INTERNATIONAL JOURNAL OF LEPROSY

PUBLISHED AS THE OFFICIAL ORGAN OF THE
INTERNATIONAL LEPROSY ASSOCIATION
WITH THE AID OF THE LEONARD WOOD MEMORIAL

Postal Address: P. O. Box 606, Manila, Philippines
Office at the Institute of Hygiene and Public Health
Entered at the Post Office at Manila as second-class matter

Vol. 8 JULY-SEPTEMBER, 1940 No. 3

EDITORIAL

Editorials are written by members of the Editorial Board, and opinions expressed are those of the writers. Any statement that meets with disagreement will be of service if it but stimulates discussion.

RACIAL SUSCEPTIBILITY TO LEPROSY

It was suggested by Liveing[1] that leprosy died out of Europe because it had killed off the susceptible stock in the population. This theory has been more recently promulgated by Molesworth[2], who says: "It apparently took about 1,000 years for the susceptible stock to be eliminated from England and France... Though the elimination of susceptibles from Europe required about a thousand years, we do not know whether after an equal or a longer time, susceptibles will again become numerous enough to permit the establishment of a new endemic." He concludes; however, that "... it appears extremely unlikely that a new endemic will be established in Europe at any time, unless that continent is inhabited by a different race." One gathers from this that Molesworth considers that the elimination of susceptibles is the principal factor, not only in the elimination of leprosy from Europe but also in preventing it from again becoming endemic at the present day.

Without going into the arguments by which this hypothesis is supported, let us ask this important question: Is there any evidence that Europeans *are* less susceptible than inhabitants of other countries where leprosy is still highly endemic? There are

[1] *British Medical Journal* I (1873) 277-281.
[2] *International Journal of Leprosy* I (1933) 265-282.

certain criteria which are regarded by many authorities as indicating high susceptibility in a community:

(1) The prevalence of great average severity of the disease in both its types.

(2) Regarding the case-type rate, a large proportion of lepromatous as compared with neural cases.

(3) Regarding the childhood rate, a low average age of onset.

(4) Evidence obtained with the lepromin test. This test has not yet been tried out to any great extent, but it is worthy of trial where possible in testing the susceptibility of the general population, as there is considerable evidence that a positive reaction to intradermally injected lepromin indicates strong resistance.

The frequency of leprosy in a community cannot in itself be regarded as an absolute criterion of susceptibility, unless it is combined with one or more of the above features. For instance, in Northeastern Congo it is estimated that at least four percent of the population suffer from leprosy, and in the west of Northern Nigeria about three percent. In both of these regions, however, the disease is not severe; "lepra reaction" seldom occurs, deformities are not great, the proportion of cases with the severe lepromatous type is small, and the disease is comparatively infrequent among children.

South Africa offers an almost unique opportunity for studying race susceptibility. Compulsory segregation is in force, and within the walls of the West Fort Leprosy Institution at Pretoria are gathered Europeans (of pure Northern European descent, though domiciled for one or more generations in South Africa), Coloured (half-caste), and native Bantus. In a recent visit the writer found that while only 25 percent of the Bantu patients admitted were of the lepromatous type, a great majority of the Europeans were of that type; in fact, every one of the twelve Europeans admitted in the last year was lepromatous.

The small proportion of 25 percent lepromatous among these Bantus is, on the average, the same as is found in other parts of Africa, and in some highly endemic parts of India the proportion is even less. Though in some places it is more and in others less, nowhere among the native inhabitants of Africa or India, so far as the writer is aware, is there so large a proportion of lepromatous cases as is found among the European patients at Pretoria. It is not easy to refer this difference between these two communities to any known environmental factor. Not only among the Bantus, but also among the poorer Europeans—who furnish most of

these cases—malnutrition is common and the standard of living and sanitation leaves much to be desired.

The rate of known leprosy among the Europeans in South Africa is 0.048 per mille, and that among the Bantus is 0.33. Thus, the case rate in the latter community is seven times as great as in the former, but the type rate of the Europeans indicates much greater susceptibility on their part. Their lower case rate does not appear to result from higher natural resistance, but from the higher standard of living and sanitation in the average European as compared with the average Bantu.

There is reason to believe that the Europeans of South Africa are not in any way exceptional in their case-type rate. Of 94 active cases of leprosy examined by the writer in the Cyprus Leper Farm, 92 (98 percent) were of the lepromatous type and only two of them were neural. Segregation of lepers is compulsory in Cyprus, but there were 40 arrested cases formerly in the camp who had been sent home under surveillance. Though figures were not available, possibly a larger proportion of these 40 cases, than of those in the camp at the time of inspection, suffered from the neural type; but in any event the proportion of lepromatous cases is very high among these Europeans compared with the average of 25 percent among the natives of Africa.

Our experience of the disease in Europeans who return home to England after contracting leprosy in the tropics is that a great majority are of the severe lepromatous type, and that the disease runs a more rapid course than it does among the natives of India and Africa. Liveing from his experience of such cases in England wrote: " 'Once a leper, always a leper' is perfectly true"; and there are few with experience of the disease as it is found in this country who would not acknowledge that there is much truth in this statement. Far different is the case in India and Africa. To take only one example: in the Union of South Africa on June 30th, 1938, there were 1,764 cases which had been discharged as arrested but still under surveillance, and 2,738 other such cases that had already been released from surveillance; almost all these are, of course, natives. In the Calcutta leprosy hospital, where both Indian patients—chiefly of the lepromatous type—and Anglo-Indian patients are treated, the writer's experience was that the former, though often more advanced on admission, made much better and more rapid advance toward recovery than the latter.

Another relevant observation was recently made by the writer in this connection in Nyasaland and Northern Rhodesia. In

the extreme west of this region already referred to (Barotseland), where the incidence of leprosy has been calculated at three percent, the case-type rate of severe lepromatous (L2 or L3) cases was only eleven percent, while in the extreme east (Nyasaland), where the incidence of the disease is considerably less, the rate of such cases was thirty-five percent. This may be accounted for by the higher standard of living, better education and sanitation, and greater care to prevent contact with lepers in Nyasaland as compared with Barotseland, which has resulted in fewer of the less susceptible inhabitants being infected, although these factors are not sufficient to prevent infection of the more susceptible cases. There is no evidence, however, of greater susceptibility in either region as compared with the other.

More evidence is required before we can interpret the significance of a high type-incidence of lepromatous cases; but, if we accept it as meaning high susceptibility, then the preponderance of facts is against the theory that Europeans are less susceptible to leprosy than the natives of Africa and India. It is, in consequence, against the theory that racial natural resistance is the principal factor in causing the freedom of England, France and other highly civilized countries of Western Europe from endemic leprosy.

One might be inclined to suggest that the greater susceptibility of Europeans, as compared with Indians and Africans, is connected directly or indirectly with the most obvious difference between them—that is, skin pigment—if it were not for the severe form of leprosy found among another race with fairly dark skin, namely, the Burmans. Lowe[3] has recently shown that leprosy is much more severe among them than among Indians living in the same place and under similar circumstances. In the Rangoon Leper Asylum the percentages of lepromatous-type cases were 75 among Burmans and 39 among Indians; in the villages the percentages were 56 and 31, respectively. The age factor was also unfavorable, 71 percent of Burman and only 40 percent of Indian lepers being under thirty.

It is generally agreed that another criterion of susceptibility to leprosy is, as has been mentioned, the incidence of the disease among children. Hayashi[4] has pointed out the importance of the childhood rate in ascertaining the progress of leprosy in Japan, where he considers that an increasing average age indicates the

[3] *Leprosy in India* **10** (1938) 132-139.
[4] *International Journal of Leprosy* **6** (1938) 491-496.

dying out of the disease. Unfortunately, the age incidence has so far been worked out only in a very few places.

One of the results made possible by the more accurate methods of type classification and of recording endemiological statistics, which were adopted at the Cairo Congress, should be the gradual collection of comparable data from all countries where this disease is endemic. Particularly necessary is it that leprosy surveys should, in addition to the actual incidence, contain accurate statistics of the following: (*a*) the severity of the disease as shown by the frequency of reaction in cases of the lepromatous type and of neural reaction (reacting tuberculoid), the amount of nerve thickening, nerve abscess, deformities, etc.; (*b*) careful division of cases according to the Cairo classification; (*c*) statistics of the age incidence; (*d*) where possible, the findings of the lepromin test, which should be used to ascertain the resistance of the general population to leprosy.

Before coming to any conclusions as to racial susceptibility, it is necessary to consider two other elements which may affect the severity and age and type incidence. They are: (*a*) the opportunities for transmission of infection in the community; and (*b*) the general health and standard of living of the community. There is no doubt that both of these factors strongly affect incidence and severity. It has been suggested above that increased opportunities of transmission, as in the Belgian Congo and Barotseland, tend to augment the proportion of the neural type. On the other hand an unfavorable climate, prevalence of debilitating diseases, and other depressing factors would be expected to increase the severity of the disease. But in the instances given in South Africa, Cyprus and Burma, this factor will not explain the findings.

There is evidence, therefore, that in some races, including the Burman and certain European peoples, as compared with the great majority of those in India and Africa, leprosy appears in a more severe form and a much larger proportion of cases are of the severe lepromatous type.

It might be suggested that different strains of *Mycobacterium leprae* are the cause of the varying severity of leprosy as between Africans and Europeans. But the facts that, in South Africa, Europeans and Bantus are living side by side, as are also Burmans and Indians in Burma, and that in both these places the infection is likely to be spread from one group to the other, make this suggestion most improbable.

Why then does leprosy not spread in an endemic form in a country like England, where infectious cases are constantly entering from the tropics and where no precautions are taken by the public health authorities to prevent its spread? From what is mentioned above it seems unlikely that this protection from the spread of the disease is dependent on specially high inherited racial immunity, and there is much reason to believe that the reverse is the case. Nor can it be claimed that the level of nutrition and sanitation is uniformly high or that overcrowding and lack of personal hygiene, frequently associated with leprosy in the tropics, are unknown. It may be stated, however, that persons who enter England suffering from leprosy are seldom those who are likely to live in the more congested and insanitary areas, or to mix freely with the public, especially with children, without due precautions. It is when leprosy enters uncontrolled into family life, without knowledge or acknowledgment of its dangers, and especially under squalid conditions, that it is likely to spread. And it seems to be leprosy-consciousness, a popular conception of the disease which stirs up the community to avoid infection, combined with a certain minimal standard of living, that causes the disease to become eliminated from the community. —E. MUIR