

# PROPAGATION OF LEPROSY

THE article published in THE NEW YORK TIMES issue of Monday, the 23d, on the question of the eradication of leprosy from Hawaii by the gradual extinction of the native race does not give the whole scientific reason why isolation of lepers at Molokai has failed to prevent the spread of the disease. All authorities are agreed that enforced isolation in Hawaii is a complete failure. Moyer says that it did not diminish by segregation; there are just as many now as at the start, fifty years ago. Alvarez, Superintendent of the hospitals for the treatment of lepers in Honolulu, wrote me thus:

"The laws of Hawaii fail to stamp out the disease, [leprosy,] but still they are necessary to keep it in check." He continues:

"We have had strict laws of compulsory segregation for the last thirty years, and the results are anything but encouraging. I believe, however, that leprosy as well as any other contagious disease could be stamped out by strict isolation, but we find it impossible to isolate every leper as soon as the first symptom appears, and we do not know if the disease is also communicated to others during the long period of incubation, when the most searching investigation would fail to reveal it."

Dr. A. Mouritz, formerly in charge at Molokai, wrote me:

"One of the best fields for observing the grasp that leprosy has on mankind and the penalty the human race is paying for its apathy in dealing with the disease can be seen on this island [Molokai] and within twenty-five miles of my home, [Mapulehu.] Year in and year out the lepers at the settlements average between 1,100 and 1,200, chiefly Hawaiians, but within the past year or two the disease is making among the foreigners here (white people) considerable inroads. If you have ever lived here you must have learned that segregation is the proposed policy of the Government in dealing with the disease. Yet for years the law was out of the caprice of the politicians; to-day we are reaping the benefits. Segregation is better carried out to-day, but it is far from thorough."

President Smith of the Hawaiian Board of Health, also wrote me as follows:

"Here in Hawaii we have had much experience with leprosy for thirty years and have sought for, and are still seeking, to find the best means of treating the disease."

Father Conrardi, the Belgian priest who took Father Damien's place with the leper boys at Molokai, where he remained seven years, told me while he stopped with me in New York last year that leprosy was becoming less widespread in Hawaii, not because of the law of segregation, which did not prevent the actual contact between the healthy and leprosy people, but because the Kanakas are dying out as a race. Damien himself became a leper because there was contact between him and the leper. Yet here in New York our Board of Health sees no danger in allowing lepers to leave quarantine and mingle freely with our people.

In the last number of The Pacific Medical Journal, San Francisco, the editor says:

"It would seem that we were in error when we claimed in our last issue that there were not more than 100 lepers in the United States. Dr. Ashmead of New York states there are 400 lepers in Louisiana, only 23 of whom are isolated. The doctor also states there are at least 100 lepers in New York State. Dr. Ashmead knows a bank teller who is a leper and handles money every day. It is estimated there are 500 lepers in Havana Province. It is claimed there are Japanese lepers engaged in catching and canning salmon along the Columbia River. Dr. Ashmead claims that there are also many Philippine lepers in California and Washington.

"Hence there must be some other reason besides imperfect segregation to account for the spread of leprosy in Hawaii, where it is estimated to-day there are 4,000 lepers in all."

I have been occupied for some years with the study of the relation which may exist between fish diet of the Japanese and some other nations and leprosy. I think such a relation would be firmly established if the leper bacillus could be cultivated—say on the gold fish, the most Japanese of all fishes. The carp is eaten alive in Japan, which is a fact of general knowledge, though not the gold carp. The latter is exceedingly susceptible of disease; different kinds of fungi tackle it as soon as a scale gets off. Sometimes without any such cause the fish dies away and the scales appear to be all turned up. No cultivation of the leper bacillus outside of the human body has ever been accomplished. I myself have already removed scales from the gold fish and inoculated the latter with the leper bacillus, but without result; the fish died.

United States Consul Sol Berliner recently made a report to the State Department at Washington on leprosy in the Canary Islands. His opinion was that the disease is endemic among the people of these islands on account of their eating a good deal of fish.

I beg to say that this belief is quite common to many leper countries, and even medical authorities indorse it. Mr. Jonathan Hutchinson, the distinguished dermatologist of London, and myself, also believe that there is an insidious connection between fish and the propagation of leprosy.

Since the middle ages leprosy has progressively declined in Europe, excepting in fish-eating countries. Norway, Spain, Portugal, the Baltic States of Russia, Iceland, the fishing provinces of France have

still leprosy. Leprosy scourges the fish-eating countries of the Orient, Japan and China, where Buddhist law prohibits the killing and eating of animals. In Japan raw living fish are eaten even while the flesh quivers. Mr. Hutchinson believes in the fish alimentation theory of propagation of leprosy. I believe that fish and mosquitos act together as intermediary hosts for the transference of the leper poison; that mosquitos that have bitten lepers become food for fishes which then transmit the germs or spores to man when eaten raw.

Prof. David Starr Jordan, Chief of the United States Fish Commission to Hawaii, promised me he would take some interest in investigating the question, which interests him very much. He put the matter in the hands of Prof. Everman, ichthyologist of the expedition. My brother, Prof. William H. Ashmead, of the United States National Museum, was the entomologist who accompanied these gentlemen to Hawaii last Summer. Prof. Jordan wrote me that he had found while visiting Japan, that many kinds of fish were eaten raw. The gold fish, which he said was found in every stream, might well be an intermediary host, as might several of the fresh-water minnows.

Now, when we consider the enormous reproductive power of fishes, it will be evident how readily leprosy-infected fish might propagate the spores of the disease, even inoculate the fresh-water streams of a whole country. In one lobster there were found 20,000 eggs. Fish produce an incredi-

ble number of eggs. A herring has 30,000, a smelt 30,000, a sole 1,000,000, a roach 1,150,000, a sturgeon 3,000,000, a tench 383,000, a mackerel 546, (their eggs are larger than those of most fish,) a perch 992,000, a flounder 1,357. But of all fish a cod of leprosy-infected Nova Scotia is the most prolific, according to one naturalist 3,686,000 and according to another 9,444,000.

Were 1 per cent. of the eggs of a Columbia River salmon now caught by Japanese lepers, and perhaps already infected with the germ, to result in full-grown fish, and were they and their progeny to increase in the same proportion, they would in sixty years amount in bulk to many times the size of the earth.

On our Columbia River there are to-day several thousand Japanese, some of whom, I learn, are lepers. How easy it will be for those germs, through the fish—if fish and mosquitos propagate leprosy, which we do not know is not the case—to spread through the streams of the Pacific Coast. Bream, perch, and mullet of leprosy Norway transmitted the disease to their young. Fifty female bream produce 3,000,000 young, 100 mullet produce 4,000,000 young. Just think of the rapid spread of the disease that is possible. Of course, in countries where there are no lepers there could be no spread of leprosy through the fish. Until Hawaiian fish became contaminated by Chinese lepers there were no Kanaka lepers.

I have described the feature of this theory of transmission of leprosy and presented it in an article published in medical journals of this country and Europe. The manner in which many cases of leprosy have been spread singularly agrees with the theory which I, with other leprologists, entertain as to the rapid propagation of leprosy. ALBERT S. ASHMEAD, M. D. 350 West Twenty-third Street, New York, Sept. 25, 1901.