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Investigations made in accordance with
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A REPORT UPON THE TREATMENT OF SIX CASES OF LEPROSY WITH NASTINE (DEYCKE).

By WALTER R. BRINCKERHOFF, S.B., M.D.,
Director Leprosy Investigation Station, Public Health and Marine-Hospital Service,

and

JAMES T. WAYSON, M.D.,
Member of the Board of Health of the Territory of Hawaii, Honolulu, Hawaii.

INTRODUCTION.

The following report details a preliminary trial of the therapeutic value of nastine [a] in the treatment of leprosy. The investigation was undertaken by the United States Leprosy Investigation Station, Public Health and Marine-Hospital Service, in conjunction with the Board of Health of the Territory of Hawaii. A small but representative series of cases of the disease was selected for treatment. It was felt that a more extended trial of the remedy might well wait upon reports from other investigators, as well as upon the results obtaining in these our preliminary studies.

MATERIAL.

CASE 1. (K. 1.)

Part Hawaiian; age, 10 years; male. Type of disease, tubercular. Duration, about two years.

Treatment.—One ampulla of nastine B. 1 once a week from November 21, 1907, to March 27, 1908. One ampulla of nastine B. 1 twice a week from March 28 to May 1, 1908. One ampulla of nastine B. 1 three times a week from May 1 to December 4, 1908. One ampulla of nastine B. 2 three times a week from December 7, 1908, to January 1, 1909. One ampulla of nastine B. 2 twice a week from January 2 to February 18, 1909. One ampulla of nastine B. 1 twice a week from February 19 to March 3, 1909, when nastine medication was discontinued. After February 17, 1909, chaulmoogra oil (one drop three times a day) was given.

[a] Deycke-Pascha and Reschad Bey. A bacterial fat as immunizing substance in leprosy. The Therapist, London, 1907, vol. 17, p. 49. Directions for nastine treatment, distributed by Kalle & Co., Beirich.

General condition at beginning of treatment.—Irregular nodular enlargement of both ears, most marked on the left side. Some infiltration of both cheeks and of forehead; accessible nerve trunks not enlarged or nodular. Trunks and limbs not notable. General infection with scabies. Diagnosis of leprosy confirmed by bacterial examination of tissue excised from left ear.

General condition after nine months' treatment.—Right ear shows extensive nodular formation, particularly around the rim. Left ear shows no nodules along the rim, but the lobule is swollen. Face shows massive infiltration of right cheek and of brow. Infiltration, but less extensive, on left cheek. Infiltrated area is indurated and dusky red, with slight superficial irregularities. Skin is shiny; eyebrows absent; trunk negative. Forearm and hands dusky red, with some furfuracious scaling. Several nodules on left wrist, extensor surface, which are from 0.5 to 2 cm. in extent and elevated 0.5 cm. Skin surface over the nodules is similar to that over the infiltration on the face. Both hands show marked drumstick fingers. Pink and brown macules from 4 to 9 mm. in extent over buttocks and posterior aspect of thighs. Legs and feet show dusky red skin, with fine cracks and slight shininess.

General condition after fifteen months and one week of treatment.—Both ears show extensive infiltration and nodule formation along rim of helix; both ears now equally involved. Infiltration of cheeks somewhat increased since last examination. Right forearm: Nodules increased in size; infiltration of the dorsal aspect of the little and third fingers of the right hand; left hand shows no infiltration. Five nodules on extensor aspect of the left forearm, ranging from one-half to 1 cm. in extent. Generalized scabies infection. Ulceration on the mucous membrane of the cartilaginous septum of the nose on the left side, with atrophy of the cartilage. Aside from scabies the trunk is negative. Macule formation as before. Legs and feet as before.

Summary of case 1.—A case of tubercular leprosy in a part Hawaiian boy of 10 years of age during fifteen months of treatment with nastine showed no amelioration of the disease, but rather a steady increase in the severity and extent of the lesions. No constitutional reaction was observed at any time during the treatment.

Case 2. (K. 2.)

A part Hawaiian; age, 20 years; male. Duration, four years. Type of disease, tubercular.

Treatment.—One ampulla of nastine once a week from April 21 to June 5, 1908. One ampulla of nastine B. 1 twice a week from June 10 to June 29, 1908. One ampulla of nastine B. 1 three times a week from July 3 to August 31, 1908. One and one-half ampulla of nastine B. 1 three times a week from September 2 to December 6, 1908.

One ampulla of nastine B. 2 three times a week from December 7 to December 30, 1908. One ampulla of nastine B. 2 twice a week and two ampullæ of nastine once a week from January 1 to February 10, 1909.

General condition at beginning of treatment.—Dusky flush with infiltration of cheeks; slight swelling of lobules of ears; slight swelling of right forearm, with subjective symptoms of numbness. Irregular loss of eyebrows. Somewhat anemic and complains of general muscular weakness. Diagnosis of leprosy confirmed by bacterial examination of tissue excised from left ear.

General condition after four months and three weeks of treatment.—A diffuse infiltration with secondary nodule formation on left cheek, opposite nares, 5 cm. in diameter; color, dusky red. Slight thickening of lobule of left ear. A diffuse infiltration of right cheek over malar eminence. Left ear shows enlargement of lobule and a nodule near antitragus, and one in lobule near anterior inferior border. Eyebrows reduced to inner one-half, symmetrical and thin. Forehead presents scattered dusky red elevation. Trunk, negative. Moderately well-marked drumstick fingers. Irregular dusky red area, 10 cm. in extent, over left buttock. Some superficial scaling. General physical condition improved.

General condition after ten months and one week of treatment.—Forehead presents irregular elevations, 3 to 5 mm. in extent, elevated 1 to 3 mm. on a generally roughened elevated skin area, involving a triangular area in the center of the forehead above the eyebrows, apex of this triangle coming within 2 cm. of the hair line. Slight dusky reddish color of the skin in this area, but no sharp lines of demarcation. Skin over malar eminences similar to that on forehead. A similar area, 3 cm. in diameter, on a level with the nose on the right cheek, is seated upon an indurated base somewhat larger than the affected skin surface. On the nose the skin is similar to that on the forehead; small secondary nodule on the tip of the nose. Mucous membrane on the cartilaginous portion of the nasal septum thickened and opaque, with adherent hemmorhagic crusts. Right ear shows a sharply circumscribed nodule 1 cm. in diameter. The extremity of the right lobule and the antitragus is the site of a similar infiltration; elsewhere the ear is normal. Left ear shows nodular formation in tragus, antitragus, lobule, and posterior inferior aspect of pinna. Right forearm is slightly swollen, with some ill-defined dusky mottling of the skin. Dorsal aspect of right hand somewhat swollen; index, middle, and third finger show drumstick form. Left forearm shows irregular infiltration of the skin on both flexor and extensor surfaces, with ill-defined nodule formations, approximately 5 mm. in extent, which are shotty in palpation and pink in color. Left hand similar to right. Epitrochlea glands enlarged on both sides;

ulnar nerve enlarged on both sides; trunk not notable. Lower extremities show swelling of feet and ankles, with shiny skin beset with fine cracks and slight furfuracious desquemation.

Summary of case 2.—A case of tubercular leprosy (with slight ulnar nerve involvement) in a part Hawaiian of 20 years of age. During ten months' treatment with nastine showed some improvement in the general physical condition, but a progressive increase in the extent and severity of the lesions of the disease.

CASE 3. (K. 3.)

A part Hawaiian; age, 41 years; male. Duration, according to the patient, eight months, but probably much longer. Type of disease, tubercular.

Treatment.—One ampulla of nastine B. 1 once a week from December 5, 1907, to May 1, 1908. One and a half ampulla of nastine B. 1 twice a week from May 2 to December 4, 1908. One ampulla of nastine B. 2 three times a week from December 7, 1908, to January 1, 1909. One ampulla of nastine B. 2 twice a week and two ampulla of nastine B. 2 once a week from January 2 to February 19, 1909.

General condition at beginning of treatment.—Extensive infiltration on cheeks and ears, slight tendency to nodule formation. Complete loss of eyebrows. Marked thickening of skin of nose. Slight atrophy of right forearm; otherwise physical examination not notable. Diagnosis of leprosy confirmed by demonstrations of bacilli in nasal secretion.

General condition after ten months and two weeks' treatment.—Complete disappearance of eyebrows; both ears enlarged, with pendulous lobules. The rim of the pinna of the ear shows numerous discreet nodules, 5 mm. or more in extent. The diffuse infiltration of the ear has been replaced by this nodule formation. Infiltration of cheeks and forehead less marked, but discreet nodule formation is prominent both on the cheeks and alæ nasi. Occasional nodules similar to those on face found upon back and front of trunk. Upper extremities negative. Lower extremities showed dusky red flush on legs and feet, with slight furfuracious desquemation and some fine cracking of the epidermis. Soles, negative.

General condition after fourteen months of treatment.—General condition similar to that at previous examination. Marked decrease in the areas of induration on the ears and face. Hands present puffiness of the dorsum, with dusky red flush and some flexion of fingers. Open ulcer on right side of cartilaginous portion of nasal septum. Planta pedis ulcer opposite base of third toe on right foot.

At the time when this examination was made the nastine treatment had been discontinued twelve days and the patient had been taking increasing doses of chaulmoogra and eucalyptus oils with strychnine

for four weeks. The improvement noted at this examination had largely taken place after the cessation of the nastine treatment, although we are of the opinion that previous to discontinuing this treatment the disease was showing a tendency to become localized, particularly about the face. The discreet nodule formation was dominating the clinical picture in this region, whereas when the case first came under our observation broad massive infiltrations characterized the picture. We regret that the patient absolutely refused to continue the nastine treatment, although his rapid improvement, which has continued under the chaulmoogra and eucalyptus oil treatment, makes us feel that we would not have been justified in insisting upon a continuation of the nastine medication against the patient's protests. It was noted in this case, and in other of our tubercular lepers, that the nastine caused a subnormal temperature, similar cases not receiving treatment and living under identical conditions in every other way showing a normal temperature.

Summary of case 3.—A case of tubercular leprosy, in a part Hawaiian of 40 years of age, while under treatment with nastine for fifteen months, showed a marked tendency for the lesions of the disease to shift their type from broad, massive infiltrations (in the region of the face) to discreet nodule formations. The impression derived from observing this case was that a slight improvement was going on in the reaction of the individual to the disease. The subsequent history of the case shows that he reacts well to treatment with chaulmoogra and eucalyptus oil with strychnine.

CASE 4. (E. 4).

American; age, 16; male. Duration, according to patient, is eight months, but from the clinical history of the case the duration is probably at least two years. Type of disease, mixed leprosy.

Treatment.—One ampulla of nastine B. 1 once a week from November 21, 1907, to May 1, 1908. One and one-half ampulla of nastine B. 1 twice a week from July 2 to August 4, 1908, when treatment was suspended, as the patient was transferred to the leper settlement of Molokai for disciplinary reasons.

General condition at the beginning of treatment.—Patient presents a nodule 1 cm. in diameter on the rim of the helix of the right ear. The skin over this nodule is unbroken, is smooth, and is traced with a delicate capillary network; second toe on left foot absent (history of amputation for an indolent ulcer one year before); typical planta pedis ulcer on ball of great toe of left foot; physical examination not otherwise notable. Diagnosis of leprosy confirmed by demonstration of bacilli in tissue excised from nodule on ear.

Seven weeks after the beginning of treatment the nodule on the ear was excised by one of us (J. T. W.), the operation wound healing

by first intention. Microscopic examination of the nodule showed a typical picture of a leproma. Examination of the bacilli present showed no evidence that they had lost any of their acid-fast character. Three weeks later the planta pedis ulcer was excised and the exposed bone curetted. Healing took place after slight local reaction.

During July, 1908 (the last month of treatment), the patient showed swelling of the dorsum of the hands and typical drumstick fingers. Superficial indolent ulcers developed on the dorsal aspect of several fingers; otherwise his condition remained unchanged. There was no recurrence at the site of the tubercle on the ear.

Summary of case 4.—A case of mild, mixed leprosy in a 16-year-old American boy showed some increase in severity of the disease during ten months of treatment. The first seven weeks of treatment appeared to have no effect upon the acid-fast character of the bacilli in a leproma.

CASE 5. (K. 6.)

Portuguese; age, 30 years; male. Type of disease, mixed leprosy. Duration, over four years. Patient has been in Japan for hot-bath treatment.

Treatment.—One ampulla of nastine B. 1 once a week from December 26, 1907, to May 1, 1908. Two ampullæ of nastine B. 1 three times a week from May 2 to December 4, 1908. One ampulla of nastine B. 2 three times a week and one ampulla of nastine B. 1 twice a week from January 6 to February 19, 1909.

General condition at beginning of treatment.—Firm nodule, 1 cm. in diameter, in the antitragus of the right ear. Face shows extensive smallpox scars; eyebrows thin and even; slight swelling of both hands and forearms; complains of numbness of same; feet and ankles swollen, with irregular dusky red areas 3 to 4 cm. in extent. Tactile sensation diminished to absent over distribution of both ulnar nerves; both ulnar nerves somewhat thickened, but no nodule formation. Diagnosis confirmed by demonstration of lepra bacilli in tissue excised from nodule of left ear.

General condition after eight months and three weeks' treatment.—Eyebrows as before; ears show no nodule formation; in each ear the antitragus is soft and the two sides are equal and symmetrical; slight flexure of third and little fingers of right hand; sensory conditions as before; the mucous membrane on the cartilaginous portion of the septum is without ulceration, but presents occasional islands of chronic atrophied rhinitis. On the right side of the septum is a depressed scar slightly pigmented, 3 by 8 mm. in extent. The mucous membrane over this area is smooth and glistening. Bacteriological examination of scraping from nasal septum shows no acid-fast bacilli.

General condition after ten months' treatment.—Areas of anesthesia as before; atrophy of interosseous muscles of right hand and thickening of ulnar nerve as before. Aside from these lesions, indicating an antecedent nerve destruction, there are no clinical signs of active leprosy. Lepra bacilli were demonstrated in a small bit of tissue removed from the antitragus of the left ear at the site of the nodule described in the first examination. The bacilli in question showed marked beading, but on comparison with the bacilli in the smear made from the original nodule at the time of the first examination it was found that the beaded appearance of the bacilli was as prominent then as now.

General condition after thirteen months' treatment.—Left eyebrow slightly thinner than right; no areas of induration or nodule formation on the face. Antitragus on both ears prominent, but without nodule formation; no nodules made out in lobules of ears; trunk presents scattered leucodermic areas, not over 1 cm. in extent, on posterior aspect of shoulders. Upper extremities: Right forearm shows slight atrophy of muscles on ulnar aspect; epitrochlea glands not palpable; ulnar nerve approximately 1 cm. in diameter for distance of 6 cm. from elbow joint. Right hand: Skin on dorsum shiny, some atrophy of interosseous muscles; third and little fingers semiflexed; thena eminence slightly atrophied. Left arm: Ulnar nerve slightly enlarged, some atrophy of interosseous muscles of hand; otherwise not notable. Nasal mucous membrane as before. Lower extremities: On posterior external aspect of right thigh is a white cicatrix, said to be the result of a burn, 3 by 5 cm. in extent. The border is faintly hyperpigmented and sharply circumscribed. Similar scar on inner aspect of left thigh. Tactile sensation diminished on and around scars.

Summary of case 5.—A Portuguese, male, 30 years of age, suffering from mixed leprosy, under nastine treatment for thirteen months showed disappearance of a nodule in the ear, but the bacilli persisted unchanged in the tissue at the site of the nodule. Those manifestations of the disease referable to nerve destruction progressed somewhat during the period of treatment.

CASE 6. (K. 7.)

Hawaiian boy; age, 18 years. Type of disease, mixed leprosy. Duration, between one and two years.

Treatment.—One ampulla of nastine B. 1 and one ampulla of nastine B. 2 once a week from December 7, 1908, to January 1, 1909. One ampulla of nastine B. 2 twice a week and one ampulla of nastine B. 1 once a week from January 2 to February 1, 1909. One ampulla of nastine B. 1 once a week from February 2 till March 5, 1909.

General condition at beginning of treatment.—A firm nodule, 3 mm. in diameter, on the rim of the left ear at the junction of the pinna and lobule. Nasal mucous membrane normal. Repeated bacteriological examinations of nasal secretions showed only a single suspicious acid-fast bacillus, which was found in a smear taken after the exhibition of a large dose of potassium iodide. Accessible nerve trunks normal on palpation. Patient complains of numbness of right forearm and hand. Tactile sensation diminished or absent in the distribution of the right ulnar nerve. Over buttocks and posterior aspect of thighs and around ankles are irregular depigmented areas from 1 to 6 cm. in extent. Nodule in left ear excised; smear from same shows large numbers of lepra bacilli. Operation wound healed by first intention.

General condition after three months and three weeks' treatment.—The site of the operation on the left ear shows no evidence of recurrence. On the right ear on a level with the tragus, just inside the rim of the pinna, is a nodule 5 mm. in diameter, elevated 3 mm. above the surface, slightly darker in color than the surrounding skin. Nasal mucous membrane appears normal. Sensory disturbance as before. Depigmented areas on buttocks and lower extremities as before.

General condition after four months and one week's treatment.—Physical examination shows no change in condition of patient. Nodule in right ear excised under cocaine anesthesia. Smears made from cut surface of nodule show large numbers of typical lepra bacilli. A comparison between the smears from this nodule and those taken from the nodule excised before the beginning of treatment shows no variation in the distribution of the acid-fast substance in the bacilli, solid staining forms dominating the picture in both instances.

Summary of case 6.—An incipient case of leprosy presenting a single small tubercle, evidence of ulnar nerve involvement and scars of antecedent macules, after four months and one week of nastine treatment showed the development of a second nodule in the unaffected ear, and no change in the bacilli present. Under these circumstances, and in view of the failure to control the progress of the disease in other cases with nastine, we did not feel justified in continuing the treatment of this case with nastine.

GENERAL SUMMARY.

Types of disease treated.—Three cases of tubercular and three cases of tubercuo-anesthetic leprosy.

Age of patients.—The age varied from 10 to 40 years, being 10, 16, 18, 20, 30, and 40 years, respectively.

Sex.—All patients were of the male sex.

Duration of treatment.—The cases were under nastine medication for from four months, three weeks, and five days to one year and three months (case 1, one year and three months; case 2, nine months and three weeks; case 3, one year, two months, and two weeks; case 4, eight months and two weeks; case 5, one year, one month, three weeks, and three days; case 6, four months, three weeks, and five days).

Dosage.—Our experience with dosage can be summed up as follows: Prolonged administration of small doses seemed to have no effect upon the progress of the disease, while an increase in the dose caused muscular pains, which necessitated a reduction of the dose or an abandonment of the treatment before any amelioration of the symptoms of the disease was observed.

In three cases we made comparisons of the condition of the bacilli in the lesions before and after nastine medication and found no change in the distribution of the acid-fast substance.

CONCLUSION.

1. In our hands the administration of nastine to six cases of leprosy gave slightly encouraging results in two cases. In one of these the lesions decreased in extent and took on a focal character. In the other case a tubercle disappeared during the treatment.

2. Four cases seemed unaffected by the treatment, even when persisted in for over a year.

3. Constitutional reactions were only seen when the dosage was large. No local reaction or puriform softening of tubercles was observed.[a]

We wish to express our indebtedness to Dr. J. T. McDonald, territorial bacteriologist, for excerpts from his records.

[a] At one time we were inclined to attribute the failure of constitutional and other reactions to an inactivation of the preparation resultant upon adverse conditions in transit to us from the makers, but a box of six doses of nastine B. 1 returned by us to Kalle & Co. was reported by them to be active.

LEPROSY IN THE UNITED STATES OF AMERICA IN 1909.

By Walter R. Brinckerhoff, S. B., M. D.,
Director Leprosy Investigation Station, Public Health and Marine-Hospital Service.

INTRODUCTION.

This report will detail the present occurrence and distribution of leprosy in the United States of America and its dependencies and the means employed for the control of the disease since the First International Lepra Conference held in Berlin in 1897.

THE OCCURRENCE AND GEOGRAPHICAL DISTRIBUTION OF LEPROSY IN THE UNITED STATES.

STATES AND TERRITORIES.

This section is based upon answers received from a circular letter of inquiry addressed to the secretaries of the boards of health of each State, Territory, and in certain instances large municipalities in the United States.[a]

Twenty-nine States report no officially recognized cases of leprosy, and these will be omitted from our tabulation. The occurrence of the disease in the remaining States and Territories can be best expressed by a table, as follows:

Table I.—*Occurrence of leprosy in States, Territories, and dependencies of the United States of America in 1909.*

State or Territory.	Cases of leprosy.
States:	
Louisiana	50
Florida	20
California	20
Minnesota	16
Texas	12
Massachusetts	8
New York (city only)	4
South Carolina	3
Washington (State)	1
Wisconsin	1
New Jersey	1
Missouri	1
District of Columbia	1
Virginia	1
Total	139

[a] No answer was received from the following States: Wyoming, Arkansas, and Alabama, but as it was not deemed probable that there were many cases of leprosy in these States, with the possible exception of the last named, which is near the Gulf coast foci, it is felt that the absence of data from these regions will not seriously affect the conclusions to be drawn from the compilation of the occurrence of the disease.

TABLE I.—*Occurrence of leprosy in States, Territories, and dependencies of the United States of America in 1909*—Continued.

State or Territory.	Cases of leprosy.
Territories:	
Hawaii	764
Alaska	0
Porto Rico (1903)	17
Total	781
Dependencies:	
Philippine Islands	2,330
Guam	.....
Canal Zone (1906)	7
Total (a)	2,337

a It must be remembered that these are "officially recognized cases." It is probable that, save where a systematic attempt is made to discover all cases of the disease, one may safely reckon upon at least one case at large for each officially recognized case. In 1901 the leprosy commission found 278 cases in the continental United States and considered that this figure was too small. The report of 1901 was compiled from data gathered after a most voluminous correspondence with all officials and private practitioners who it was thought might be able to furnish information as to the occurrence of the disease. It is therefore not to be thought that because the present compilation shows about half as many cases as the report of the 1901 leprosy commission that the disease is decreasing.

In the analysis of this table we will consider the occurrence of the disease in the natural geographical divisions of the United States. We see that in the continental portion of the United States (excluding Alaska) leprosy is known to exist in 14 States. (The District of Columbia and the city of New York are treated as States in this respect. In the case of the city of New York, in the absence of definite data from the State, we have to regard the conditions in the principal city of the State as typical for the whole State.) The number of recorded cases varies from 50 in Louisiana to 1 each in Washington, New Jersey, Virginia, Missouri, and the District of Columbia. The total number of cases, 139, is trivial in relation to a total population of over 76,000,000 in the area under consideration.[a] Even in the State having the largest number of lepers, Louisiana, there are only 50 officially recognized cases of the disease in a population of over 1,300,000. This would be represented by 3.84 lepers per 100,000 of the population. If it were not for the popular dread of leprosy these figures would be of little significance, but when we consider the penalty imposed upon those unfortunate enough to contract the disease we must regard even this relatively small number of cases as a grave condition, justifying the most serious effort to limit the spread of the disease.

When we turn to the regional distribution of the disease we can distinguish four fairly defined zones of infection. (See map, Appendix I.) These zones can be conveniently designated as, first, the Atlantic seaboard zone; second, the Gulf coast zone; third, the Pacific coast zone; and, fourth, the north central zone.

a All population statistics are based upon the census of 1900.

The Atlantic seaboard zone.—This includes Massachusetts (8 cases), New York (4 cases), New Jersey (1 case), Virginia (1 case), and South Carolina (3 cases). The leprosy commission of 1901 report Massachusetts 2 cases and New York 7 cases. Owing to the cosmopolitan character of the commercial relations of the Atlantic seaboard, it is not necessary to assume that the cases in this zone constitute one or more endemic foci of the disease. It is more reasonable to assume that the occurrence of these cases of leprosy in the main is dependent upon the commercial relations of the region with and immigration from leprous countries.

Gulf coast zone.—This includes Florida (20 cases), Louisiana (50 cases), and Texas (12 cases). It is hard to understand why a considerable number of cases of the disease should be present in Florida and not in the adjoining State of Alabama. It is also to be noted that leprosy is prevalent in Louisiana and has been for years; yet the adjacent State of Mississippi reports no cases. In view of the homogeneity of the population of these Gulf States—Texas, Louisiana, Mississippi, Alabama, Georgia, and Florida—and the relative prevalence of the disease in three of them, we feel justified in treating this group of States as a single zone in considering the epidemiology of the disease. The leprosy commission report of 1901 assigned 3 cases to Texas, 155 to Louisiana, 5 to Mississippi, 1 to Alabama, 1 to Georgia, and 24 to Florida. In view of the fact that Louisiana, Texas, and Florida are endemic foci of the disease, this zone is to be regarded as an endemic area.

Pacific coast zone.—On the Pacific coast we have a repetition of the conditions on the Atlantic seaboard, and can group together the single case in Washington and the 20 cases in California. The leprosy commission of 1901 list 1 case in Oregon and 24 in California. As these communities are in direct commercial relationship with the Orient, it seems most reasonable to regard this as a zone in which the disease is due to commercial intercourse with and immigration from leprous countries, and not as a well-established endemic focus of the disease. Nevertheless, it must be clearly recognized that such a zone may gradually become an endemic focus of leprosy if no means are taken to limit the spread of the disease. This applies with equal force to the Atlantic seaboard zone.

North central zone.—This centers about the focus of the disease in Minnesota, which was at first, inasmuch as it was due to emigration from a leprous country, to be classed with the commercial zones, but must now, as a few cases have developed in the native born, be classed as an endemic focus. The Leprosy Commission of 1901 found 20 cases in Minnesota, 3 cases in Wisconsin, 16 cases in North Dakota (no cases reported in 1909), and 1 case in Iowa.

In the remaining territory of the continental portion of the United States the occurrence of sporadic cases of leprosy can be said to have but little public health significance.

If this classification be accepted we have one zone along the Gulf coast in which the disease is active in at least three foci; two zones on the Atlantic and the Pacific coasts, respectively, in which a variable number of sporadic and imported cases are always to be expected, with occasional secondary cases, and a focus in the north central portion of the country in which the disease appears to be under control and is dying out.

EXTRA-CONTINENTAL TERRITORIES.

Territory of Hawaii.—Since the middle of the last century Hawaii has been a well-defined endemic focus of leprosy and has given origin to occasional cases of the disease which appear from time to time in various mainland communities; for example, in Massachusetts, Utah, and California. The number of cases of leprosy in these islands is not great in proportion to the total population, but as the disease is almost wholly confined to the native race such a proposition is not significant. When the number of native lepers is compared with the total of the native population it is found that the race is heavily inflicted with the disease. At the present time there are 764 officially recognized cases of leprosy in the Territory among a native population of 37,000 (estimated from the census of 1900).

Alaska.—There is no territorial board of health in Alaska. The circular letter of inquiry as to the prevalence of leprosy in that region was answered by Dr. C. C. Grieve, United States naval hospital, Sitka. He reports no cases of leprosy in the Territory.

Porto Rico.—In 1901 there were estimated to be 60 lepers in the Territory, of whom 17 were segregated.[a]

DEPENDENCIES OF THE UNITED STATES.

Philippine Islands.—Leprosy has existed for many years in the archipelago, and it is to be regarded as an endemic focus of the disease. The number of officially recognized cases of leprosy is probably more accurate than is usually the case, for it was determined in the course of a carefully planned and conducted campaign for the control of the disease by segregation. The presence of 2,330 lepers in a population of over 6,000,000 shows a problem worthy the careful attention which is being devoted to the situation.

Guam.—Have no data on occurrence of leprosy in Guam.

Panama Canal Zone.—Dyer[b] found 7 cases of lepra segregated

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[a] Leprosy in Porto Rico. First report Governor Allen, Washington, D. C., p. 52. Lepra, vol. 3, p. 238.

[b] Dyer, I., Panama leper colony. Lepra, vol. 6, p. 26.

in 1906. These were indigent cases. Lepers who were able to care for themselves were not restrained, therefore the number of cases in the community must be greater than this.

CONTROL OF LEPROSY IN THE UNITED STATES OF AMERICA.

The form of government in the United States places the responsibility for the domestic control of communicable diseases largely in the hands of the local authorities. For this reason we will first detail the policy of the various constituent States, Territories, and dependencies, and then consider the activities of the Federal Government in relation to the leprosy problem.

STATES.

The great majority of the States and Territories in the continental portion of the United States (exclusive of Alaska) requires reporting and segregation of cases of leprosy, and class the disease as dangerous and communicable. For our purposes interest centers rather about those communities where the policy of reporting and segregation does not prevail. An analysis of the replies to a circular letter shows that in Minnesota reporting of cases, with self-isolation in the home, is required. In New York City and in the State of Virginia reporting of cases is required, but no isolation or segregation is practiced. South Carolina, North Carolina, South Dakota, New York State, and Missouri have no settled policy with regard to the disease. Tennessee, Utah, Nebraska, Illinois, Michigan, Ohio, and Georgia made answer that no official action was on record, owing to the absence of cases of the disease. Wyoming, Arkansas, and Alabama made no reply to inquiries sent out, and so their attitude can not be stated.

The most striking thing about this compilation is that in the largest city in the United States, a community most exposed to imported cases, with a congestion of population which would furnish good opportunities for transmission, segregation is not practiced. In Massachusetts, on the other hand, a leper hospital has recently been provided by the State, and segregation is vigorously enforced.

EXTRA-CONTINENTAL TERRITORIES.

Hawaii.—Segregation for the control of leprosy has been practiced in the Territory of Hawaii for over forty years. Administrative difficulties have prevented the policy from yielding the best results, but a new and admirable law has just been passed, and it is hoped that the disease will be brought under control within a reasonable time. (For text of the law, see Appendix II.)

Alaska.—As the disease is not prominent in the Territory, there are no special leper laws.

Porto Rico.—The policy of segregation is pursued and a leprosarium is provided on an island at the entrance of the harbor of San Juan.

DEPENDENCIES.

Philippine Islands.—The control of leprosy by segregation is being carried out in a most thorough manner in the Philippines by Passed Asst. Surg. Victor C. Heiser, of the Public Health and Marine-Hospital Service, who is director of public health under the civil commission of the Philippine Islands. The law, which is admirably adjusted to the local conditions, gives the necessary authority for a vigorous policy. (For the text of the law, see Appendix III.)

Guam.—The administration of the islands is under the United States Navy, and the policy of segregation is being pursued, being carried out by the officers of the navy medical service.

Panama Canal Zone.—Dyer found segregation of indigent lepers practiced in 1906.

FEDERAL GOVERNMENT.

The point of contact between the Federal Government and the leprosy problem is through the Public Health and Marine-Hospital Service. The work of this service brings it in relation to leprosy in the conduct of maritime quarantine. Leprosy is classed as a quarantinable disease, and the officers in charge of enforcing the law are always alert to discover cases of the disease on shipboard. (See Appendix IV.) Officers of the Public Health and Marine-Hospital Service, detailed for the medical inspection of immigrants also, have frequently come in contact with the disease among immigrants.

Congress has charged the Public Health and Marine-Hospital Service with the conduct of a leprosy-investigation station, which is situated in the leper settlement in the Territory of Hawaii. This station is required to conduct investigations into the cause, the transmission, and the treatment of leprosy. Suitable buildings have been erected upon a federal reservation in the leper settlement, and have been equipped for the scientific study of leprosy. A 15-bed hospital will furnish cases for investigation. In addition to this work, the officers of the station carry on investigations of incipient cases of the disease in conjunction with the territorial authorities at the territorial receiving station, where those suspected of leprosy are detained for official diagnosis. Pending the completion of the station in the leper settlement, investigations have been in progress in a temporary laboratory at the territorial receiving station, and bulletins detailing the results of those studies have been published.

In 1901 a commission composed of officers of the Public Health and Marine-Hospital Service, under the direction of the Surgeon-General, and by direction of Congress, prepared an exhaustive report upon the origin and prevalence of leprosy in the United States. This report was submitted to Congress and published as Senate Document No. 269.

The Surgeon-General of the Public Health and Marine-Hospital Service has also recommended the establishment of a national leprous hospital, but as yet legislation to this end has not been completed by Congress.

SUMMARY.

The Government of the United States, through its various medical bureaus, particularly the Public Health and Marine-Hospital Service, has been active in the study and control of leprosy in the United States.

In various dependencies of the United States the medical officers of the National Government are dealing with the leprosy problem; for example, the Navy Department on the island of Guam.

The local authorities show, with few exceptions, a willingness to deal sanely with the question of the control of leprosy.

The United States of America can report the following definite steps taken looking to the control of leprosy since the First Lepra Conference, in 1897:

First. The preparation of an exhaustive report upon the origin and prevalence of leprosy in the United States by the Public Health and Marine-Hospital Service.

Second. The establishment, by act of Congress, of a scientific institution for the investigation of the cause, transmission, and treatment of the disease, conducted by the Public Health and Marine-Hospital Service of the United States.

Third. The establishment of a leprosy hospital and enforcement of segregation by the State of Massachusetts.

Fourth. The enactment of an adequate leper law in Hawaii and in the Philippine Islands, the latter being enforced by an officer of the Public Health and Marine-Hospital Service, acting as director of health for the civil commission.

Fifth. The formulation of tentative legislation for the establishment of a national leprous hospital under the charge of the Public Health and Marine-Hospital Service.

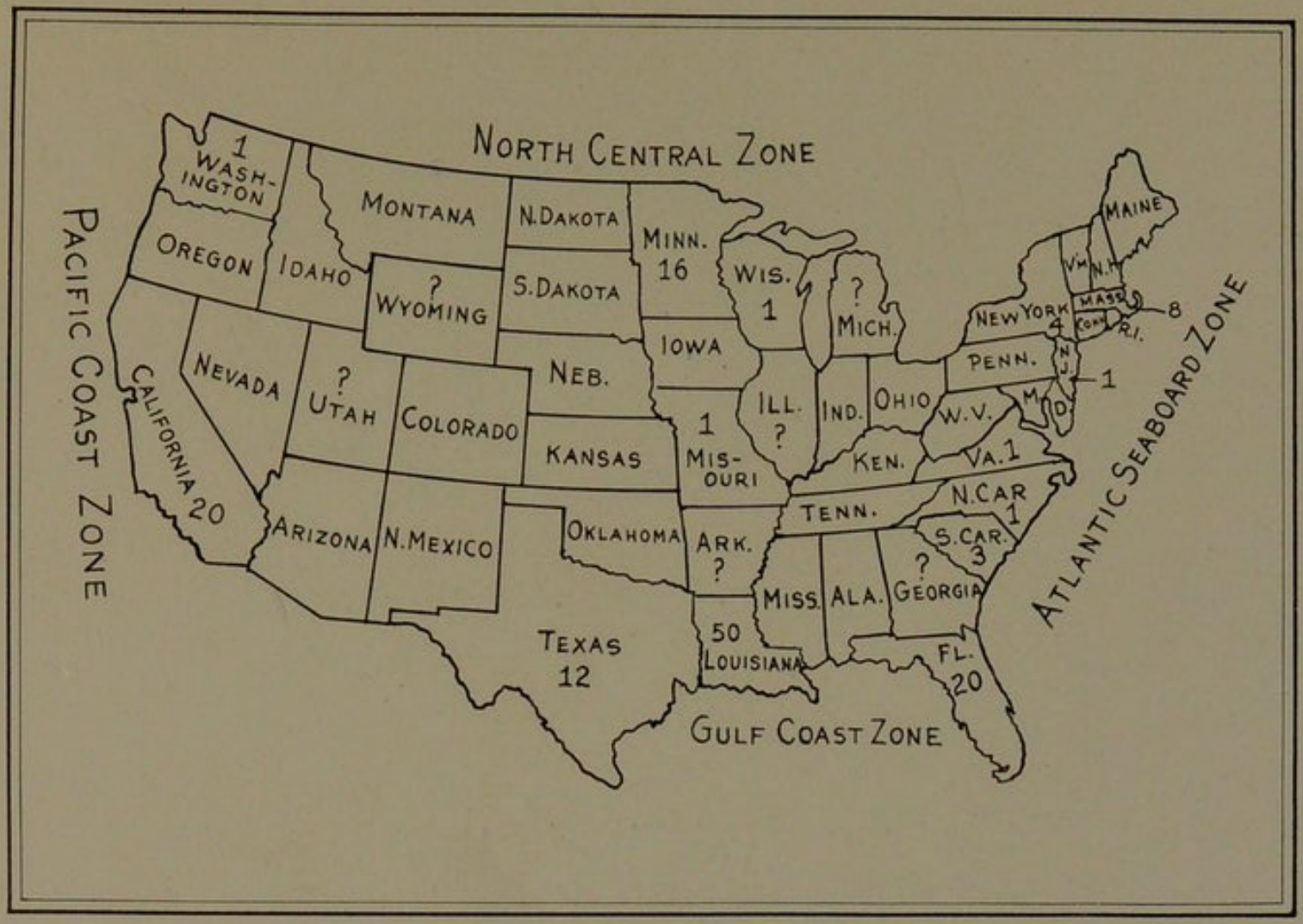
Appendix I.

EXPLANATION OF MAP.

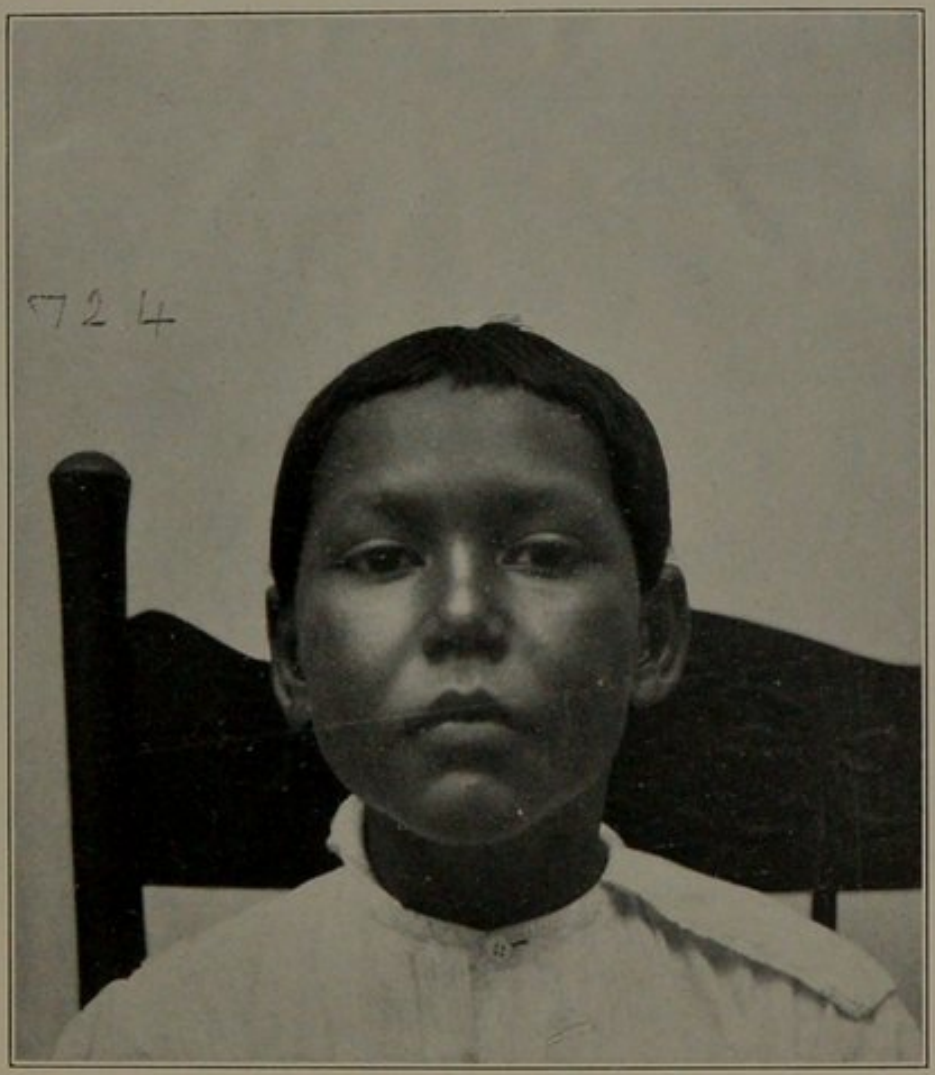
Numeral indicates number of officially recognized cases of leprosy in State or Territory.

Interrogation mark indicates that no answer was received to circular letter of inquiry.

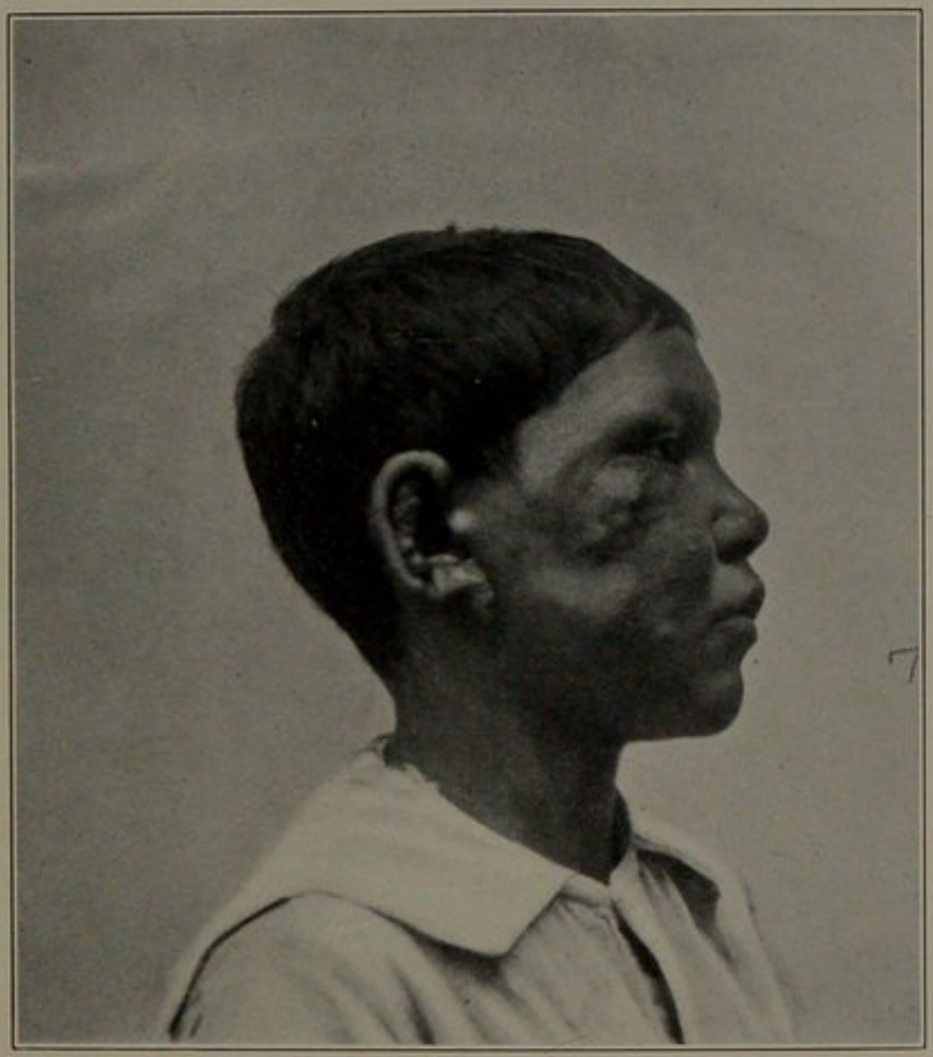
No numeral or interrogation mark indicates that there are no officially recognized cases of leprosy in the State or Territory.



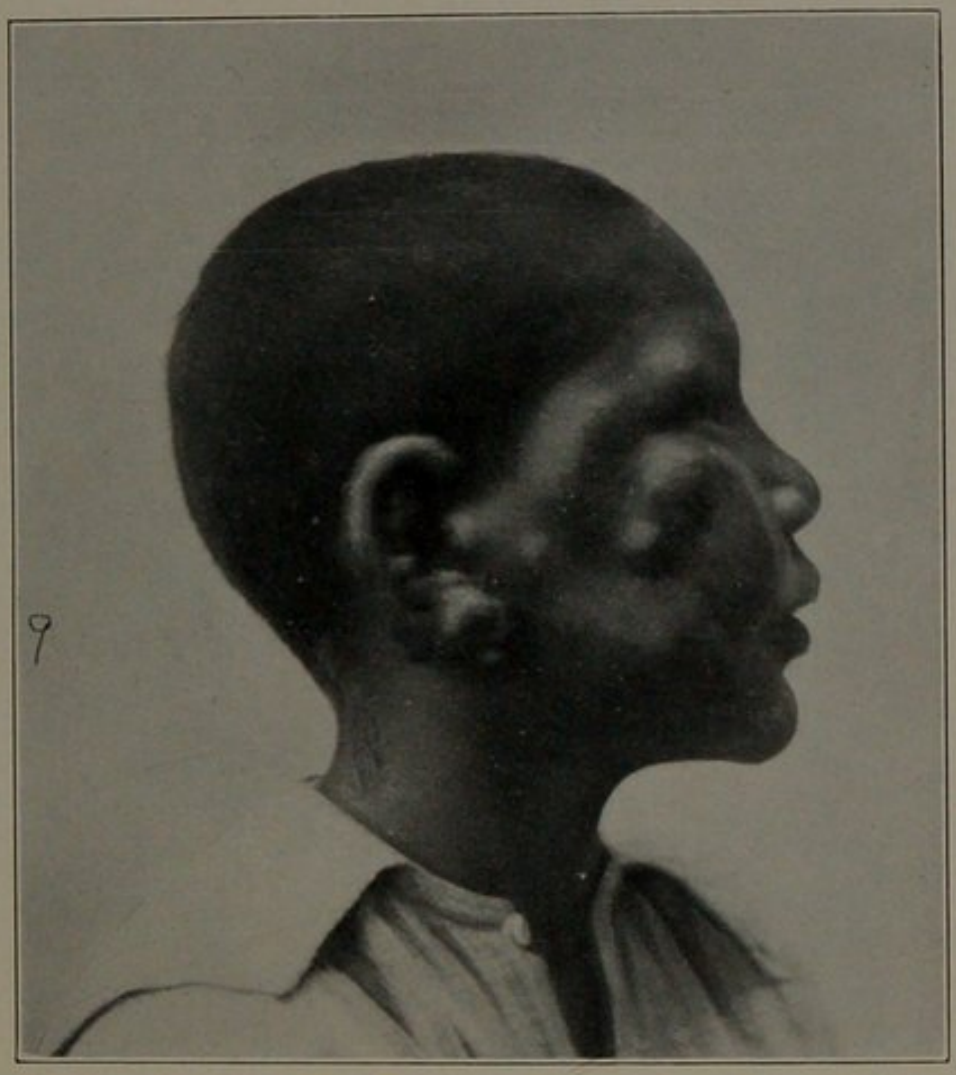
LEPROSY IN THE UNITED STATES IN 1909.



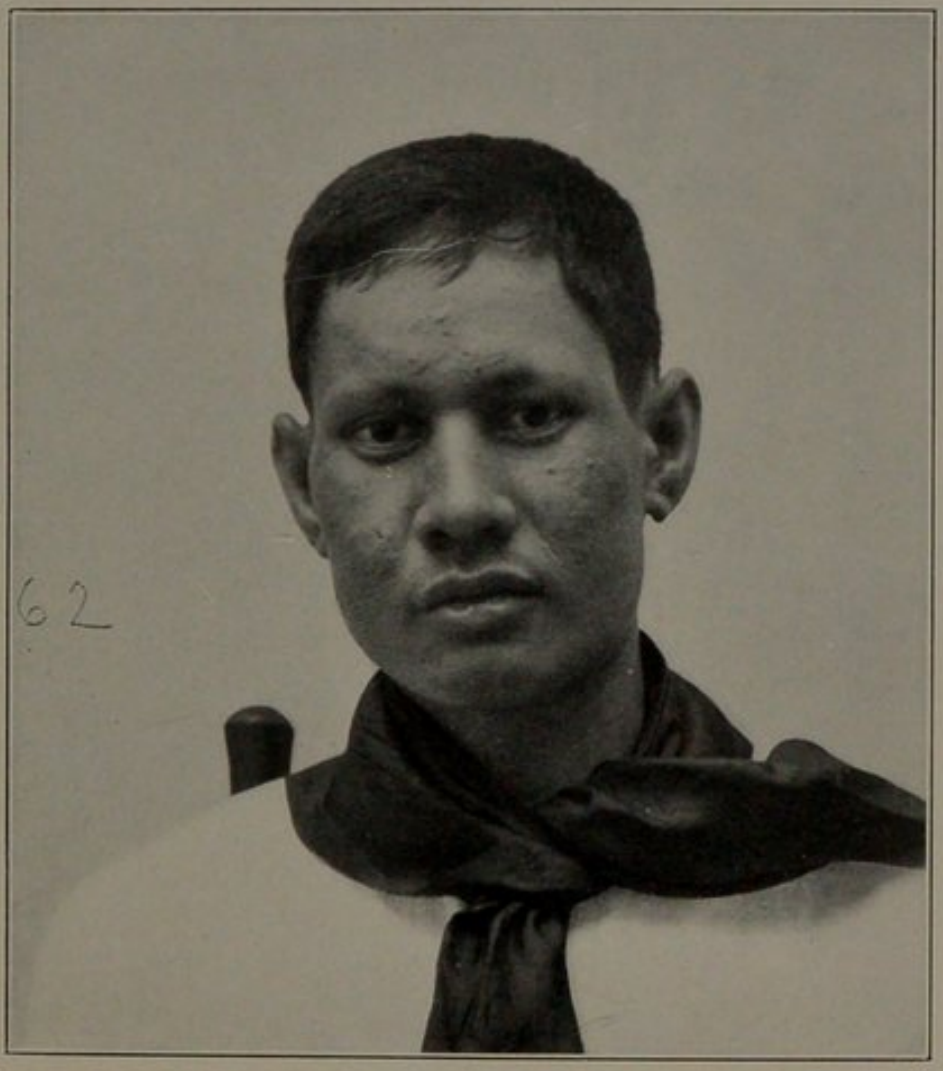
CASE 1.—TUBERCULAR LEPROSY. BEFORE TREATMENT.



CASE 1.—TUBERCULAR LEPROSY. AFTER NINE MONTHS' TREATMENT WITH NASTINE. NOTE TUBERCLE FORMATION ON EAR AND MASSIVE INFILTRATION OF CHEEK.

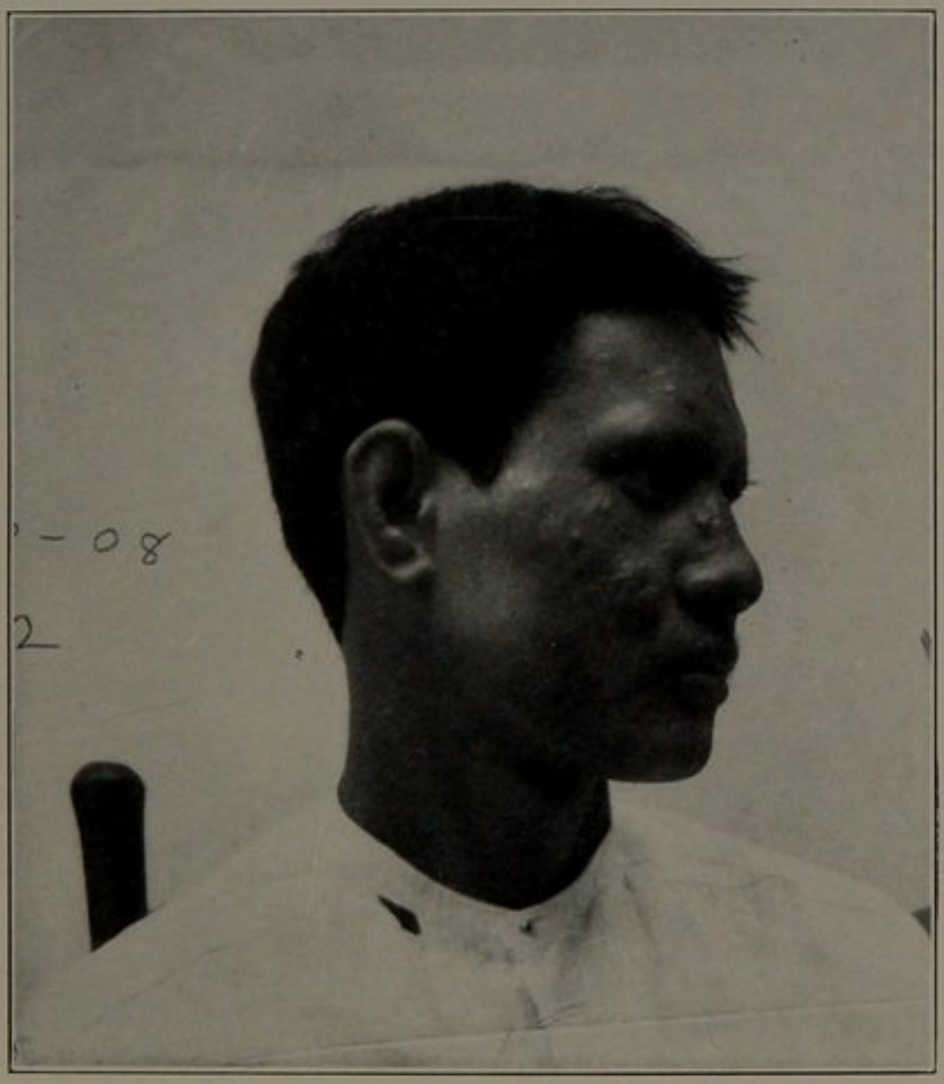


CASE 1.—TUBERCULAR LEPROSY. AFTER FIFTEEN MONTHS AND ONE WEEK OF NASTINE TREATMENT. NOTE EXTENSION OF TUBERCLE FORMATION ON EAR AND PROMINENCE OF LESIONS ON CHEEK AND BROW.

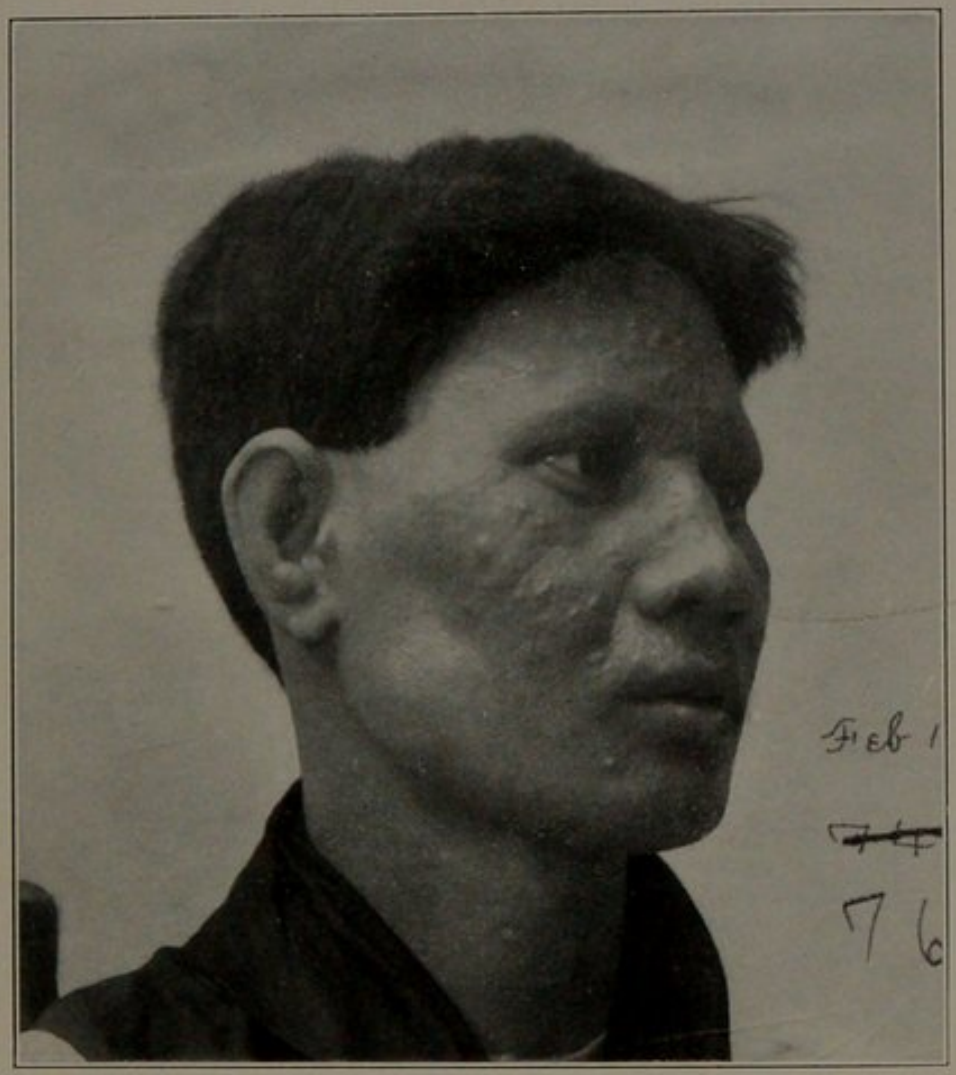


CASE 2.—TUBERCULAR LEPROSY. BEFORE TREATMENT WITH NASTINE.

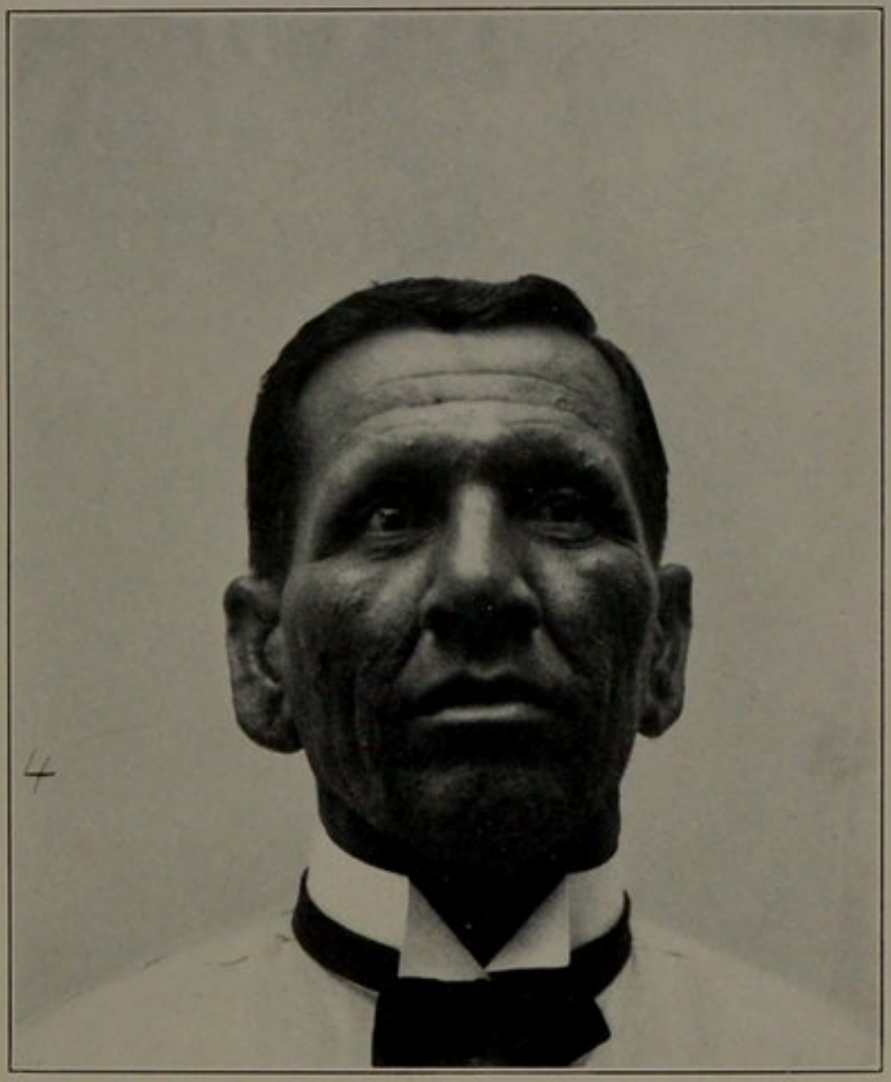
CASE 2.—TUBERCULAR LEPROSY. AFTER FOUR MONTHS AND THREE WEEKS OF TREATMENT WITH NASTINE. NOTE TUBERCLE FORMATION ON CHEEKS AND BROW.



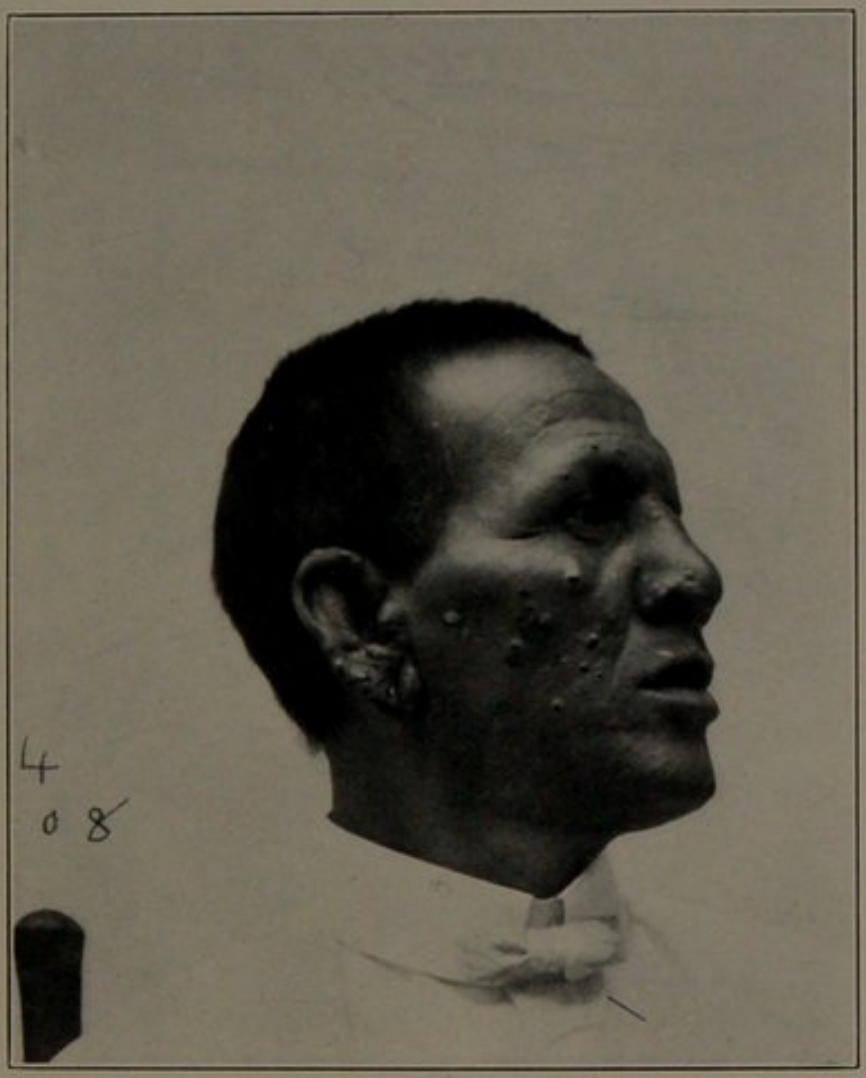
CASE 2.—TUBERCULAR LEPROSY. AFTER FOUR MONTHS AND THREE WEEKS' TREATMENT WITH NASTINE. NOTE TUBERCLE FORMATION ON BROW, CHEEK, AND NOSE. THE BEGINNING OF INVOLVEMENT OF THE EAR IS SHOWN.



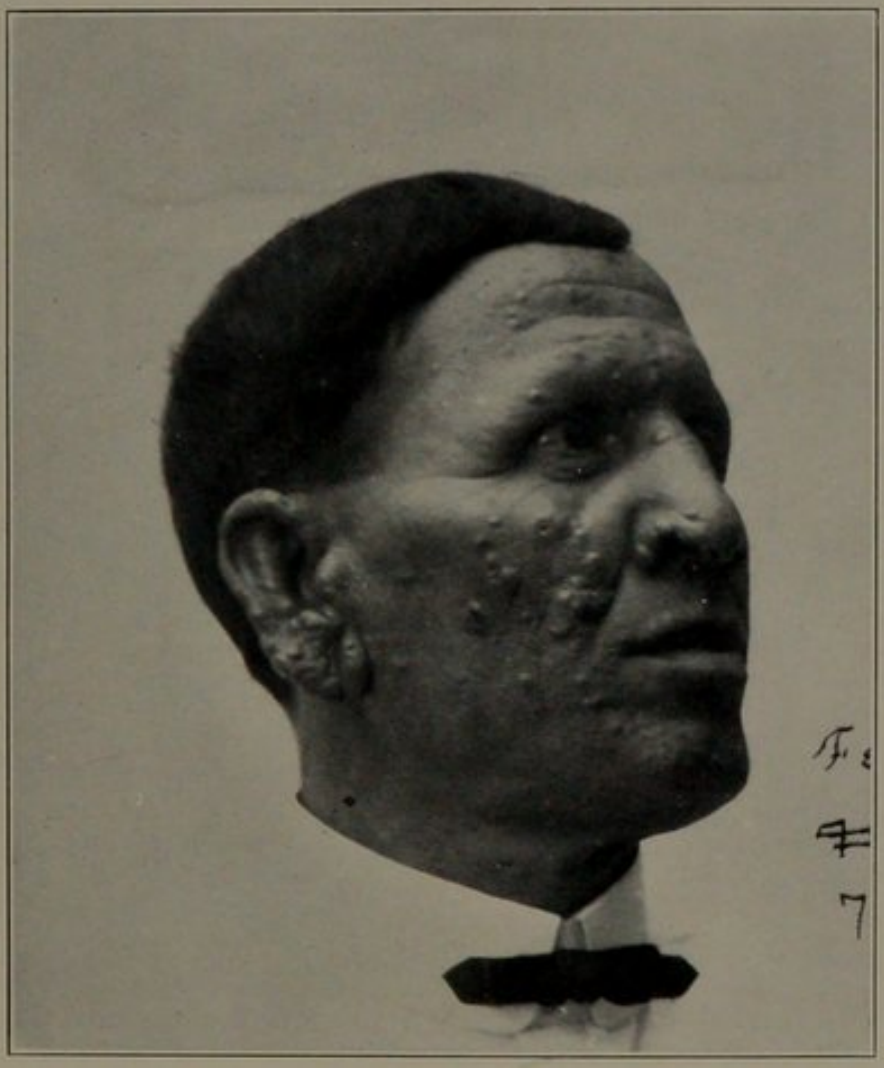
CASE 2.—TUBERCULAR LEPROSY. AFTER TEN MONTHS AND ONE WEEK OF TREATMENT WITH NASTINE. NOTE INCREASE OF EXTENT OF LESIONS ON FACE SINCE PREVIOUS PHOTOGRAPH. (Cf. PLATE V AND VI.)



CASE 3.—TUBERCULAR LEPROSY. BEFORE TREATMENT WAS BEGUN. NOTE DIFFUSE INFILTRATION OF RIGHT EAR AND CHEEKS.



CASE 3.—TUBERCULAR LEPROSY. AFTER TEN MONTHS AND TWO WEEKS' TREATMENT WITH NASTINE. NOTE THE DECREASE IN THE INFILTRATION OF THE EAR AND CHEEK DISCREET TUBERCLE FORMATION DOMINATES THE PICTURE.



CASE 3.—TUBERCULAR LEPROSY. AFTER FOURTEEN MONTHS' TREATMENT WITH NASTINE. MANY SMALL TUBERCLES ON FACE AND EARS, BUT LESS MASSIVE INFILTRATIONS. CASE SHOWED SOME IMPROVEMENT.

APPENDIX II.

LEPER LAW, TERRITORY OF HAWAII.

[ACT 81.]

AN ACT Providing for the care and medical treatment of persons afflicted with leprosy.

Be it enacted by the legislature of the Territory of Hawaii:

SECTION 1. *Hospital.*—There shall be established at and on such place on the island of Oahu, Territory of Hawaii, as the governor shall direct, a hospital for the care of persons afflicted with leprosy, there to receive such treatment as shall be provided or approved by the board of health.

SEC. 2. *Treatment at hospital.*—At such hospital every reasonable effort shall be made to effect a cure of the patients, and such patients shall be cared for as well as circumstances will permit and given such liberties as may be deemed compatible with public safety. They shall be treated by such licensed physician or physicians as the board shall designate, but if any patient so prefers he may be treated at his own expense by a licensed physician of his own selection under such conditions as the board may prescribe. Any person may, at any time, secure free of charge at such hospital an examination for the purpose of determining whether or not he is a leper, and in case he is found not to be a leper the board shall upon request furnish him with a certificate setting forth such fact, the date of examination, and the name or names of the physician or physicians making such examination.

SEC. 3. *Notification.*—Every person who knows, or has reason to believe, that he or any other person, not already under the care or control of the board of health, is a leper, shall forthwith report to the board or its authorized agent that fact and such other information relating thereto as he may have and the board may require.

SEC. 4. *Examination.*—Any person so reported, or otherwise believed to be a leper, may be examined at any time and place and by any physician or physicians that may be agreed upon by him and the board or its agent.

The board or its agent may, however, instead request such person to appear at a designated time and place not less than five days thereafter and then and there to submit to an examination by a designated physician for the purpose of ascertaining whether such person is a leper.

If, however, such person prefers such examination to be made by more than one physician, he may so notify the board or its agent at any time before the time so designated and may at the same time or within such further time as the board or its agent may allow designate to the board or its agent one licensed physician, in which case the board or its agent shall within five days thereafter designate to such physician a second licensed physician and at the same time so notify such person and such second physician, and the two physicians so designated shall within five days thereafter designate to the board or its agent a third licensed physician, and if they fail to do so such third physician shall be designated by the circuit judge of the circuit in which the examination is to be held and in the case of the first circuit by the first circuit judge; and in case such person shall fail to designate a physician within the time allowed, all three physicians shall be designated by such judge; notice of any such designation

or designations by a judge shall be given forthwith to such person and to the board or its agent; when the three physicians have been so designated, such examination shall be made by them or a majority of them at a convenient time or place designated by the board or its agent, reasonable notice of which shall have been given by the board or its agent to such person and such physicians. The physician or physicians who make the examination shall report to the board or its agent whether in his or their opinion such person is a leper.

If such person is under the age of 16 years, his parent or guardian, if any, may exercise such preference and thereafter represent such person as far as may be for the purposes of this section.

If upon examination such person is found not to be a leper, the board shall furnish him upon request a certificate setting forth such fact, the date of examination, and the name or names of the physician or physicians making the examination.

SEC. 5. *Transfer to hospital.*—If upon examination such person is found by such physicians or a majority of them to be a leper, he may be transferred by the board or its agent to such hospital. If he shall refuse or fail to appear or submit to any such examination at the time and place designated or agreed, he may be arrested and taken to such hospital upon a warrant issued by any circuit judge or district magistrate upon a sworn complaint setting forth the necessary facts and shall there be examined as near as may be as provided in section 4 of this act. All lepers at such hospital shall remain in the custody of the board and its agent until lawfully discharged or removed by its direction or permission.

SEC. 6. *Removal to settlement.*—Any leper may be removed from such hospital or any other place to the leper settlement at any time with his consent; but no leper shall be so removed until he has been at such hospital for at least six months unless, in the opinion of at least three licensed physicians he can not be materially benefited by further treatment there, provided that any leper whose custody it has been necessary to obtain by arrest or who is unwilling to receive such treatment or to submit to such rules and regulations as the board may approve or prescribe may be so removed at any time. When so removed, he shall remain in the custody or control of the board until lawfully discharged.

SEC. 7. *Discharge.*—Any person detained as a leper, whether at the hospital or at the settlement, shall be released whenever the board shall be satisfied in any way that he is not a leper. Upon the request of any such person at any time not less than one year after any previous examination, he shall be examined by three licensed physicians to be chosen in the manner provided in section 4 of this act. A decision by a majority of the examining physicians that he is not a leper shall entitle him to a discharge.

SEC. 8. *Expenses; rules.*—The board shall bear all expenses of travel and other necessary expenses incurred under this act; and may prescribe all rules, regulations, and forms and perform all acts necessary and proper for carrying out its provisions.

SEC. 9. *Penalty.*—Any physician or police or other officer who shall violate the provisions of the third section of this act shall be liable to a penalty of not more than one hundred dollars and in addition thereto to forfeiture of his license to practice, or to removal from office, as the case may be.

SEC. 10. *Repeal.*—Sections 1122 and 1122A of the Revised Laws and act 122 of the laws of 1907 are hereby repealed.

SEC. 11. The sum of $40,000 is hereby appropriated, out of moneys in the treasury received from the general revenues, for a hospital to be erected under this act.

SEC. 12. This act shall take effect upon its approval.

Approved this 14th day of April, A. D. 1909.

WALTER F. FREAR,
Governor of the Territory of Hawaii.

APPENDIX III.

[No. 1711.]

AN ACT Providing for the apprehension, detention, segregation, and treatment of lepers in the Philippine Islands.

By authority of the United States, be it enacted by the Philippine Commission that:

SECTION 1. The director of health and his authorized agents are hereby empowered to cause to be apprehended and detained, isolated, segregated, or confined all leprous persons in the Philippine Islands, and upon application of the director of health it shall be the duty of every insular, provincial, or municipal official having police powers to cause to be arrested and delivered to the director of health, or his agents, any person alleged or believed to be a leper, and it shall be the duty of such officers to assist in the conveyance of any person so arrested to such place as the director of health or his agents may require, in order that such person may be subject to medical inspection, and such other procedure as may be necessary to establish a diagnosis, and thereafter to assist in removing such person to a place for detention, treatment, isolation, or segregation, if so required by the director of health or his agents: *Provided*, That all protests and petitions shall be given careful consideration, and if the diagnosis is questioned, no person shall be permanently removed to Culion leper colony, or other place of segregation or detention, until the diagnosis of leprosy has been confirmed by bacteriological methods. Whenever the detention, treatment, isolation, or segregation of leprous persons shall involve the security of property or money belonging to or held by said leprous persons, the provincial treasurer, or such person as he may designate, shall act as guardian pending the appointment of a guardian by the court of first instance having jurisdiction in the province in which such person resides.

SEC. 2. Whoever shall knowingly detain or harbor on premises subject to his control, or shall in any manner conceal or secrete, or assist in concealing or secreting, any person afflicted with leprosy, with the intent that such person be not discovered or delivered to the director of health or his agents, or who shall support or assist in supporting any leper living in concealment, shall upon conviction be punished as hereinafter provided.

SEC. 3. It shall be the duty of every police officer or other peace officer having reason to believe that any person within his district is afflicted with leprosy to report the fact forthwith to the district health officer of the district in which the case occurs. Any police officer or other peace officer who shall willfully fail to comply with the provisions of this section shall upon conviction be punished as hereinafter provided.

SEC. 4. The director of health is authorized to cause to be established hospitals and detention camps at such places as may be necessary, and where such hospitals and detention camps are established he may order the treatment of leprous patients in the incipient stage in order to attempt a cure, and he may discharge such patients as he shall deem cured or free from leprosy, and send to a place of segregation and isolation all such patients as shall be considered by him incurable or capable of spreading the disease of leprosy. The director of health may permit any duly qualified and reputable physician to engage in the treatment of lepers or any person supposed to have

leprosy: *Provided*, That such treatment shall be under the conditions and regulations prescribed by the director of health. The director of health or his agents may require from patients such reasonable amount of labor as may be recommended by the attending physician, and the director of health may further make and publish such rules and regulations as he may deem advisable for the amelioration of the condition of lepers.

SEC. 5. Voluntary helpers or friends living with lepers segregated under orders by the director of health or his agents shall be under the control of the director of health for a reasonable time and may be isolated from those free from the disease.

SEC. 6. Any person violating any section or part thereof of this act shall upon conviction be punished by a fine not to exceed two hundred pesos, or imprisonment for not to exceed six months, or both, in the discretion of the court.

SEC. 7. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An act prescribing the order of procedure by the commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

SEC. 8. This act shall take effect on its passage.

Enacted, September 12, 1907.

APPENDIX IV.

QUARANTINE LAWS AND REGULATIONS OF THE UNITED STATES WITH REGARD TO LEPROSY.

122. Vessels arriving at quarantine with leprosy on board shall not be granted pratique until the leper, with his or her baggage, has been removed from the vessel to the quarantine station.

123. No alien leper shall be landed.

124. If the leper is an alien passenger and the vessel is from a foreign port, action will be taken as provided by the immigration laws and regulations of the United States. And to this end the case shall be certified as a leper and reported to the nearest commissioner of immigration.

125. If the leper is an alien and a member of the crew and the vessel is from a foreign port, said leper shall be detained at the quarantine at the vessel's expense until taken on board by the same vessel when outward bound. Such case of leprosy should be promptly reported to the collector of customs at the port of arrival of the vessel, and the collector shall exact a bond from the vessel for the reshipment of the said alien leper upon the departure of the vessel.