Personal Observations of Leprosy in Mexico and the Sandwich Islands.

BY

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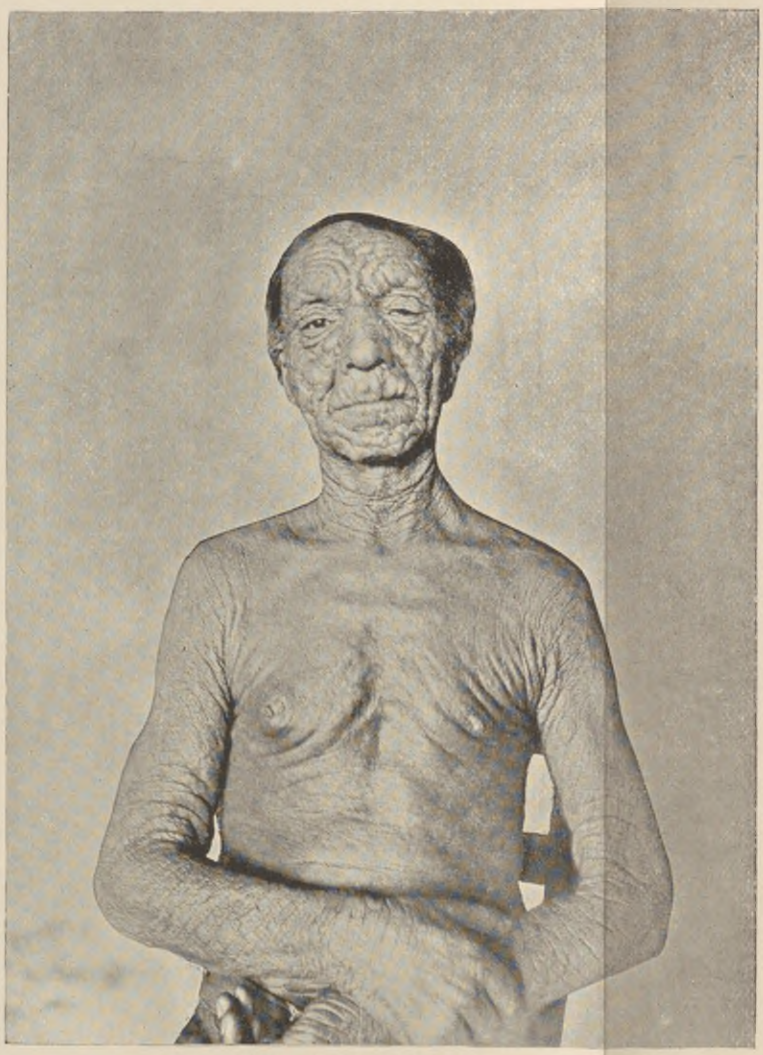

Tubercular Type of Leprosy.

Mixed Type of Leprosy.

Tubercular Leprosy. Anæsthetic Leprosy.

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PERSONAL OBSERVATIONS OF LEPROSY IN MEXICO AND THE SANDWICH ISLANDS.*

By PRINCE A. MORROW, A. M., M. D.

Mr. President and Fellows of the Academy: I should, perhaps, apologize for not having prepared a systematic paper upon the subject of the evening. I have thought, however, that the result of my personal observations of leprosy, at least so far as its clinical features are concerned, might be more effectively, and at the same time attractively, presented by means of photographic illustrations taken from life. I shall therefore, after a few general remarks, have the pleasure of exhibiting before you lantern slides illustrating not only the typical forms of the disease but also the various phases which these different forms assume in the process of their evolution.

In the first place, I may remark that by the great majority of the profession leprosy is looked upon as possessing at the present day only a historical interest. It is classed in the same category as the pestilences and plagues which formerly swept away entire populations and devastated countries, but which are now practically extinct. Unfor-

* Remarks made before the New York Academy of Medicine, June 6, 1889, in connection with the exhibition of fifty lantern slides of typical forms of leprosy.

tunately, leprosy can not be relegated to the past; it is still a living, actual reality, and to-day prevails over more than one fourth the habitable surface of the globe. By reference to the map, the red shadings of which indicate the present geographical distribution of leprosy, it will be seen that it extends from the tropics to the arctic regions, embracing every variety of soil and climate and the most diverse races and nationalities. While it affects principally maritime populations, inland countries are by no means exempt; it prevails in both marshy and mountainous regions, in the lowlands of Louisiana as well as in the elevated tablelands of Mexico.

I would call attention to the fact that this extensive distribution of leprosy has a most important bearing upon its ætiology. As is well known, racial peculiarities, conditions of soil, of climate, and especially of food, have been assigned as ætiological factors. It is evident, however, that the widespread and diversified distribution of the disease precludes the possibility of any of these agencies being invoked as efficient causes.

It would not be possible to give an accurate compilation of the number of lepers upon the face of the earth at the present day. In India it has been estimated that there are over two hundred and fifty thousand; in China, Japan, Africa, and Egypt there are large numbers. In Europe the most important center of the disease in the present century is in Norway and Sweden.

The development of leprosy in a country previously exempt from the disease can always be traced to its importation from an infected center. The spread of leprosy throughout a great portion of Europe early in our present era may be traced along the routes of the Roman armies, and its general diffusion throughout Christendom in the eleventh, twelfth, and thirteenth centuries was materially influenced

by the return of the Crusaders. In the Western Hemisphere leprosy was first introduced into Central and South America by Portuguese traders, in Mexico probably by the Spanish, and in Canada by the French *émigrés*. It persists in New Brunswick at the present day, the most important center being at Tracadie.

In our own country the introduction of leprosy may be traced to at least four separate and distinct sources. In Louisiana it was carried by the Acadians, in the northwestern States of Iowa, Illinois, Wisconsin, and Minnesota by the Scandinavian colonists, along the Pacific coast in California and Oregon by the Chinese, and along the southern Atlantic coast it was brought from the West Indies. In Salt Lake City the disease was imported by a colony of Kanaka women brought by the Mormons from the Sandwich Islands.

My own observation of leprosy during the past winter began at New Orleans, where, it will be remembered, Dr. Blanc has recently reported the existence of forty-two cases. I also visited the Tèsche River district, where there have long existed two leprous centers—one at St. Martinsville, the other at Bayou Lafourche. I had no opportunity of examining the subjects at St. Martinsville, as they had been subjected to a disagreeable newspaper notoriety and kept themselves secluded from observation. Along the line of the Southern Pacific Railroad, at San Antonio and other points, I learned of the existence of scattered cases. In Mexico I saw a number of cases at the San Pablo Hospital and in the streets of the city. In California I received reports of about twenty cases, but only had the opportunity of examining six which were in the pest-house of San Francisco.

The Hawaiian or Sandwich Islands afford to-day, perhaps, the best field for the observation and study of leprosy of any leprous center in the world. The disease is of com-

paratively recent introduction. Certain elements of confusion which have surrounded its ætiology in other countries may here be eliminated: the influence of contagion, of heredity, of racial peculiarities, and of certain conditions which have contributed to the rapid diffusion of the disease may be traced with precision. Thanks to the rigid system of segregation enforced by the board of health, the leper settlement of Molokai, in which eleven hundred lepers are gathered, affords abundant opportunities for the clinical study of every possible form and phase of the disease.

Before entering into an exposition of the clinical features of leprosy it may be well to briefly indicate the present status of our knowledge of the disease. It is the reproach of medical science that a disease which has been characterized as the most ancient and the most exclusively human of all diseases should, after centuries of observation, be so imperfectly understood. We know something of its nature, its clinical features and course, its diagnosis and prognosis; but there are many essential points connected with its ætiology, the degree and conditions of its contagiousness, its modes of propagation, concerning which our knowledge is incomplete and indefinite.

The facts of our positive knowledge of leprosy may be thus formulated:

Leprosy is a parasitic disease; the bacillus of leprosy has a definite form, a slow rate of development, and is endowed with an extraordinary vital resistance, presenting many analogies with the bacillus of tuberculosis.

Like all specific microbes, it has an elective affinity or predilection for certain tissues and fluids of the organism. The bacilli occur in all forms and stages of leprosy; they are found in both the diffuse and nodular infiltrations of the skin and mucous membranes, in the connective tissue of the peripheral nerves, in the cornea, in the cartilages,

and in the liver, spleen, spermatic tubes, and testicles. They are found abundantly in the lymphatic glands and spaces. They are absent from the blood and the physiological secretions, such as the tears, saliva, milk, semen, urine, etc. It is worthy of note, however, that when the nasal, pharyngeal, and intestinal mucous membranes are the seat of leprous lesions the secretions from these surfaces swarm with bacilli.

Leprosy has an exclusive origin; it is invariably derived from the lesions or secretions of a person similarly diseased; it never originates spontaneously, nor does its virulent principle attach to the soil, the water, or the food. Its origin and spread can always be traced to human contact. It is not inoculable to the lower animals, as is abundantly proved by the negative results of numerous experiments. The question of its inoculability to man has until now always been decided in the negative, as the inoculation experiments made by Campana and others have invariably failed, the only result being a septic lymphangeitis. In September, 1884, Dr. Arning inoculated a Hawaiian convict, Keanu, previously free from all leprous taint. This man had been condemned to penal servitude for life, and special care was taken that he should not be exposed to contagion by contact with other lepers. For a long time this experiment was regarded as a failure, but a few months ago Keanu developed unmistakable signs of tubercular leprosy and was sent to the leper settlement at Molokai. Upon the occasion of my recent visit I excised a small subcutaneous tubercle and a portion of the overlying skin. Numerous sections of this specimen were made by my associate, Dr. Fordyce, and in all, the presence of bacilli was demonstrated. (These specimens were shown under the microscope.)

We know, further, that leprosy has a prolonged but somewhat indefinite period of incubation, a slow and irregu-

lar course of development, a characteristic and well-defined symptomatology rendering its diagnosis easy, and that its prognostic significance is most grave: it progresses almost invariably to a fatal termination. The period of incubation of leprosy is generally placed at from three to five years. Examples have been recorded in which this period has been materially lessened or prolonged to seven, ten, and even fifteen years or longer; it depends largely upon individual capacity of resistance. It will be readily appreciated that, since the disease has no initial lesion and the early symptoms are quite indefinite and equivocal, it is difficult, if not impossible, to determine the exact interval between contagious exposure and the first outbreak of undoubted symptoms.

As there is some confusion in the terms used in designating the different forms of the disease, I may say that by modern authorities three types of the disease are recognized which, while pathologically similar, are clinically distinct. When the morbid deposits occur upon the skin and mucous membranes in the shape of macules and nodules, the form of the disease is termed tegumentary or *tubercular;* when they are centered upon the peripheral nerves, it is termed tropho-neurotic or *anæsthetic.* There is, in a certain proportion of cases, an admixture of both forms in the same individual, the lesions peculiar to one or the other predominating; this combination constitutes what is known as the *mixed type* of leprosy.

In addition to these two typical forms of leprosy and the series of symptoms common to both which make up the mixed form, certain writers have described a macular form. There is, however, no good basis for this further division; macular lesions may be met with in any of the forms of leprosy; they do not constitute a type, but simply represent a phase in the evolution of the disease.

The relative frequency of these three types varies in different countries and under different conditions. In the Sandwich Islands about one half the cases are of the tubercular type, about one third are anæsthetic, and the remaining one sixth represent the mixed form. The tubercular form is most progressive and rapidly fatal, the anæsthetic the least so, and the mixed form intermediate between the two.

As the clinical appearances of the different forms of leprosy will be fully illustrated in the lantern slides presently to be shown, I shall not occupy your time with a verbal description.

Having thus summarized the facts of our positive knowledge, I may briefly refer to certain moot points connected with leprosy. When we come to the consideration of the question of its contagiousness, the precise conditions under which contagion takes place, the various modes of infection, the influence of heredity, etc., it must be confessed that the teachings of science are by no means fixed and definite.

As regards the first point, it may be said that a belief in the contagiousness of leprosy has been universally held from the earliest ages until within recent times. All the prophylactic measures contained in the Levitical regulations, as well as those enforced in mediæval times, for the suppression of the disease, were based upon the recognition of the fact that every leper was a possible source of danger to all with whom he came in contact.

About thirty years ago the contagiousness of leprosy began to be questioned, and in 1867 the Royal College of Physicians of London formulated the dogma that leprosy was not a contagious disease. This opinion was generally accepted by the profession in Europe, although it may be said that the dermatologists of this country have never sub-

scribed to this doctrine. In 1885, when the famous discussion upon the contagiousness of leprosy took place before the French Academy of Medicine, it transpired that only three physicians in France upheld the doctrine of contagion. In 1888, when this discussion was again reopened, the partisans of contagion were much more numerous, but among the non-contagionists were numbered some of the most distinguished members of the French Academy.

It will, of course, be impossible, within the brief time at my disposal this evening, to enter into a consideration of the various arguments *pro* and *con* which have been advanced toward the determination of this question. As I propose to submit only the results of my personal observations, I may say that the facts of the development and spread of leprosy in the Sandwich Islands furnish the most abundant and conclusive proof of its eminent contagiousness. Upon no other possible ground can be explained the remarkable and rapid dissemination of the disease which, within the short space of a single generation, has decimated the population of these islands. At the present day from five to ten per cent. of the entire native population are affected with leprosy, while many foreigners coming from countries where leprosy is not endemic, and in whom no hereditary taint can possibly be alleged, have fallen victims to the disease.

In my examinations of numerous cases there was afforded in almost every instance a history of known exposure by sexual or other intimate relations with lepers. Another proof of contagion may be found in the fact that of the Kokuas who go to the leper settlement at Molokai as helpers or nurses, a large percentage contract the disease. To take only the statistics of the past two years, the president of the board of health in his report for 1888 states: Of sixty-six Kokuas who went to the settlement presumably

healthy and free from all manifestations of the disease, twenty-three were found to present unmistakable signs of leprosy, and eleven more presented symptoms which caused us to declare them "suspected lepers."

On the other hand, it must be admitted that there are numerous instances of Kokuas living in prolonged and intimate contact with lepers who have not developed the disease. In Dr. Mouritz's report for 1886, forty-eight cases are cited, giving an average exposure of fifteen years to intimate contact, in which the subjects remain entirely exempt from all manifestations. This prolonged exemption does not, however, guarantee an absolute immunity for the future. One of the cases cited was that of the washerwoman of the hospital, who had washed the soiled clothing of the worst patients for seventeen years. In addition, she had lived with two leper husbands in succession, and yet in 1886 she was hale, hearty, and apparently healthy. Upon the occasion of my recent visit to the settlement this woman was suffering from undoubted manifestations of the disease.

The negative proofs of contagion are, however, so overshadowed by the immense mass of positive clinical testimony that they fall to the ground. They simply prove that there is nothing constant in contagion; that infection is not inevitable; that, in order that contagion may operate, a susceptibility or receptivity on the part of the individual is essential; and, further, that, owing to individual peculiarities, some persons are endowed with a capacity of resistance which renders them absolutely refractory to its contagious activity.

As regards the modes of infection, our knowledge is by no means definite. It is probable that in the immense majority of cases the disease is propagated through sexual intercourse. This mode of infection is rendered almost certain by the observed fact that healthy individuals having

sexual relations with lepers almost invariably become contaminated. The liability to the disease from exposure of this kind is so generally recognized that the husband or wife of a leper, though apparently sound, is readily admitted to the leper settlement as a Kokua, on the presumption that the germs of the disease have already been implanted in his or her system.

It is also probable that the virulent principle of leprosy may find entrance to a healthy organism through cracks, fissures, or abrasions of the integument or mucous membranes. It may possibly be inoculated by means of the bites of insects, such as flies or mosquitoes, or by animal parasites, such as the *Acarus scabiei*. This mode of infection is well attested in the case of elephantiasis Arabum. It is worthy of note that the latter disease prevails extensively in the Samoan Islands, while it is unknown in the Sandwich Islands.

Inhalation is another assumed mode of contagion, but it rests upon presumptive rather than positive proof.

Vaccination is believed by the natives as well as by many intelligent physicians to be a potent agency in the rapid diffusion of leprosy through the islands. It must be remembered that until recently vaccination was performed by unskillful persons, human virus was used, and no distinction was made between a healthy person and a leper as the vaccinifer. The fact is incontestable that, after the general vaccination of the natives, numerous leprous centers developed in various parts of the islands where the disease had previously been unknown. Arning demonstrated the plentiful presence of bacilli in the lymph and crusts of vaccine pustules in lepers.

There are many other interesting points in connection with contagion to which I might refer did time permit; thus, for example:

At what period in the evolution of leprosy does the system become endowed with contagious activity? Is it during the prodromal stage or during the eruptive stage, or is it delayed until the tubercles have softened and broken down?

Are the lesions of the anæsthetic form contagious? The bacillus is not found in the chronic sores or the necrosed tissues and bones of the anæsthetic leper. Numerous and repeated examinations of sections of an amputated finger showed no bacilli.

Another point of interest: A woman may have several husbands in succession who become lepers and she remains apparently exempt. Is the disease latent in this woman, powerless to produce general accidents, yet sufficiently active to contaminate others?

Finally, there remains to be considered the question of heredity. The traditional belief in the hereditary transmission of leprosy has rarely been questioned. It has generally been regarded as the principal mode of the propagation and perpetuation of the disease. In all ages and in all countries marriage has been prohibited between lepers, and its development in one partner has been accepted, not only as a sufficient pretext, but an urgent argument, for the dissolution of the marriage tie.

The history of the development of leprosy in the Hawaiian Islands would seem to show that here at least heredity has played an insignificant if not an inappreciable rôle in the propagation of the disease. The following facts may be stated: There is no authentic record of a congenital case of leprosy. I secured the placenta, cord, and portions of the body of a child still-born at full term, of leprous parents. Repeated examinations of these specimens made by Dr. Fordyce showed the absence of bacilli. Leprosy never develops until the third or fifth year, a period which corresponds to

the classic period of incubation of the acquired disease. In the immense majority of cases the first manifestations of leprosy occur from the thirtieth to the fiftieth year. In the next place, lepers are almost always sterile. Only two children were born in the leper settlement in the first five years after its establishment; in the next five years only three children were born of parents both leprous. In 1886 Dr. Mouritz collected statistics of twenty-six children born in the settlement, whose ages ranged from three to fourteen years. Of these, nine had become lepers, while seventeen showed no signs of the disease. Considering the multitudinous chances of post-natal contagion from intimate contact with their leprous parents, it seems altogether probable that if these nine children had been immediately removed they might have escaped the disease.

The exemption of the offspring of leprous parents from the parental disease was so frequently observed that in 1885 the Kapiolani Home was established at Honolulu, where these children might be cared for and kept under surveillance as "suspects" until evidences of the disease might be manifest. I am unable to give the statistics of this Home, but they are sufficiently favorable to justify the wisdom of this step.

My observations would seem to justify the conclusion that the influence of heredity in the transmission of leprosy must be regarded as an open question. It is probable that, as in tuberculosis, with which leprosy presents certain analogies, a predisposition to the disease rather than the actual germ is transmitted from parent to offspring.

Finally, there remains to be considered the practical question of the danger of the spread of leprosy in this country. As my remarks have already extended much beyond their proposed limit, I shall refer to this important subject but briefly.

In the determination of this question the facts of the development and spread of leprosy in other countries can not be ignored. The teachings of observation and experience show that in all countries invaded by leprosy its first approaches have been slow and insidious. To take the Sandwich Islands, for example, we find that for twenty years after the first case of leprosy was identified the disease spread slowly, without making sufficient advance to attract the attention of the health authorities. When they awakened to the realization of the danger which threatened the public health, the disease had already gained such headway that they found it impossible to arrest its progress even by the most rigid system of segregation. It has continued to spread until now it threatens the ultimate extinction of the Hawaiian race.

Can any one doubt that if the disease had been promptly dealt with upon its first appearance, every leper removed or isolated from contact with the healthy, it might have been easily eradicated?

Its development may be aptly compared to a slow conflagration, easily extinguished at first, but which, neglected, gains such force and headway that it becomes uncontrollable and can not be checked until it exhausts the materials upon which it feeds.

Unquestionably, leprosy is slowly gaining ground in this country. The existence of forty-two cases in New Orleans, unearthed by Dr. Blanc, was a revelation and a surprise to the entire profession. It is quite significant that a large proportion of these cases were in natives of Louisiana who had never been outside the State. The report by Dr. Berger (in the "New York Medical Journal" of Jan. 5, 1889) of one hundred cases at Key West, where the existence of the disease was scarcely suspected, is no less significant. A rigid investigation would doubtless disclose numerous cases outside

the several leprous centers I have located, but which, for obvious reasons, are concealed, or their true nature unrecognized.

Do these facts portend the spread of leprosy in this country? The seeds of the disease are sufficiently abundant; the only question is whether the conditions of soil are suitable for their germination. Either we must admit that this danger exists, or we must assume that, owing to the better physical stamina of our people and the improved hygienic conditions under which we live, the soil is sterile and the seed will fail to propagate. We are not justified in the assumption that susceptibility to leprosy is extinguished by civilization, or that its potentiality for mischief is enfeebled or destroyed by improved modes of living. It is to be remembered that the spread of leprosy in the Sandwich Islands has been coincident with an advanced civilization of the natives. The average Hawaiian of to-day is more cleanly in his person, better fed, and better housed than the majority of the tenement-house population in our large cities.

After all, the danger of the spread of leprosy in the United States resolves itself into a question of the contagiousness of the disease. If leprosy is a communicable disease, then it follows that every leper must be regarded as a possible source of danger to every one with whom he may come into intimate contact. The question to be decided is not the fact, but the degree of danger—whether it rises to the magnitude of a serious menace to the public health and demands State legislation for its suppression.

My own personal belief is that the extensive spread of leprosy in this country must be regarded as a possibility, rather than a strong probability. Still, in dealing with a disease with which medical science has shown its utter inability to cope, except by prophylactic measures, it becomes

the manifest duty of the medical profession, in their capacity as guardians of the public health, to enlighten our legislative authorities as to this possible danger, and urge them to adopt measures for the isolation of every leper in our midst, and especially to prevent the immigration from foreign countries of those who bear in their systems the seeds of this frightful malady.