

A LEPROSY SURVEY OF A CONTROL AREA—SANTAN-
DER, CEBU, PHILIPPINES

WITH A VERY LOW PREVALENCE OF LEPROSY

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INTRODUCTION

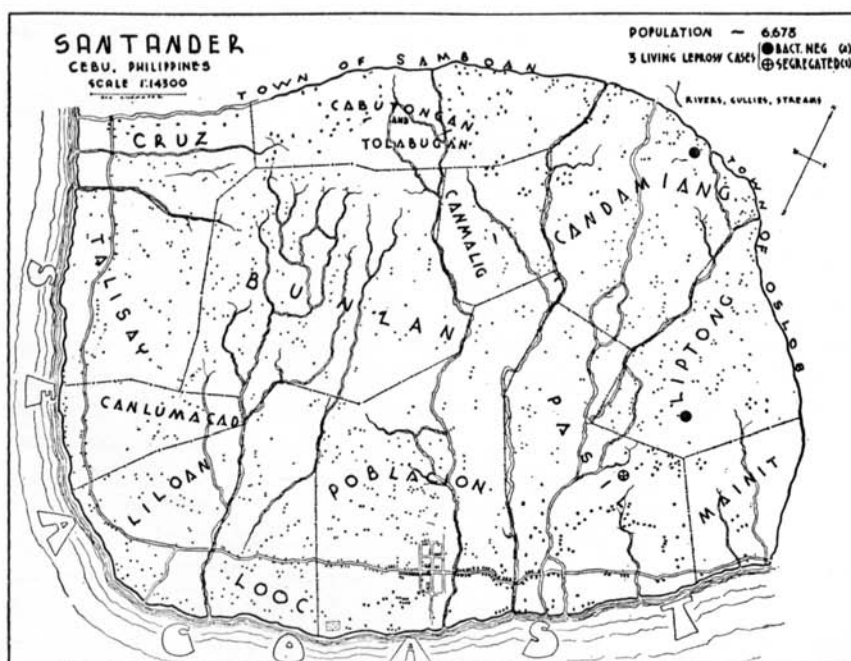
The results of two field studies of leprosy carried out by personnel of the Leonard Wood Memorial in cooperation with the Bureau of Health of the Philippines in the highly infected municipalities of Cordova and Talisay, both located in the province of Cebu, have already been published (1, 2, 3). The present report differs in that it deals with an area in the same province which for many years have been known to be relatively free from the disease. This control investigation was made in order to ascertain if there could be found any local condition, positive or negative, that might explain the marked difference in leprosy incidence between this area and the heavily infected ones previously surveyed.

Several considerations led to the selection of the town of Santander for this purpose. The topography and soil in the low-lying coastal zone are similar to those of Cordova, while at the same time there is a mountainous district somewhat comparable to that of Talisay. Furthermore, the evidently friendly and cooperative attitude of the people gave assurance that the project could be undertaken successfully, for success depends on the willingness of the people to submit to physical examination.

As in Cordova and Talisay, the procedure employed in Santander consisted of three parts, namely: (a) preliminary enumeration of all inhabitants, together with a detailed sanitary and sociological census; (b) physical examination of the entire enumerated population; and (c) an investigation of the known cases of leprosy in the area.

DESCRIPTION OF AREA

Santander is located in the southern tip of the island of Cebu, 132 kilometers from the capital of the province. The area is roughly oval in shape, 7.5 kilometers long and 5.5 wide, comprising approximately 35 square kilometers (Text-fig. 1). It is made up of an outer coastal plain about one kilometer wide, with a shore line 12 kilometers long, and an inner or central



TEXT-FIG. 1. Map of Santander, Cebu, Philippines

mountainous district which comprises two-thirds of the total land area. This latter portion is arranged in a series of gradually ascending plateaus, reaching its highest elevation, 1,557 feet, at the inner, northwestern border near the summit of the central divide. Here Santander borders on the town of Samboan; on the east and north it is contiguous with the town of Oslob. Neither of these municipalities is highly infected with leprosy.

A narrow channel about six kilometers wide, the Tañon strait, separates Santander on the southwest from Dumaguete and other towns on the opposite shore of the neighboring island of Negros. Considerable intercourse by means of sailboats exists between San-

tander and these towns. The channel around Santander is of considerable depth, making it unsuitable for fishing on a commercial scale.

Approximately one-half of the people live in the larger mountainous district. The remainder live along the provincial road which skirts the coast from Oslob on to Samboan.

As in Cordova, the soil is poor and of rocky formation, so that cultivation is possible only in limited areas and only with hand implements. Corn—in insufficient quantities—and coconuts are the only crops grown.

Coconut trees are more numerous than in Cordova and are the chief source of income, although it has been an almost negligible source during the past few years because of poor prices. Many men have been forced to seek work as laborers during the planting and harvesting seasons on the more productive farms and sugar fields of Negros, at meager pay, and the young women find employment as servants in the larger towns. The difficulties of living in Santander have led also to permanent migration of many families to Mindanao during the last ten years or more. The total population, according to the official census, has decreased from 7,587 in 1918 to 6,507 in 1939, though that of the Philippines as a whole has increased greatly.

FREQUENCY OF LEPROSY

The total population of Santander as enumerated in this survey was 6,673. Of this number, 6,581, or 98.6 percent, were examined for leprosy. The great majority of these examinations (6,227, or 94.6 percent) were made at barrio clinics established for the purpose; only 354 persons (5.3 percent), mostly aged and infirm, were examined in their homes. Of the 92 residents who were not examined (1.4 percent of the total), 17 had died after enumeration but before they could be examined, 68 were temporarily absent from the town, and 7 failed to keep their appointments with the examiner. None of those not examined was suspected to be suffering from leprosy.

Only two cases of leprosy had ever been recorded from this town. One of them was in Culion at the time of the study; the other had died there in 1920. During the survey two other cases were discovered, both of them bacteriologically negative, one of them imported. This raised the total number of known living

cases to three, an incidence of 0.45 per 1000 inhabitants. This is strikingly and significantly lower than the rate for Cordova, of 17.6 per 1000, and that for Talisay, of 19.7 per 1000. Only one other person was placed under observation because of suspected leprosy. In Cordova and Talisay there were 37 such cases, of whom at least two have subsequently developed the typical macular form of the disease.

The three living cases were classified as follows: (1) an open one, in segregation, (2) a closed, macular, clinically active one, and (3) a closed, fairly advanced neural one, with trophic lesions.

Since the prevalence of leprosy in Santander is so much lower than in Cordova and in Talisay, a brief description of certain sociological, sanitary and health conditions will be made.

SOCIOLOGICAL DATA

Occupations.—Agriculture and fishing are the major occupations in the three municipalities surveyed, the former predominating in two of them and the latter in the third (Table 1). Considering only male adults over 15 years of age, it was found that in Santander about 65 percent of them are engaged in agriculture. An additional 20 percent are engaged in both agriculture and fishing, but only 4 percent are fishermen exclusively. In Talisay, 56 percent are engaged in agriculture, less than 1 percent in both agriculture and fishing, and 3 percent in fishing alone. In Cordova, on the other hand, only 19 percent are occupied in agriculture (much of it, moreover, being the raising and retting of maguey, not grown in the other two municipalities), 11 percent in both agriculture and fishing, and 39 percent only in fishing.

TABLE 1. *Principal occupations of male adults in the municipalities surveyed (in percentages).*

Occupation	Santander	Talisay	Cordova
Agriculture only.....	65	56	19
Agriculture and fishing.....	20	1	11
Fishing only.....	4	3	39
Business or industry.....	5	34	26
Miscellaneous.....	6	6	5

Very few (5 percent) of the men in Santander are engaged in business or industry. On the other hand, near Cordova there is a large coconut oil refinery and in Talisay a large sugar central.

Furthermore, the proximity of these latter municipalities to the city of Cebu enables many men to work at various pursuits there and yet live at home. Altogether, in Cordova 26 percent of adult males, and in Talisay 34 percent, are engaged in business or industrial pursuits.

These differences in occupation may have no direct bearing on variations in prevalence of leprosy. They show, however, that Santander is more isolated than is indicated by its geographical position, since its occupations involve much less intercourse with the large center of population—the city of Cebu, in which leprosy is highly prevalent—than do those of Cordova and Talisay.

Relative economic status.—It is difficult to obtain data of any exactness on this matter, but it would seem that Santander is, on the whole, the least well-off of the three towns surveyed. The inhabitants of Talisay appear to be definitely the most favorably situated of all, for the soil is fertile and sugar cane is a cash crop. In less prosperous Cordova maguey was formerly a good source of income, but as with coconuts in Santander this has not been the case recently. Nevertheless, the relatively large number of the people who work for wages probably places Cordova on a higher economic level than Santander, although the difference may not be great.

SANITATION

Disposal of excreta.—The proportion of homes in Santander that are without privies is precisely the same as in Cordova, 63 percent. Talisay is the least favorable in this respect, the corresponding figure there being 83 percent.

Water supply.—Santander is unique in that the chief sources of drinking water are some ten natural springs. In Talisay there is a small municipal water system, but for the most part the people are dependent upon shallow surface wells. In Cordova there are several municipal driven wells which furnish drinking water for 70 percent of the inhabitants; most of the remainder use shallow wells, but a few obtain water from a small municipal rain-water cistern.

Crowding in the household.—In all of these surveys the actual floor space of rooms used for sleeping was measured. Allowing a certain unit of space for each adult, and various fractions thereof for children according to age, a theoretical space-requirement was obtained for each family. The ratio of actual to theoretical space is used as an index of crowding.

In Santander, only 28 percent of the houses had an index of less than 5; in Talisay 53 percent fell below this level, and in Cordova 62 percent. Although the inhabitants of Santander are no better off economically than are those of Cordova, and though they are certainly much worse off than are those of Talisay, the practice of building larger houses seems to have prevailed for a long time. This practice does not entail any appreciably greater cash expenditure, merely the desire and more labor, and it has resulted in less overcrowding within the homes.

It was observed in Cordova, and to a great extent in Talisay, that there was a definite tendency for the houses in a barrio or district to be divided into separate small groups called "sitios," each made up of households living together in intimate association and related to each other by ties of blood or marriage. This sort of joint-family life, conspicuous in both of these highly infected municipalities, was much less pronounced in Santander. This may possibly have resulted because of extensive migration of many families to other islands during the last twenty years.

HEALTH CONDITIONS

Skin diseases.—Although no association has been established between the frequency of leprosy and that of any other skin disease, it was noted that scabies, tinea versicolor and tinea circinata were about equally prevalent in all three towns. For some reason, probably greater cleanliness and less overcrowding, impetigo was much less frequent in Santander than in the other areas. Yaws, which is highly prevalent in Cordova, was not detected in Santander; and only two late cases were found in Talisay.

An ichthyotic condition of the skin, particularly of the shins, has been reported in leprosy. A similar dry scaly condition of the skin on the front of the legs of the normal population was much more frequently seen in Cordova (60 percent) and in Talisay (36 percent) than in Santander (14 percent).

Diet and nutrition.—No difference in the diet of the inhabitants could be observed between Santander and either of the two highly infected municipalities. The bulk of the food is carbohydrate, corn—not rice, in this region—being the principal grain consumed. Young leaves of the "kamungay" tree (*Moringa oleifera* Linn.) constitute the only leafy vegetable eaten consistently. Fish, in insufficient quantity, either fresh or salted, is practically

the only source of animal protein, since very little meat is eaten and no milk is taken after weaning.

In spite of obvious deficiencies in the diet, however, no appreciable malnutrition exists in any of the three areas. The state of nutrition of approximately 90 percent of all the people examined in both Cordova and Talisay was considered by the examining physician to be "fair" or "good," and in Santander the rate was virtually the same (87 percent). As in Cordova and Talisay, only a few cases of peripheral neuritis due to beri-beri were discovered, and no cases of scurvy, rickets or pellagra.

THE CASES OF LEPROSY IN SANTANDER

Notes on the known cases of leprosy arising in this municipality follow.

PREVIOUSLY KNOWN CASES

CASE M. B.—The first known case in Santander was in a woman who was born about 1876 in the barrio of Pacil. After marrying in 1897 she moved to a neighboring barrio, Liptong, where her husband still resides. She developed leprosy about 1910 and was admitted to Culion in April, 1916, where she died in 1927. The Culion records and her husband's statement made in 1938 agree as to the approximate date of onset. According to the description of the appearance of the patient supplied by the husband, advanced lepromatous lesions were present on her face and body at time of admission.

It has not been possible to trace the source of infection in this case. All immediate relatives of the patient are dead. Her husband and other surviving informants know of no previous case in her family, and they believe that she was the first one to occur in Santander. Barrio Pacil, however, is near the town of Oslob (population about 11,000) in which 46 cases were registered between 1907 and 1936.

CASE A. D.—The woman M.B. was childless, but in 1906 she took into her home a female infant, eight months of age, who was born in Valencia, a town in Negros Oriental. About three years after the segregation of the foster-mother—that is, in 1919—this child also developed leprosy. She was admitted to the old Carreta leprosarium in Cebu in June, 1920, her age being given as 14 years. In 1939 she was still a patient in Culion.

Efforts have been made to trace the parents of this patient. She was an illegitimate child and was brought to Liptong from Negros by her mother, who almost immediately left her in the care of M.B. and her husband. So far as can be learned the mother, who died about ten years later, showed no obvious signs of leprosy, nor have there been any known cases in her family. The father is unknown.

It seems reasonable to assume that this girl was infected by her foster-mother. If this be accepted, then the first known case of leprosy in Santander transmitted the disease to a nonrelative who was the only child exposed in the household.

NEWLY DISCOVERED CASES

Examination of the enumerated population of Santander disclosed only two new cases of leprosy, both of them "closed" or bacteriologically negative. One of these, however, was a rediscovery, since the individual had been previously known to the health authorities but was not known to be living in this town. This result is in marked contrast with the findings in Cordova, where 30 new cases were discovered in a population of approximately the same number, and with those in Talisay, with 65 newly discovered cases in nearly twice the number of inhabitants.

CASE E.O.—The previously diagnosed case was in a man born about 1885 in Oslob, who came to Santander already showing advanced neural lesions. This man had left Oslob in 1912, going to Hawaii as a farm laborer. He developed leprosy while there and was confined for several years in a Hawaiian detention hospital before the health authorities sent him back to the Philippines, in 1920. Although he had well-developed trophic lesions on his arrival at Cebu, he was evidently bacteriologically negative since he was allowed to live at home.

This man first came to Santander in 1927, and he was a frequent visitor there for the next three years. From 1930 to 1933 he made his home in Barrio Candamian, at some distance from the area in which the three autochthonous cases arose. There he conducted a barrio school for religious instruction of young children. Since then, except for visits to his sister in Oslob, he has remained in Candamian, making his home with several families and mingling freely with the townspeople.

This individual, with the neural form of the disease, exposed the residents of Candamian for a period of ten years. In his activity as a teacher he was for three years in particularly close contact with a considerable number of the more susceptible element of the population. In spite of these facts no new cases were found in that barrio.

CASE C.B.—The other newly-discovered case was in a girl born in Barrio Liptong in February, 1921. In 1937 she developed a small anesthetic macule on one arm. When seen a year later this lesion was apparently active, and it was stated to have increased in size. Her father is said to have died of tuberculosis. Her mother and two brothers, with whom she had lived since birth, were examined and found healthy.

This child was born seven months after the more recent of the two known cases of open leprosy in the town (A.D.) was segregated, and no history of contact with the neural case (E.O.) could be established. Her mother stated that the patient never left Santander until she was 13 years old, when she made the first of many visits to Dumaguete, in Negros Oriental.

In this girl the possibility of infection from some untraced source in Dumaguete must be considered. On the other hand it

is of interest—though not necessarily of significance—that the house in which she lived is located only two or three hundred meters from that of the first two cases, the second of which had been removed to Culion only seven months before this child was born.

Because of some interesting features, mention may be made here of a man (S.A.), born in Santander but classified as a non-resident in 1938, who developed leprosy and was admitted to the Cebu leprosarium in March, 1939. He was born about 1908 in Barrio Talisay in the easternmost part of Santander, where his father and three brothers are still living. Both the patient and his father deny having had any contact or acquaintance with the two known open cases of leprosy in Santander, who had lived at the opposite end of the municipality. In 1921, at the age of 13 years, S.A. went to the city of Cebu, where he was in daily contact from 1922 to 1925 with a paroled leper (M.) as a fellow worker in a butcher shop. He was married in 1930. A child born in 1932 died two years later; a second daughter (Sofia A.) was born in 1934. About 1936 the man developed leprosy and two years later—at the age of 4 years—his daughter Sofia A. showed cutaneous lesions. Father and daughter are now in segregation. The wife showed no signs of leprosy on examination in 1939.

SUMMARY

X For the town of Santander, surveyed for comparison with the findings in the highly leprous municipalities of Cordova and Talisay, the records of the Bureau of Health show only two reported cases of leprosy from the beginning of notification in 1906 to the end of 1938. In addition, one other former resident of the municipality is known to have developed leprosy but apparently he was infected elsewhere. This is in marked contrast with the situation in Cordova, which had had more than two hundred known cases from 1906 to 1933 in approximately the same number of inhabitants, and in Talisay, which had more than four hundred such cases from 1906 to 1937 in a population less than twice as large.

Examination of 6,581 persons in Santander, or 98.6 percent of the enumerated population, revealed only two additional cases. One was an advanced case of neural type, and the other was macular, slight; both were bacteriologically negative.

The first previously recorded case is considered to have transmitted the disease to her adopted daughter. Both were segre-

gated in Culion, the former in 1916 and the latter in 1920. The mother had obvious cutaneous lesions for at least six years before segregation, and the daughter for at least one year. Nevertheless, no further infections have been traced to them. The only other household contact was the husband, who is still living and well. The barrio is relatively sparsely settled and the extrafamilial associations of these patients were consequently fewer than is usual in Cordova and Talisay. Two childhood playmates of the daughter were identified, examined and found healthy. Thus, introduction of the disease to the municipality of Santander resulted in spread but only within the original household. It is unlikely that there will be any further effect from these cases for additional ones from this focus are improbable after so long a period (eighteen years).

Of the newly discovered cases, one was infected elsewhere and had neural leprosy when he came to Santander. The other also may have contracted the disease in another area; if so, the exposure was after the age of 12 years. No history of familial or other contact was obtained, for although her residence was near that of the earlier cases she was not born until after the last of them had been segregated. Numerous inhabitants of the municipality have been exposed to one of these newly-found cases over a period of years. The other case is of recent development.

Santander is unquestionably much more isolated than Cordova and Talisay, but it is difficult to find other differences between them which might be considered of direct significance with regard to the existence and spread of leprosy. In all three the diet is substantially the same, and there are no great differences as regards state of nutrition of the people, sanitation or frequency of other infectious skin diseases. Yaws is highly prevalent in Cordova, rare in Talisay and absent in Santander. Hookworm is common in Talisay but was not found in Cordova or Santander.

There are some differences with regard to occupations. In Santander, as in Talisay, the chief occupation is agriculture; in Cordova it is fishing. In Cordova and Talisay, however, on account of proximity to the city, from one-quarter to one-third of the adult males are employed in business or industrial pursuits. As regards the possible dispersion of an infection of human origin, this latter fact is certainly of importance.

Less overcrowding of the household was observed in Santander than in the other municipalities, and also the tendency of mem-

bers of related families to lead a communal life was less apparent. The more extensive joint-family system in Cordova and Talisay, leading to association of groups of families almost as close as that of a single household, may be a factor contributing to the higher prevalence of leprosy in those towns than in Santander. ✕

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