

LEPROSY IN PANAMA

A STUDY OF ITS ORIGIN AND SPREAD

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While completing a new series of histories and physical examinations of all of the patients in the Palo Seco Leper Colony, in the Panama Canal Zone, the writer became impressed with the high frequency with which the histories gave evidence of transmission of the disease by contact, and also with the large number of familial relationships among these patients. So striking were these indications that it seemed desirable to visit the provinces of the Republic of Panama to obtain further information concerning the origin and contact spread of leprosy in the country. Also, to aid in estimating the necessary extent of the new building program at the Palo Seco colony, it was desirable to attempt to learn how many new cases were at liberty in the republic.

DATA OBTAINED IN THE PALO SECO LEPER COLONY

Origin of patients.—At the time this study was begun there were 109 lepers in the colony, 32 of whom were females and 77 were males. Of the total no less than 78, or 71 percent, were of Spanish-Indian origin (*mestizos*). The remaining 31 were of foreign origin, as shown in Table 1.

TABLE 1. *Origin of lepers of foreign birth.*

Colombia.....	6	Jamaica.....	8
Costa Rica.....	2	Barbados.....	7
Nicaragua.....	1	Grenada.....	1
Haiti.....	1	St. Lucia.....	1
Martinique.....	3	St. Vincent.....	1

Age at onset.—The average age at onset of the disease, as first noticed by the patients, was 28.4 years, the youngest being 6 and the oldest 70 years. The distribution is shown in Table 2.

TABLE 2. *Age at onset of leprosy.*

1 to 5 years.....	0 cases	31 to 40 years.....	17 cases
6 to 10 years.....	9 cases	41 to 50 years.....	10 cases
11 to 15 years.....	15 cases	51 to 60 years.....	8 cases
16 to 20 years.....	10 cases	61 to 70 years.....	6 cases
21 to 30 years.....	34 cases		

Duration on admission.—The average elapsed time from onset of symptoms until time of admission to the colony was 3 years and 1 month, the time spread being from 1 month to 26 years.

LEPROSY CONTACT DATA

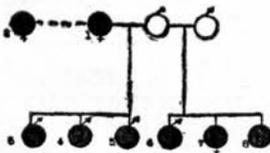
To obtain as nearly exact leprosy contact figures as possible, only those cases which would fall into the following classes were accepted as having had established contact history:

1. Those having immediate relatives with leprosy.
2. Those who had associated intimately (i.e., had lived, eaten, or slept) with close friends or neighbors with leprosy.
3. Those who admitted other contact; but these were accepted only when their statements were corroborated by other members of the family, or by records of the local mayor (*alcalde*) or of the church.

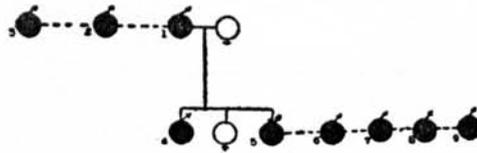
TABLE 3. *Leprosy contacts of the 64 patients with history of contact.*

Child playmates.....	24 instances	Cousin.....	9 instances
Adult friends.....	36 instances	Son.....	6 instances
Father.....	7 instances	Daughter.....	4 instances
Mother.....	4 instances	Servant.....	1 instance
Brother.....	6 instances	Sister-in-law.....	1 instance
Sister.....	5 instances	Brother-in-law.....	1 instance
Aunt.....	3 instances	Grandmother.....	2 instances
Uncle.....	10 instances		

An analysis of the colony records revealed a definite history of contact in 64, or 59 percent, of the patients. These contacts are shown in Table 3. Some of the patients had had contact with two or more leprosy persons. Of these 64 patients, 52 are believed to have acquired their infection from blood relatives.



TEXT-FIG. 2. Leprosy in one family from Darien Province. Cases 1 and 2 were close friends, both with leprosy. No. 1 married twice and had six children all of whom developed leprosy.



TEXT-FIG. 3. Spread of leprosy in one family and friends in Colon. Three adult friends acquired leprosy from a common source, or from one another. (Probably, Nos. 1 and 2 were infected by No. 3.) Two sons of No. 1 developed leprosy (Nos. 4 and 5), as did four playmates (Nos. 6 to 9).

Two outstanding examples of familial leprosy are illustrated in Text-figs. 2 and 3. In the first of these instances eight persons

developed the disease in two generations; and in the second instance nine persons developed leprosy in two generations.¹

GEOGRAPHICAL CONSIDERATIONS

In an analysis of the records with regard to the places of origin of the cases in the colony, it was found that 49 of them, or 45 percent, originated from the four towns of Las Tablas, Los Santos, Bocas del Toro, and Taboga, which represent a total population of not over 25,000 people. The remaining 60 cases originated from numerous other towns scattered throughout the republic (Table 4), with a total population of about 450,000.

The Republic of Panama lies as a narrow isthmus between Costa Rica on the west and Colombia on the east, with the Caribbean Sea to the north and the Pacific Ocean to the south. The central part, much of which lies between 8° and 9° N. latitude, is traversed by rivers draining to the Atlantic or the Pacific; the

TABLE 4. *Geographical distribution of the cases; villages of origin.*

Las Tablas.....	10 cases	Limon.....	2 cases
Los Santos.....	10 cases	Pinogana.....	2 cases
Bocas del Toro.....	10 cases	Juan Diaz.....	2 cases
Taboga.....	8 cases	Chiriqui.....	1 case
Pacora.....	1 case	Sabanas.....	1 case
Chepo.....	4 cases	Anton.....	1 case
Chorrera.....	2 cases	Darien.....	1 case
David.....	2 cases	Colombia.....	6 cases
Chitre.....	2 cases	Costa Rica.....	2 cases
Colon.....	4 cases	Nicaragua.....	1 case
Panama City.....	12 cases ^a	British and French	
Viento Frio.....	1 case	West Indies.....	24 cases

^aAll but two of the cases attributed to Panama City were found to have actually developed leprosy elsewhere before moving to the city.

Costa Rican and Colombian borders are guarded by lofty mountain ranges. The old routes of invasion and commerce to this narrow strip of land that links the Central and South Americas must necessarily have been, and were, few and well marked. They were, as indicated in Text-fig. 1, as follows:

1. Overland via the Camino Real from Old, and later New, Panama City to the seaport towns of Nombre de Dios and Porto Bello, and thence by direct shipping routes to Cartagena, Colombia, or to Spain.

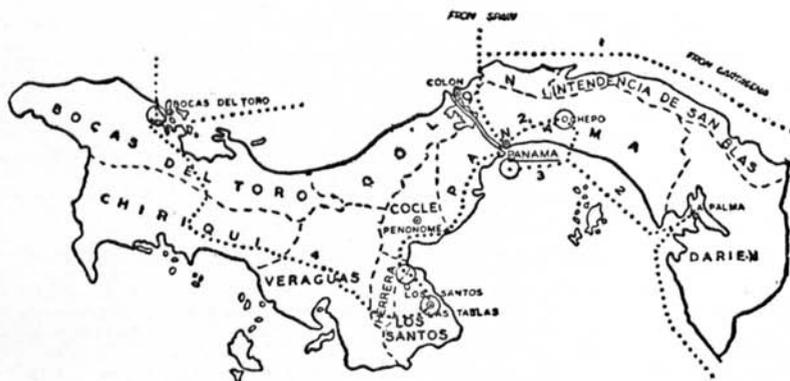
2. By boat from the Pacific side of Colombia to Las Palmas or Che-

¹In these and succeeding charts, to avoid confusion, brothers and sisters who did not acquire leprosy, so far as is known, have not been included. *Black circles* represent cases of leprosy, *unblackened ones* represent husbands or wives who did not have the disease.

pigana at the mouth of the Santa Maria River, Darien; thence to Chepillo Island, at the mouth of the Bayano or Chepo River; on up this river to the town of Chepo and then overland for 28 miles to Panama City. This route persists for small commerce to the present time.

3. The same route as No. 2, except directly by ship from Chepillo Island to the Island of Taboga, in the bay of Panama.

4. From Cartagena, Colombia, to the archipelago and coast of Bocas del Toro; thence inland and eastward to Panama City.



TEXT-FIG. 1. The Republic of Panama, showing the provinces, the principal towns mentioned, and the old routes of invasion and commerce.

Prior to the founding of Nombre de Dios by the Spanish in 1509, and for nearly 200 years thereafter, leprosy was unknown among the natives of Panama. This statement is borne out by the fact that the old records of the Roman Catholic Church (especially those of the Dominican Order) make no mention of leprosy in the natives; whereas as early as 1717 they mention its appearance in their Spanish and Portuguese countrymen. Even today the disease is but rarely found among the more remote and isolated Indian groups. Following the appearance of the mestizo there begin to appear church records of leprosy occurring among the Panamanians. As the Spanish *conquistadores* and settlers from Colombia and Peru located along the highways and begot children by the native Indian women, villages were formed, later to become fair sized towns. With these events leprosy was introduced and spread in the country.

DATA OBTAINED IN THE PROVINCES

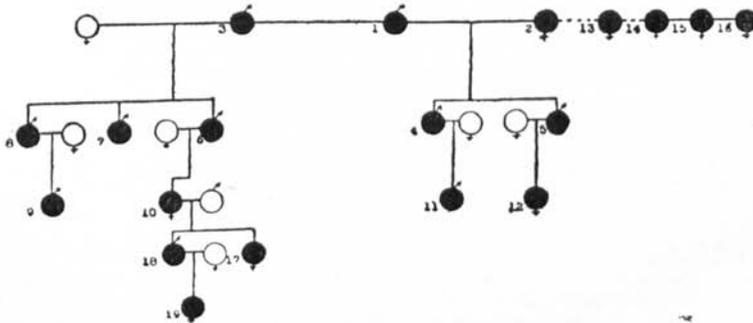
In making this study there were certain definite objectives. These were to determine if the towns which appeared to be foci of leprosy were actually so; and to learn if there were any other focal

points which had not been recognized. It was also desired to learn whether the cases which were scattered in small towns and outlying *campos* (small native villages) were merely isolated ones, or if they were directly associated with or related to those that came from the assumed focal areas of Las Tablas, Los Santos, Bocas del Toro and Taboga.

PROVINCE OF LOS SANTOS

Las Tablas and surrounding campos.—Las Tablas, the capital of Los Santos province, lies on the Pacific side, about twenty-miles inland from the sea, on a vast *llano* or plain. It is one of two towns of any consequence in this province, and surrounding it are seven campos with a total population of approximately 7,000.

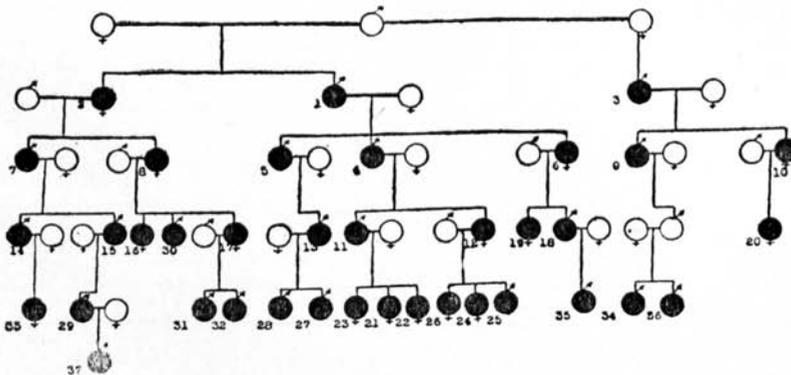
It was learned that the earliest known case of leprosy in this town was in a Spanish Colombian, by the name of Jose Ruiz Perez, who about 1880 immigrated from Cartagena by way of Route 4, and at the time of settling in the Las Tablas area already showed a mild form of leprosy. He died in Las Tablas about 1907, but before that his wife, father-in-law and some of their descendants, had developed the disease. From this single case there have subsequently developed 18 other known ones, 12 of which were in direct familial descendants. These cases, with their contact relationships, are illustrated in Text-fig. 4.



TEXT-FIG. 4. Original and subsequent cases of leprosy occurring in Las Tablas. No. 1 represents the original case, Nos. 2 and 3 were his wife and a brother. Descendants of Nos. 1 and 2 were: two sons (Nos. 4 and 5) and one grandson and one granddaughter (Nos. 11 and 12). Descendants of No. 3 were: three sons (Nos. 6, 7 and 8), one grandson and one granddaughter (Nos. 9 and 10), one great-granddaughter and one great-grandson (Nos. 17 and 18) and one great-great-granddaughter (No. 19). There was one close neighbor, a female, who frequently ate with the wife of the original case, who became infected (No. 13). She served as nurse-maid and laundress for three sisters; they are Nos. 14, 15 and 16.

Los Santos and outlying campos.—Los Santos, the other important town of the Province of Los Santos, is situated on a river of the same name, this river being the boundary between the provinces of Los Santos and Herrera.

Here it was learned that the first known case of leprosy appeared in a Spanish Colombian by the name of de Para. This Colombian also immigrated from Cartagena, but he came by Route 1; he arrived in Los Santos about 1845 and died there of leprosy about 1860, after three members of his family are known to have developed the disease. In total, 35 subsequent cases have developed. Two of them were a sister and a half-brother; the other 33 cases were in direct descendants of the first three. Of the total, 21 were in males and 15 in females. The relationships of these cases are illustrated in Text-fig. 5.



TEXT-FIG. 5. Original and subsequent cases of leprosy occurring in Los Santos. Of No. 1, the original case, a sister and a half-brother, became infected (Nos. 2 and 3). Descendants of the original case who developed leprosy were: two sons (Nos. 4 and 5), one daughter (No. 6), three grandsons (Nos. 11, 13 and 18), two granddaughters (Nos. 12 and 19), five great-granddaughters (Nos. 21, 22, 23, 24 and 26) and four great-grandsons (Nos. 25, 27, 28 and 35). Descendants of No. 2 who had the disease were: one son and one daughter (Nos. 7 and 8), three grandsons (Nos. 14, 15 and 30), two granddaughters (Nos. 16 and 17), three great-grandsons (Nos. 29, 31 and 32), one great-granddaughter (No. 33) and one great-great-grandson (No. 37). Leprous descendants of No. 3 were: one son and one daughter (Nos. 9 and 10), one granddaughter (No. 20), and two great-grandsons (Nos. 34 and 36). Case 8 married and moved to a nearby village, La Arena Chitre, and the subsequent cases Nos. 15, 16, 17, 31 and 32 developed in that village. Case 18 married and had a son who developed leprosy (No. 35) and now lives in the nearby village of Chitre.

Other observations.—It should also be mentioned that in 1885 a possible new impetus to the spread of leprosy was given by a Chinese merchant who developed leprosy after coming to Los Santos but who continued for the next ten years to sell food-stuffs

over his counter. Just how much this leper was responsible for the dissemination of the disease can not be proven.

In this investigation all of the campos surrounding Las Tablas, Los Santos and Chitre were visited. The larger ones are known as La Arena de Chitre, Santo Domingo, La Laja, Guarare, Subanagrande, Parita, Pese, Potuga and Monagrillo, but numerous other villages in the mountains and plains were visited that are nameless. In this entire area only three definite new cases and five unconfirmed ones were found. In each instance the patient was related to a previous case in Las Tablas or Los Santos, and, upon noticing the first signs of the disease, had gone to a remote place in the llanos or mountains to escape detection.

PROVINCE OF DARIEN

From the best available historical records it appears that the Spanish conquistadores and settlers first entered the territory known as Darien by crossing the Seri Mali Mountains from Colombia and passing down the Turia or Santa Maria River to the seacoast towns of Las Palmas and Chepigana. During this trek some of the invaders remained behind in a llano town known as Pinogana.

Here occurred the earliest known case of leprosy in this province, in a Spanish conquistador by the name of Cortez, who died there of the disease about 1717. Before he died he took for himself a Cuna Indian mistress and had several children by her. At least one son is known to have developed leprosy. In this study there were found only 10 cases of leprosy from Darien Province, and they were all of Spanish descent.

PROVINCE OF COCLE

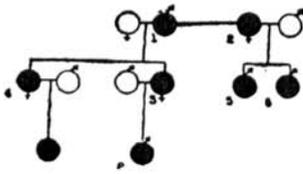
In the province of Cocle, along the early coastal and now international highway route, lie the more important towns of Anton, Penonome, La Pintada and Aguadulce. These towns are surrounded by the usual campos.

Only one person in Aguadulce and its surrounding campos is known to have had leprosy, and that one actually developed the disease in Los Santos but moved to Aguadulce, where he died. No case was found in Nata or its campos, or in Penonome proper. However, in the foothills of the Cocle Mountains, behind Penonome, six clinical cases were found in the campos of Marica, Marica Abajo, and Las Delicias.

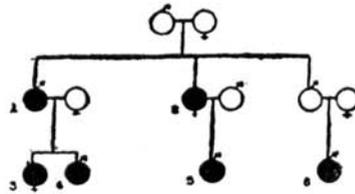
Marica.—The first known case occurring in this region was in

a Spanish Colombian by the name of Rodriguez, who died of leprosy in these mountains about 1820. This man took an Indian woman as his mistress and begot several children by her, some of whom became infected. From the original one there have developed seven other known cases. One was a sister; the other six were descendants of these two. Four of the cases were in females and four in males. The original and subsequent cases, with their contact relationships, are illustrated in Text-fig. 6.

Anton.—In Anton, another of the principal towns of Coclé Province, it was learned that in 1845 Carlos Guardia was the first known case of leprosy. This man was of direct Spanish descent and had immigrated to Anton from Panama City. Subsequent to this case one sister, one son, one daughter, and two nephews developed leprosy. These are illustrated in Text-fig. 7.



TEXT-FIG. 6. Cases of leprosy occurring in Marica. No. 1, the original case; No. 2, a sister. Descendants of No. 1 who developed leprosy were: two daughters (Nos. 3 and 4), one grandson (No. 8), and one granddaughter (No. 7). The sister (No. 2) had two sons (Nos. 5 and 6) who became leprosy.



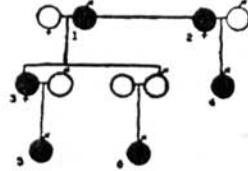
TEXT-FIG. 7. Original and subsequent cases of leprosy occurring in Anton. No. 1, the original case; No. 2 a sister. Descendants of No. 1 who developed leprosy were: one son and one daughter (Nos. 3 and 4). One descendant of No. 2 became infected, a son (No. 5). Case 6 was the son of a nonleprosy brother of Nos. 1 and 2.

PROVINCE OF PANAMA

In the province of Panama is centered about one-half of the total population of the entire country. The more important towns—excluding Panama City, the capital—are San Carlos, Chame, Capira, Chorrera, Chepo, Juan Diaz, Pacora and Taboga. Most of these towns lie directly on the routes of conquest and commerce of the conquistadores and merchants, and as those people traveled to and fro it was inevitable that some should settle there. Also, whether they stayed or passed on, they took native women for their mistresses and had children by them. And as came the conquistadores and merchant settlers, so came leprosy; and with their progeny came its spread.

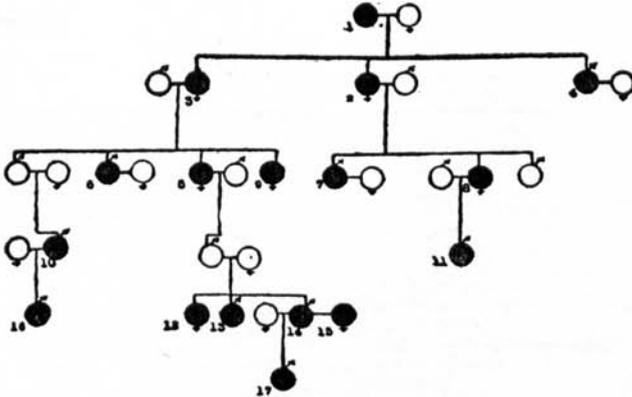
Chorrera.—In this town the first known case of leprosy was in a Spanish Colombian. Five subsequent cases were known to have

developed here, these being all in relatives of the original one. They are illustrated in Text-fig. 8.



TEXT-FIG. 8. Original and subsequent cases of leprosy occurring in Chorrera. No. 1, the original case; No. 2 a sister. Descendants of No. 1 who developed leprosy were: one daughter (No. 3) and two grandsons (Nos. 5 and 6). One son of the sister (No. 2) developed the disease (No. 4).

Chepo, Pacora and Juan Diaz.—Chepo was, and to a lesser extent is today, the town of disembarkation on the Bayano or Chepo River, and thus it is one of the most prominent points in Route 2 from the west coast of Colombia and Peru. On the overland route from Chepo to Panama City travelers pass through Pacora and Juan Diaz; therefore these two towns are considered with that of Chepo.



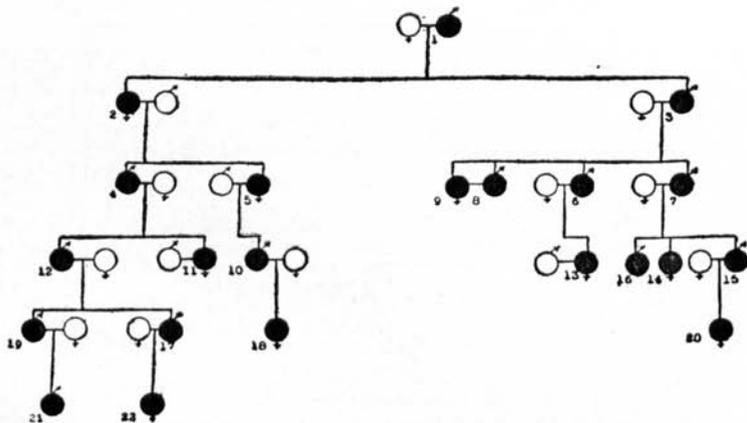
TEXT-FIG. 9. Original and subsequent cases of leprosy occurring in Chepo. No. 1, the original case. Descendants who developed leprosy were: one son (No. 4), two daughters (Nos. 2 and 3), two grandsons (Nos. 6 and 7), three granddaughters (Nos. 5, 8 and 9), two great-grandsons (Nos. 10 and 11), three great-great-grandsons (Nos. 13, 14 and 16), one great-great-granddaughter (No. 12) and one great-great-great-grandson (No. 17). A close friend of No. 14 also became infected (No. 15).

The first known leper in this region was a Spanish Colombian conquistador by the name of José Villalobos. He came to Chepo by way of Route 2 and died there of leprosy about 1740. From this original case there subsequently occurred 16 other known ones, all except one of which were in direct descendants. The

exception to the familial relationship was a female who frequently ate with leper descendants of the original case. Of the 17 total cases, 10 were in males and seven in females. Their relationships are shown in Text-fig. 9.

Taboga Island.—The island of Taboga lies in the Pacific Ocean, about ten miles from the harbor of Panama City. The Spanish and Portuguese conquistadores and merchants early established a settlement here, and, later, ships were beached here for scraping and repairing their hulls. At one time the village had a population of from three to five thousand; but as it was not over ten acres in size, the inhabitants were crowded together in adjoining shacks.

The first known case of leprosy on this island was in a Spanish Colombian by the name of Pedro Rivera. He came to Taboga by way of Route 3 and died there of leprosy about 1840. Before his death a son and a daughter developed the disease; and 19 other cases have been known to occur in Taboga, all of them in direct descendants of the original one. Of the total of 22 known cases, 13 were in males and 9 in females. The relationships of these cases are shown in Text-fig. 10.



TEXT-FIG. 10. Original and subsequent cases occurring in Taboga. No. 1, the original case. Descendants who developed leprosy were: one son (No. 3), one daughter (No. 2), four grandsons (Nos. 4, 6, 7 and 8), two granddaughters (Nos. 5 and 9), four great-grandsons (Nos. 10, 12, 15 and 16), three great-granddaughters (Nos. 11, 13, and 14), two great-great-grandsons (Nos. 17 and 19), two great-great-granddaughters (Nos. 18 and 20) and one great-great-great-grandson and one great-great-great-granddaughter (Nos. 21 and 22).

Other towns.—In the study of San Carlos, Chame and Capira, no cases of leprosy or records of previous cases were found.

PROVINCE OF BOCAS DEL TORO

Although the province of Bocas del Toro was not visited, a study of the known cases from there has satisfied the writer that the original cases were introduced by the Spanish. Another element, however, has been introduced during the past fifty to seventy-five years in the form of a constant importation of West Indian negroes from the French and British colonies in the Caribbean, to serve as laborers in this and other provinces. Some of these laborers, the writer has found, brought leprosy with them, thus giving a new stimulus to its spread.

PROVINCE OF CHIRIQUI

In the province of Chiriqui there have been found six cases of leprosy, all in persons of Spanish descent.

STATISTICAL COMMENTS

Since 1907 there have been 188 cases of leprosy, isolated and admitted to the Palo Seco Leper Colony, in addition to the 109 there at the time of this study.

There have been, according to the local records of the Roman Catholic churches and of the alcaldes, about 120 other cases that have died in their own villages.

During the investigation here reported the writer saw seven clinically active cases of leprosy, and thirteen unconfirmed cases, at liberty in the villages that were visited. These cases were reported to the local medical health authorities, who initiated control measures within their localities or took steps for the admission of the patients to the Palo Seco colony.

The population of the Republic of Panama is estimated to be 500,000. This figure, with a known number of 130 active cases of leprosy, gives a rate of 26 active cases per 100,000 population (0.26 per thousand).

With the new information gathered in the study, the actual contact history of the patients now residing in Palo Seco Leper Colony has been raised from 58 percent to 74 percent.

At the present time leprosy is found to be present in certain endemic focal centers.

SUMMARY AND CONCLUSIONS

1. No record has been found of leprosy among the natives of Panama prior to the founding of the first Spanish settlement, Nombre de Dios, in 1509.

2. Leprosy was introduced principally by the Spanish conquistadores, merchants and settlers, some of whom came directly from the Old World while others came by way of Colombia and Peru; and it has been maintained mostly by their descendants and direct familial contacts.

3. In the majority of cases, the spread of leprosy in Panama has been along the routes of territorial invasion and of commercial travel.

4. From 15 leprous West Indian negro laborers who came to Panama from the French and British colonies in the Caribbean Sea, there have developed nine secondary cases among descendants or contacts in a period of approximately 35 years.

5. Among the 109 patients hospitalized in the Palo Seco Leper Colony, it was possible to obtain from 74 percent definite histories of contact with preexisting cases of leprosy.

6. Of the new cases found in the provinces, those already hospitalized and whose families were visited in the provinces, and those studied in church or other records,—the total of these being approximately 116—histories of prior contact with leprosy was established for all save one.

7. At the present time residual endemic foci of leprosy in the Republic of Panama are the towns and villages of Las Tablas, Los Santos, Chepo, Taboga, Bocas del Toro, and probably Marica and Las Delicias.

8. Leprosy, in Panama, appears to be a familial disease, which the writer interprets not as an example of biologic inheritance of the bacterial invasion but as evidence of inherited predisposition to leprosy, coupled with prolonged intimate contact with the disease.

ACKNOWLEDGMENT

The writer desires to express his appreciation to Col. H. C. Pillsbury, Chief Health Officer of the Panama Canal, for the opportunity to study the case records and to make the provincial studies. The writer further desires to express his appreciation to Dr. O. E. Denney, Chief Quarantine Officer of the Panama Canal, for his encouragement and his many constructive comments. The writer is also indebted to a number of the Panamanian doctors, in several of the provinces, for their aid in locating new cases of leprosy and records of old ones.