Before the introduction of sulfone drugs in the treatment of leprosy, the only method available for controlling spread of the disease was isolation of infective cases. Although ideal in theory, since it is expected to break the chain of infection, in practice this method suffers from great limitations. In countries with a large number of cases of leprosy and limited resources, it is not possible to provide facilities for isolation of all the infective cases. In countries with a limited number of cases of leprosy, and with sufficient funds available for antileprosy work, the isolation of all the infective cases in the institutions may be possible. Even under these conditions, however, there are great difficulties, such as unwillingness of a number of patients to be isolated in institutions, and the consequent tendency to concealment during the early stage of the disease. These cases are usually not detected until signs of the disease become too readily apparent for concealment, with the result that when the disease is detected, the patients have already spread infection to a large number of healthy people. Because of this, even in countries where isolation of detected cases has been rigorously applied over a number of years, as in Brazil, it has failed to control the spread of the disease.

As a measure for controlling spread of the disease, therefore, isolation of infective cases has great limitations, which are now gen-

erally well recognized. It is therefore obvious that in most countries, especially those with a sizeable leprosy problem, isolation is of limited application and value, and cannot be depended upon as the only or the main method for the control of leprosy.

Until sometime back the situation appeared to be a hopeless one, since any alternative commonly applicable method for the control of leprosy was not available, especially in the countries where leprosy is highly prevalent at present. With the recent advances in the treatment of leprosy, however, the position has changed for the better, as it has made possible a new practical approach.

Introduction of the sulfone drugs in the treatment of leprosy has made possible the practical alternative and supplementary method referred to above for general application for control of the disease. It is now the considered opinion of all leprologists that organized mass scale sulfone treatment constitutes one of the most important measures for the control of leprosy. It is regarded as the most potent generally applicable weapon now available; it forms the sheet anchor of present day leprosy control programs in most countries where leprosy is highly prevalent.

The rationale of this method of control is to make infective patients less infective, and ultimately noninfective, thus reducing the quantum of infection. For this purpose it is essential that the cases be detected at an early stage, and that the drug be used on an extensive scale, so that almost all cases of leprosy in a particular area are brought under treatment. Otherwise the cases left untreated will continue to spread the disease in the area concerned.

For successful application of this new approach, there are four essential prerequisites. These are: (1) an adequate case-finding program; (2) arrangements on a wide scale for making treatment available near the homes of patients; (3) a follow-up service to ensure regular attendance of patients; and (4) periodic examination of healthy contacts of the patients in order to be able to detect the disease at a very early stage. To achieve these objectives, there is of course need for an organized antileprosy campaign including requisite administrative machinery, availability of necessary personnel (medical and paramedical), arrangements for training of such personnel, health education regarding the disease, social and financial assistance to needy patients and dependents, and steps for rehabilitation of patients in need of such help.

As is usual with the introduction of any new approach to a problem, for a time, at least, attention is concentrated exclusively on the new method, and there is a tendency to condemn and give up earlier methods of approach. This makes the pendulum swing to the other extreme, and introduces imbalance in methods of work. We believe that, after the advent of sulfone drugs for the treatment of the disease, such an imbalance has been introduced in the methods of leprosy control. This

is evident in two directions. Firstly, while it was believed earlier that the only practical method of controlling spread of the disease was isolation, now the opinion is often expressed that isolation of infective cases is no longer necessary, and leprosy control (even eradication) programs are being based and shaped according to such opinions. Secondly, while previously legal measures for compulsory isolation and other restrictions of patients were considered indispensable for controlling spread of the disease, it is now being said that legal measures are of no value, and unjustified. We believe that, while the earlier views and methods represented one extreme, the present views and methods represent the other. We believe also that, as is usually the case, both extremes are incorrect and unbalanced. There is need for striking a golden mean, representing a balanced approach to the subject.

The limitations of chemotherapy alone in controlling spread and ultimately eradicating the disease should be obvious. In the early part of this century, the introduction of injection treatment with hydnocarpus oil gave rise to great hope that it would be possible to control spread of the disease by wide-scale treatment of cases. These hopes failed to be realized, however, and it was found that, while of value in individual patients, the hydnocarpus remedies did not contribute much toward control of the disease. Hence it was realized that treatment alone could not achieve the object of preventing spread of the disease.

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

The sulfones take a long time for bacteriologic clearance of the infective cases, and this constitutes a great limitation in their ability to check spread of the disease, since even under treatment a patient remains infective for a considerable period. Besides this, other limitations are caused by difficulties in implementation of the program of regular treatment for every case in the area. Some of the reasons for these difficulties are as follows:

(1) Failure to detect all the cases in the area; this is caused by the tendency to concealment.

(2) Refusal of a proportion of the detected cases to take treatment. Experience has shown that of the detected cases up to 10 per cent or more may refuse to register for treatment for various reasons.

(3) Irregularity or nonattendance of patients registered for treatment. In a chronic disease requiring long periods of treatment, this tendency is natural. In some cases the irregularity is caused by the

clinical improvement seen under treatment, because of which the patients think that regular treatment is no longer necessary. In other cases lack of satisfactory improvement may be the reason. To a wage earner attendance for treatment may mean loss of wages. Even under favorable circumstances only about 50 to 60 per cent of patients registered for treatment have been found actually to attend for treatment. Nonregistration of an appreciable percentage of cases for treatment, and the large percentage of registered patients not attending regularly for treatment, are two problems greatly reducing the effectiveness of sulfone treatment as a control measure. The effects are most serious in case of nonregistration, irregular attendance, or nonattendance of the lepromatous patients.

(4) Intolerance to the drug on the part of a small proportion of cases, preventing use 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, and alternative chemotherapeutic drugs are now available for such cases. Many patients found intolerant to sulfones, however, are found intolerant to other chemotherapeutic drugs also.

(5) Relapses in a proportion of cases after the treatment is stopped. In such cases it is necessary to continue a maintenance dose of sulfones after the case has become 'arrested' or 'cured.' In lepromatous cases this maintenance dose may have to be continued for the rest of the life of the patient.

Because of the above limitations, it is necessary to pursue the work with great care and vigilance, considering 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. The point under investigation is the possibility of controlling spread of the disease, and eradicating it, through wide-scale treatment with these drugs alone. For this purpose proper assessment of results is essential.

Until it is demonstrated beyond doubt that the disease can be controlled and eradicated with chemotherapy alone, it should be borne clearly in mind and emphasized that chemotherapy should not be considered an exclusive method for control of the disease, making it possible to dispense completely with isolation of infective cases. It should be recognized that judicious and discriminate isolation of infective cases still holds an important place in the control of leprosy. In countries where adequate accommodation is available, chemotherapy provides a supplementary method to relax the rigors of isolation, and thereby discourage tendency to concealment. In countries where the size of the problem is coupled with limited inpatient accommodation, it provides a practical alternative approach, enabling a better use of available inpatient 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.

We are in general agreement with the views expressed by S. Schujman[1] on the "Values of segregation of bacteriologically positive cases in the prophylaxis of leprosy." Further, we agree entirely with his remark "that it would be very difficult to eradicate leprosy from an endemic country without isolation of the strongly positive cases."

Whether or not leprosy can be controlled and eradicated with chemotherapy alone, mass sulfone treatment in all the endemic countries and in endemic parts of a country is essential from the point of view of the patients themselves. Efforts in this direction should, therefore, continue to be intensified; there is no room or justification for relaxation in these efforts. In the first place, even without any reference to the public health problem, all leprosy patients should be treated for their own sakes. They have a right to demand that treatment. Secondly, reduction in the quantum of infection, even if it may not be to an extent that will completely control spread of the disease and ultimately eradicate it, will make an impression on the problem and contribute proportionately through reduction in the quantum of infection, which will in its turn depend on the degree of efficiency achieved in carrying out the program of mass chemotherapy.

The value as well as the limitations of chemotherapy in controlling the spread of leprosy have been indicated. It has been stated also that this method of control, although widely applied, should still be considered as an experimental measure until its value is clearly demonstrated. It is essential that proper assessment be made of results obtained. The method has been extensively used for several years in a large number of countries. It is doubtful, however, if requisite data for proper assessment of the measure will be available in many of the centers.

The assessment should be based on the prevalence rate of *active* cases of leprosy in an area at the start of the mass treatment, and after a sufficient period (at least 5 years) of continued chemotherapy in the area. It is necessary to lay stress on the word "active." In the initial survey at the time of starting the treatment it is not possible to differentiate clearly the cases with active disease from those in whom the disease is inactive or "arrested," because in order to express an opinion on inactivity in a particular case, it is usually necessary to follow up the case for some time. In the initial survey almost all cases will therefore be listed as active. In a later survey many of them will be eliminated, as observation in the interim period will have shown them to be "arrested," "inactive," or "cured." The total number of cases detected in the initial survey, and the prevalence rate based on that number, will therefore not provide a true base line for comparison with results at a later date. To obtain a true base line it is necessary to carry out another survey in the area, one or two years after the

[1]Schujman, S. Value of segregation of bacteriologically positive cases in the prophylaxis of leprosy. Internat. J. Leprosy **31** (1963) 46-52.

initial survey, to determine the number of inactive cases at the time of the initial survey, and to deduct this number from the total number of cases at the time of the initial survey. The resulting figures could provide more nearly correct base line data related to the time when the initial survey was carried out. These data, when compared with subsequent follow-up findings, and the findings of the final survey at the end of the investigation, could give a definite answer to the question if mass chemotherapy alone can control the spread of the disease.

The other direction in which imbalance appears obvious is with respect to legal measures. In the early days of leprosy work, isolation of cases of leprosy was considered of the greatest importance for controlling spread of the disease. Since patients and their relatives would not reconcile themselves to a program of isolation breaking up family ties, most patients did not volunteer for isolation in leprosy asylums or colonies. This led to enactment of legal measures for compulsory isolation of patients on detection. This result led to concealment of the disease by patients and their relatives, until the signs became so marked that concealment was no longer possible. It was at this time that they were detected and isolated. But up to the time of their detection they had already spread the disease to a large number of persons in the community. Nevertheless great reliance was placed on compulsory isolation, and this measure was enforced rigorously wherever necessary facilities were available. Apart from the legal measures for the isolation of the patients, other measures were enacted putting restrictions on patients suffering from leprosy.

Thus legal measures for the control of leprosy have been advocated and used for a long time in several countries. In many countries, however, these legal measures have remained a dead letter, because of lack of facilities to enforce them. At one time great reliance was placed on their utility and they were rigorously enforced wherever possible. In general, however, these measures have failed to control spread of the disease. With growth in our knowledge of the disease, and experience with such measures, there is now a general tendency to make them less rigorous. Moreover, limitations in controlling the spread of leprosy by legislation are becoming more apparent, and the present general consensus is that specific legal measures against leprosy are not of much value and therefore not justifiable. This refers especially to compulsory isolation of leprosy cases. Even in countries where sufficient facilities are available, compulsory isolation is being discarded to an increasing extent because it has failed to serve its purpose.

The Committee on Epidemiology and Control of the VIIth International Congress of Leprology, Tokyo (1958) expressed the following opinion regarding "Legal Measures" in leprosy:

"Legal restrictions on patients have limited value in the control of leprosy. They

drive many into hiding and can be effectively applied only to a few. Reporting of the disease to the health department, however, is a necessity and should be required on the part of physicians and others having knowledge of the existence of leprosy.

Indiscriminate compulsory segregation is an anachronism and should be abolished. Discretionary authority should be given to the health authorities to require isolation in those instances in which the patient is discharging leprosy bacilli, and in which sulfone therapy is neglected or ineffective and young children are exposed in the home.

On the international level, the right of national governments to refuse entry to their territories of persons suffering from leprosy is recognized. On the other hand, repatriation of an individual who develops leprosy after a long period of residence in a foreign country may cause hardship and neglect of treatment. The problem might be referred to the World Health Organization with the suggestion that governments be asked to give such individuals the same opportunity for treatment as is offered to their own citizens."

The above view that no real need exists for special legislation on leprosy is no doubt correct, and is now generally shared by almost all leprologists. Unfortunately, however, it is often interpreted to mean that there is no need at all for legal measures in the control of leprosy, although it has never been so stated by any authoritative group. It must be stressed that this interpretation (i.e., no need at all for legal measures) is obviously wrong and misleading, and capable of doing great harm.

What is really intended is that leprosy should not be marked as a special disease needing specific legislation. It is one of the communicable diseases, and as such should be included with other communicable diseases. Legal measures applying to these diseases in general should apply also to leprosy, wherever it is indicated and feasible.

That the above attitude (application of legal measures for communicable diseases to leprosy) is the correct one is apparent from the recommendations made on legal measures in the Report of the Panel on Epidemiology and Control at the VIIIth Congress (1963) which are similar to those of the Tokyo Congress, extracts from which are given below:

"Leprosy must be classified among other transmissible diseases, and special legislation directed to the disease should be abolished. In the meantime, where extravagant legislation is not yet repealed, the application of existing laws must be brought into line with present knowledge. Reporting of the disease to the health department, however, is a necessity and should be required on the part of the physicians or other professional personnel in charge. The importance of professional secrecy in doctors and auxiliaries is stressed. Indiscriminate compulsory segregation is an anachronism and must be abolished. Discretionary authority in certain circumstances could be given to health officials to require isolation of lepromatous patients discharging bacilli in those instances in which sulfone therapy is neglected or ineffective. The only desirable compulsory measure is the medical examination for transmissible diseases. On the international level, special attention should be paid to nomadic populations, especially when campaigns are unequally developed on two sides of a border."

Thus, legal powers for the control of leprosy, with all the limitations they have, are essential to meet particular situations. These powers need not be specifically directed against leprosy on the statute book, but should form part of the general public health regulations of a country.

It is admitted that because of the danger of compulsion leading

to concealment, and because of the fact that in most countries where leprosy is highly prevalent today available facilities for isolation are inadequate, antileprosy work in general must be on a voluntary basis. Compulsory isolation or legal measures to make it possible are not likely to play an important role in the antileprosy drive. Special circumstances, however, may arise for the use of compulsion, and it is considered essential that legal provisions exist to meet special situations.

Thus there is need for availability of some legal measures to fall back upon in particular circumstances. As already stated, these should not deal specifically with leprosy, but should be included in the general public health measures of the country. It must be stressed, however, than an indispensable preliminary to the success of any legislation will be education of the public on a wide scale. Moreover, a clear differentiation must be made between "open" or infective cases and "closed" or noninfective cases of leprosy, and any restrictions found necessary should apply only to the "open" or infective cases.

The importance of leprosy as a public health problem, and facilities available for dealing with it, vary markedly in different countries. It is not feasible, therefore, to postulate any uniform legal measures for adoption in the various countries; only general principles in the matter can be indicated. In general, legal measures should include provision for notification of cases, examination of cases and suspects, treatment of all cases, isolation of cases in circumstances where it is especially indicated, and restrictions on certain occupations and movements, and on immigration.

On the above basis, the broad outlines of necessary measures may be indicated as follows:

1. Notification of cases. This is essential so that public health authorities may obtain necessary information and take suitable action.

2. Facilities for free examination. Adequate facilities should exist for a free diagnostic service, and every person who is suffering or suspects he is suffering from leprosy should present himself for examination at a special place. In the event of his failure to do so, health officers should be empowered to carry out the examination, and, if necessary, enter his house for this purpose in a manner prescribed by rules.

3. Facilities for free treatment. Approved current methods of treatment should be available without cost to all persons found suffering from leprosy, at all leprosy institutions and treatment centers and general hospitals and dispensaries. Authority should be set up to deal with patients who do not use these facilties and fail to attend for treatment at a specified place.

4. Selective isolation of open cases. Wherever possible accommodation should be provided for the isolation of infective patients not responding to treatment, and living under conditions especially liable to spread the disease to healthy people and especially to children. Such

patients should be persuaded to isolate themselves, perhaps temporarily, until the infectivity is reduced, in accommodations provided for the purpose. In the case of noncompliance health officers should be empowered to have them compulsorily removed to accommodation especially provided for the purpose, except as provided in No. 5 below.

5. Isolation at home. When conditions suitable for home isolation exist, or can be created to the satisfaction of the health officer concerned, patients may be permitted to isolate themselves at their homes under medical supervision subject to the fulfillment of certain conditions to be clearly laid down.

6. Restrictions on persons suffering from "open" leprosy. Certain restrictions should be imposed on the "open" cases of leprosy with regard to (a) engaging in certain occupations, (b) presence in certain places where large numbers of people gather, and (c) use of public conveyances.

7. Restriction on immigration. There should be provision for restrictions on the immigration of leprosy patients from foreign countries, and for their repatriation if they have come recently.

As stated earlier, these provisions should not be made specifically for leprosy, but should be included in the general public health measures dealing with communicable diseases in general. Where such provisions already exist for communicable diseases, all that is necessary would be to declare leprosy a communicable disease.

Because of the importance of the matter, and the urgent need for evolving a balanced approach to the control of leprosy, the subject has been discussed above in detail. There is need for a judicious combination of chemotherapy and isolation of highly infective cases, either in inpatient institutions or at home if possible. It is possible that prophylactic treatment of healthy contacts with sulfones, and BCG vaccination of these contacts, may play an important role in the control program. An important measure, which is often not brought into the picture, perhaps because it is not a specific antileprosy measure, is the need for raising the economic and sanitary standards of the population, which will result in better housing and improved nutrition.

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