

REPRINTED ARTICLES

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THE STORY OF LEPROSY AT NAURU *

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Nauru, or Pleasant Island, is an oval-shaped atoll in the Central Pacific Ocean, about on longitude 167° E., 26 miles south of the equator. The nearest land is Ocean Island, the capital of the Gilbert and Ellice Colony, 160 miles distant. The Solomons lie 600 miles to the southwest, the Carolines 400 to the northeast, and the Gilberts 250 miles east.

The island is about 12 miles in circumference and has a population of about 2,500. One-half of these are native Nauruans, and most of the remainder are indented Chinese laborers. From 1888 to 1914 it was a German possession, but is now mandated to Australia. It has very rich phosphate deposits and is thus self-supporting. The natives are grouped for administrative purposes into fourteen districts. Each is presided over by a chief who plays the rôle of land-owner, receiving both rents for the land and royalties on each ton of phosphate shipped. Nowadays Chinese are the sole recruits for the mining labor.

The conditions are unique for a study of leprosy. The native population is entirely isolated, having no connection with neighboring island groups. The disease was introduced recently, being unknown before 1911. The conditions are favorable for close supervision of every person on the island, and the administration has spared neither effort nor reasonable expense to check and eliminate the disease.

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Introduction of the disease.—There appear to have been three possible sources of the infection. (1) Shortly before 1912 a Caroline Islander came to Nauru, resided for an unknown period, was declared a leper and repatriated. He was in close contact with the first known Nauruan leper, Demau. (2) In 1912 a Gilbertese woman, Etsio, who had formerly lived in Tahiti and then on Ocean Island where she had a son in the leper station, was permitted to land on Nauru though recognized as leprosy on her arrival. She settled in Ewa, close by Demau who was then a young girl, and died in 1914. (3) A Chinese, after eight years' residence on Nauru, was found to be leprosy on repatriation in 1920. Occasional cases occur amongst the Chinese, but the laborers are enclosed in wired locations and any association with the natives is strictly guarded against.

At Nauru, as among the other Pacific Islands, leprosy seems to be associated with indented labor, particularly from China. In the Gilbert and Ellice groups (population about 31,000), there were twenty-eight known cases of leprosy in 1925, five of them at Ocean Island. All but one had worked at Tahiti, the disease appearing 7 to 9 years after their return. Previously it was unknown. In Western Samoa (mandated to New Zealand) amongst a population of 35,000, fifteen cases had been discovered by 1925 and removed to Makogai, Fiji. Thirteen were males and two females. Five were Chinese.

The spread.—By June, 1920, eight years after the arrival of the possible sources of infection enumerated above, four cases of leprosy were under observation. (1) Demau, who had lived in Ewa, near case Etsio, and later moved to Anabar. She frequently visited her friends and relatives. (2) Moses, of Boe, a man who did not visit much. (3) Robek, of Buada, a lad of 15 years. (4) Eideraqui, a woman aged about 40, who spent some time in Menen, then in Yarren, then in Boe.

Four months later an epidemic of influenza of the pneumonic type swept the island, with an incidence of 100 per cent and mortality of 30 per cent. Of the four known lepers Demau alone survived. The epidemic left in its train an even greater morbidity; ill health and debility were everywhere rife, augmented by a definite dietary deficiency. The rapid and acute spread of leprosy has been

attributed to this lowering of resistance. Within four years 30 per cent of the entire native population showed clinical manifestations of infection.

TABLE 1.—Incidence of leprosy at Nauru.

Year *	Patients in isolation	Out-patients at clinic	Total	Releases on parole
1920	4	—	4	—
1921	10	50	60	—
1922	139	103	242	—
1923	151	144	295	—
1924	193	153	346	21
1925	189	176	365	28
1926	167	160	336	35
1927	174	163	337	—
1928	132	86	218	46

* Figures are as of December 31 of each year.

Among the first 34 proved cases 9 were relatives of Demau and 3 of Moses. The most heavily infected districts were those where the four original patients had lived. Apparently all the infection came from them, especially from Demau, who alone survived the influenza epidemic. Practically every native has been exposed, and nearly every family has at least one leper, except in one district, Ijuw, where no case has appeared.

Sex incidence is fairly equal. As for age, in 50 per cent the onset was before the twentieth year, childhood and puberty being the most susceptible period. With respect to the disease, about 90 per cent of the cases are of the maculo-anesthetic variety; the others are equally divided between nodular and mixed. The lesions occur mostly on exposed parts—arms, thighs, chest, and abdomen. The primary lesion generally has a central scar from a previous sore or boil; this suggests but one possibility, local inoculation. Acute onset with fever and rash is rarely observed. Acid-fast bacilli have been absent from the nasal mucus in almost all cases. Mutilations and deformities have rarely appeared.

The conquest.—Early diagnosis is the essential factor. Each month the medical officer inspects the entire native population, called together by the chiefs. The greater part of the body surface is exposed. Any suspicious case undergoes more detailed investigation.

This includes clinical examination, nasal swabbing, smears from nodules, dissection of lesions—if small, total resection—and preparation of paraffin sections, and finally—the most important and accurate procedure—the dissection for, and the staining of sections of subcutaneous nerves entering the lesions.

Definite and infective cases are isolated. The suspicious and non-infective ones attend the out-patient clinic, as do those released on parole. These are kept under supervision, repeated bacteriological tests are made, and they sleep in houses separate from the other natives; the children attend special schools.

The infective cases are segregated in a lazaret, where the advanced are segregated from the milder. A strip of the coast has been isolated; it is about a mile in length, varies in width from 100 to 200 yards, and is well supplied with water and food-bearing trees. Discipline is maintained by two chiefs, assisted by district constables. The hospital staff are lepers; in 1927 they gave 67,000 injections with abscess formation in only ten cases. Intercurrent disease is not very troublesome; deaths are few and mostly from tuberculosis. Children born in the station are removed at birth and do not appear to be infected.

Emphasis is placed on various factors in combating the disease. Personal cleanliness is encouraged and daily baths (sea and shower) are taken. Rain is caught for potable water. Fly-proof latrines are provided. Mass hookworm therapy is provided each half year. Efforts are made to cultivate a community spirit. Visits with friends are permitted, across a 16-foot "no man's land."

In the important matter of diet the ordinary native dietary is encouraged, with a supplementary ration of whole-meal bread, brown rice, biscuits, sugar, cod-liver oil and tinned milk. A natural, open-air life is encouraged, and out-door as well as indoor schools are maintained for the children. There are churches, and a weekly picture-show. Sports competitions are a regular feature and physical training classes have been instituted. Fishing occupies a good deal of the time.

As for specific treatment, the main agents that have been employed are, in summary: (1) Chaulmoogra oil: emulsion orally (to 1924); Heiser's formula intramuscularly (to 1924); crude oil intravenously (1924-6); ethyl esters in Muir's mixture intramuscularly (1924), and moogrol intramuscularly (1924-1926) and intravenously

(1926). (2) Sodium hydnocarpate intravenously (1925). (3) Sodium morrhuate, 3 per cent (1925-6). (4) *Hydnocarpus wightiana* oil, crude (1926-28); ethyl esters, subcutaneously under lesions, and intramuscularly. (5) Trichloroacetic acid, 1:5, painted on lesions. (6) Potassium iodide orally. At times intensive treatment by combinations has been given. All injection methods have been discontinued in favor of the wightiana oil as the most reliable and effective weapon; 4 cc. can be given daily for months.

The natives have little fear of the disease, as the manifestations are mild and not of the repulsive type. Those in segregation lead a natural, happy and normal life under ideal conditions. Their confidence is inspired by the number of friends they see released on parole each year. The administration considers the lowered incidence and the numbers paroled a good omen, and is particularly pleased at the decrease in the children affected each year.