

(2) *Nonisolated cases*.—All leprosy patients who are not isolated should be kept under regular, periodic surveillance by the health authorities. The method of carrying this out will vary in different countries. Usually the clinic will be the centre for the control of such cases. Therefore the cases registered at the clinic will fall into two categories: (a) those under surveillance and treatment, and (b) those under surveillance only.

(a) Cases under surveillance and treatment.—It is assumed that all patients with active lesions will be placed under treatment and so will be seen frequently by a responsible officer.

(b) Cases under surveillance only.—Patients who do not require treatment should be examined at regular intervals. The interval will depend on the nature of the case, but the patient should be examined at least every six months, or more often if required. Bacteriological examinations should be made each time the patient is seen. In this connection it is to be understood that every case released from isolation will be placed under surveillance. Surveillance should include regular visits to the patient's house in order that advice regarding sanitation and hygiene can be given, and in order that the home conditions may be known to the authorities.

### LEPROSY IN CHILDREN

The importance of leprosy in children cannot be too strongly stressed; therefore every effort should be made to discover early lesions of leprosy in children. To this end every child, in areas where leprosy is endemic, should be examined on admission to school, and should be re-examined every year during school life. In many instances the early lesions in children are of such a nature that the child should be permitted to continue his school studies provided he is kept under surveillance, but it is recognised that, in certain countries, the feeling of the public may compel the authorities to exclude such cases from school. Children who are open cases should be isolated. Children with progressive lesions should, where possible, be sent to an institution which has special facilities for treatment of leprosy in children.

### CONTACTS

Close contacts of every case of leprosy should be examined, and contacts who are children should be re-examined regularly.

The history of leprosy shows that persons working with the disease rarely contract it provided they observe reasonable precautions against infection.

### PROTECTION OF HEALTHY CHILDREN

Healthy children of leprous parents should be removed

from their parents, when the latter are considered a potential source of infection. Children born of leprous parents who are open cases should be removed immediately after birth and brought up under healthy conditions.

### EDUCATION AND PROPAGANDA

In order that leprosy may be dealt with successfully on a comprehensive scale, and before any large proportion of early cases will come voluntarily for examination, there must be a change in the attitude of the public towards the disease. Greater achievements have been possible as a result of increased interest in the patient's welfare under conditions of isolation; further, the increasing number of discharges has contributed towards this end. There remains, however, a vast field for health education. Any scheme for the control of leprosy will depend for its success on an educated public opinion.

No standard type of procedure to this end can be laid down for universal application, and local customs and conditions must always be taken into consideration. There are, however, certain general principles which may be formulated. These are as follows :

(1) Any propaganda must be in accord with the best informed scientific opinion.

(2) Propaganda should have as its objective: (a) Dispelling unreasonable fear of leprosy and thus teaching a right perspective regarding it. (b) Emphasising the necessity of early diagnosis, so that if a case is not considered serious anxiety may be allayed, while if treatment is needed it may be commenced at the earliest possible moment.. (c) in this connection adequate training should be made available for medical students and post graduates, such instruction preferably being given by a leprologist. (d) Courses in the diagnosis of early leprosy should be given to nurses, health visitors and sanitary inspectors. (e) Elementary instruction about leprosy should form a part of the teaching in hygiene given in teachers' training colleges. (f) Special attention should be given to the instruction of households in which there are known cases of leprosy, in methods of personal and general prophylaxis, and particularly regarding the keeping of children from contact with the infected member of the household.

## VOLUNTARY ORGANISATIONS

Voluntary organisations have in the past, and can in the future, aid greatly in antileprosy work. It should be emphasised, however, that the control of leprosy is the inescapable responsibility of the governments concerned. The primary function of the voluntary agencies should be to co-operate with governments in demonstrating the value both of approved and of newer methods of prophylaxis, education and therapy. With this principle in mind, but with recognition of the fact that in many countries financial support by government is still far from adequate, the following suggestions are made with regard to activities of voluntary organisations.

(1) *Educational activities*.—At present assistance is needed to provide opportunity for medical, nursing and technical personnel to broaden their knowledge. Much may be accomplished by organisation of short courses for intensive instruction. Regional conferences are also helpful to this end. There is a serious lack of educational material, scientifically correct and suitable for the public, such as bulletins, moving picture films, lantern slides and charts.

(2) *Welfare and Therapeutics*.—The maintenance of leprosaria should not be continued indefinitely by voluntary agencies, but should increasingly become an obligation of governments, and in new projects governments should themselves undertake financial responsibility, though their management can often best be undertaken by voluntary organisations. There is also considerable scope for such organisation to work out the most suitable type of institutions for the particular country, and the best methods of their administration. The development of preventoria for children of leprous parents who are open cases may be mentioned in this connection; these should also be generously supported by the government. There will probably always be a need for social work among patients, both in and out of institutions, for which government will have difficulty in making provision.

(3) *Research*.—Research work in leprosy should be promoted in the laboratory and the field, both by governments and voluntary organisations.

(4) *Rehabilitation*. — Rehabilitation of discharged patients is a sphere in which voluntary organisations can render valuable help with government assistance by providing suitable work for them and by helping to reabsorb them into the community.

## CULTIVATION OF THE LEPROSY BACILLUS

*Report of the Subcommittee on in Vitro. Cultivation of  
M. Leprae*

## MAJORITY REPORT

The majority of the subcommittee appreciate that much work has been done on the artificial cultivation of Hansen's bacillus. The fact that results reported by various individual or groups of workers have not, in the majority of instances, been duplicated by others, although many attempts have been made with this end in view, leads to the opinion that the problems of the *in vitro* growth of the causative agent of leprosy have not yet been solved satisfactorily. The committee highly commends the work of all who have laboured in this field and heartily recommends that research along this line be continued.

(Signed) H. E. Hasseltine (*Chairman.*)  
Malcolm H. Soule  
K. E. Birkhaug

## MINORITY REPORT

It is the opinion of the undersigned that the causative organism of leprosy has been cultivated by Prof. W. Kedrowsky and a few other research workers. It is urged that investigators in this field be encouraged to continue in the furrow already ploughed, and on the other hand, to seek for new ways, but always to carry on without preconceived ideas about the strict acid-fastness of the different bacterial forms occurring in leprosy material which are, in my opinion, only broken down stages of one and the same lower fungus.

(Signed) John Reenstierna.