

## TUBERCULOSIS SURVEYS IN PUERTO RICO

### I. STUDY OF A COAST AND A MOUNTAIN MUNICIPALITY \*

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#### SOME DATA ABOUT TUBERCULOSIS IN PUERTO RICO

The tuberculosis mortality in Puerto Rico is high, and has been increasing during the past years. In 1931 and 1932 it was responsible for 13 per cent of all the deaths occurring on the Island. The average rate during the six years from 1927 to 1932 was 275.2 deaths per 100,000 inhabitants, or nearly four and a half times the tuberculosis mortality in the United States for 1932.

The high tuberculosis mortality in Puerto Rico has been ascribed to (1) overcrowding, especially in the slums; (2) lack of hospital facilities for the isolation of sputum positive cases; (3) low standard of living of a large proportion of the population, due to extreme poverty; (4) hurricanes.

TABLE I

#### TUBERCULOSIS MORTALITY IN PUERTO RICO

<i>Year</i>	<i>Deaths per 100,000 population</i>
1927	252.6
1928	261.3
1929	301.4
1930	263.2
1931	275.5
1932	297.3
1933	337.2
1934	307.0

The hurricanes of 1928 and 1932 undoubtedly affected the tuberculosis mortality of the following years. These two cyclones brought about great destruction of dwellings and crops, thus increasing overcrowding and poverty, spread-

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The field work of this survey was done by Dr. J. Simonet.

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ing contagion and causing many latent lesions to break down under the strain of continued privations. The tuberculosis death rate for the year following the hurricane of 1928 was 19 per cent higher than that of 1927; the mortality for 1933 was 22.5 per cent higher than that of the year previous to the hurricane of 1932. The tuberculosis mortality for 1933 was the highest ever recorded in Puerto Rico. It constituted 15 per cent of the total number of deaths on the Island during that year.

Mortality statistics reveal that 17 per cent more women than men die from tuberculosis in Puerto Rico. The mortality reaches its peak for men and women alike at the ages of 25-29. The colored race has 19 per cent more deaths than the white. The death rate is 84 per cent higher in the town than in the country.

Case reporting is deficient, but has shown notable improvement during the last few years. It should be noted that Puerto Rico has belonged to the United States Death Registration Area since January, 1931, and the reporting of deaths is fairly accurate.

#### PREVIOUS SURVEYS

Dr. J. G. Townsend calls our attention to the fact that in 1875 Dr. Enrique Dumont published a report in Spanish of a health survey in Puerto Rico and the neighboring islands under the title "Essay of Medical Chirurgical History of the Island of Puerto Rico", from which we excerpt the following:

"One may consider the Island of Puerto Rico as consisting of two islands: one of the lowlands and one of the highlands; the former contributes the ailments of the tropics, the latter, those of a temperate climate. These two regions, however, present very different histories so far as tuberculosis is concerned. . ."

Dumont made a study of the damp atmosphere of the tropical thickets where coffee is cultivated in relation to the life-risks of those who dwelt in such regions, and he says:

"The tillers of the soil and the laborers . . . live exposed to the rays of the sun. They then plunge into the thick foliage which serves as shade for the coffee plants, and where constant dampness reigns, for, long after the actual rain has ceased, each shrub simply saturates the workers as they move to and fro plucking the coffee berries. . ."

"These toilers are insufficiently protected from the elements which daily, sometimes momentarily, drench them in sweat or soak them with mist and rain;

yet, pulmonary tuberculosis does not harry them as it does the laborers of the cities, or those of the torrid regions of the Island. . ."

"Tuberculosis is certainly progressive in the island of Puerto Rico. Formerly one could hardly find a tuberculous subject in any district; thirty years ago such cases were conspicuous; they were recognized, and most important of all, when they died, or became hopelessly ill, all precautions were taken to terminate the spread of the infection, clearly demonstrating that the operation of transmissibility was understood. The sick were completely isolated, and their dwellings segregated; those that waited on them were dedicated exclusively to their service; all furniture, utensils and personal belongings were separated from those of other people, and when death intervened, all such articles were burned—even the houses where they had lived being deserted or consigned to the flames. More than once we, ourselves, have witnessed this desertion of huts by peasants, especially the mountaineers, to whom these ideas of prevention had been imparted, and on enquiring the cause of these cabins being abandoned the reply was nearly always the same, 'This house has lost its master who has died from tuberculosis, and his family has left it.'"

When Dumont enquired the opinion of practicing physicians on this matter, "those who had studied in Europe" answered:

"During our stay in the medical schools we did not believe tuberculosis to be infectious, but since practising medicine in the tropics we have come to this conclusion: tuberculosis appears to be more transmissible, in Puerto Rico, from the husband to the wife than from the wife to the husband, doubtless because the husband does not suffer from the enervating influence of marriage."

A study on the influence of trades and occupations on the frequency of tuberculosis in tropical countries showed that predisposition paralleled such occupations as were entailed in working with cotton, coffee and rice, on account of the dust produced in the manipulation of these articles, particularly in:

"the mortars in which coffee and rice are pulverized, and the corn shellers: sensitiveness to bronchial affections is produced in people working with these contrivances."

"Those employed in the manufacturing of tobacco seem to be particularly susceptible to tuberculosis. Is this simply a coincidence, or does the handling of tobacco cause certain pathological conditions?—Those who gather the leaves often sleep herded together in the tobacco drying-sheds, and are exposed to the penetrating dampness of the night and the vapors from the leaves. . ."

"When the tobacco is being prepared and is fit to be rolled, the type of work necessary for its manufacture encourages the development of ailments of the throat, larynx and lungs".

"Bone tuberculosis is not so common in the subtropical regions of the Americas as in congested areas of the more temperate parts. A careful examination of records reveals only four cases in Puerto Rico. . ."

From October, 1922, to April, 1923, Dr. J. G. Townsend, Surgeon of the United States Public Health Service, carried out a tuberculosis survey in Puerto Rico under the auspices of the U. S. Public Health Service. His report was published in December, 1923, by the Government Printing Office as Public Health Bulletin No. 138.<sup>1</sup>

The objects of this survey as stated by Dr. Townsend were the following:

1. To determine approximately the number of active cases on the Island, their distribution and location.
2. To investigate the factors responsible for the propagation and spread of tuberculosis in Puerto Rico, and
3. To ascertain the most practical means of combating tuberculosis in the Island.

The survey was carried out by inquiries among the members of the medical profession; analyses of the reports of examinations of school children; study of records of the U. S. Veterans' Bureau concerning the examinations of beneficiaries; analyses of reports of examinations for Army enlistment in the regular Army and during the World War, and finally, records of private practitioners and hospital records.

From the data thus gathered Dr. Townsend reached the following conclusions:

1. Accurate estimation of morbidity was impossible, because of universal failure to report cases.
2. Death records were of value, as permits were required for burial. Nevertheless the reported number of deaths from tuberculosis was much less than the actual number; it was estimated that 60 per cent of the deaths due to tuberculosis were not so recorded.
3. The total death rate in Puerto Rico appeared to be nearly twice that of the United States, while the tuberculosis rate in ratio to the general population appeared about the same. Its distribution was not uniform, varying with towns and districts.

Townsend reported pulmonary tuberculosis to be the predominant type, with bone, joint and gland tuberculosis rare. The rate seemed low in children, first infections apparently not developing until early adult years. The outdoor life of children and sunlight were thought responsible for this delay in infection. Cow's milk appeared to play no part in tuberculosis infection in Puerto Rico. Marital transmission of tuberculosis seemed infrequent.

Townsend considered predisposing factors to be: (1) poor housing conditions, with crowding of large families, (2) exclusion of fresh air at night, (3) malnutrition, particularly scarcity of vitamins A and C, (4) bad industrial conditions, leading to spread of infection, especially in the tobacco industry, (5) poverty, (6) ignorance of the simplest sanitary precautions, (7) other diseases, especially hookworm, malaria and venereal diseases, and finally (8) lack of clinics, social service work and hospitals for tuberculous patients.

In 1930, J. Rodríguez Pastor applied the intradermic tuberculin test to 2,500 children 8 and 10 years of age in the urban and rural schools of the Island. Three successive doses of .01, 0.1 and 1 mgm. of Old Tuberculin were used. Sixty-eight per cent of the total reacted positively. Of those examined in the towns, 78.5 per cent were positive, while in the country the proportion of reactors was 57.5 per cent. Soon afterwards, the application of the intradermic tuberculin test was made a routine procedure in the Public Health Units of the Health Department. The following are some of the results obtained in recent years by several workers in different parts of the Island in children from 1 to 15.

TABLE II

Municipality or Barrio	Physician who applied the test	Number of cases	Per cent Positive
Cataño.....	A. Montalvo Guenard.....	1,000	63.6
Arecibo.....	J. A. Santos.....	107	62.4
Caguas.....	A. Ruiz Soler.....	691	72
Río Piedras.....	E. Martínez Rivera.....	549	53
Cayey.....	P. Rivera Aponte.....	264	42
Adjuntas.....	J. B. Gotay.....	156	41
San Juan*.....	P. del Valle.....	310	82.2
Santurce*.....	A. Santana Náter.....	209	93
Barrio Obrero*.....	A. Sánchez.....	489	77
Puerta de Tierra*.....	R. Timothée.....	111	51.3
Yabucoa.....	M. B. Berríos.....	719	52.9

\* Urban children only. The rest were from urban and rural zones.

#### THE PRESENT SURVEY

*Reasons for Choosing Cataño and Adjuntas.*—Cataño and Adjuntas were chosen because they are representative of two different types of Puerto Rican municipalities. The coast

municipality, Cataño, with a high proportion of colored people, a hot climate, a relatively large proportion of urban population, a high incidence of malaria, had a high tuberculosis mortality. The mountain municipality, Adjuntas, located in the center of the Island, with a predominately rural population, a large proportion of white people, a cool climate, a high incidence of hookworm disease, a low malarial incidence, had a relatively low tuberculosis mortality, according to the available statistics.

The tuberculosis survey of the Municipalities of Cataño and Adjuntas was undertaken with the following aims in view:

1. To estimate the actual number of tuberculosis cases in two communities representing different environmental, climatic and racial conditions.
2. To gather data regarding the extent of tuberculous infection in these communities, as revealed by the Mantoux test.
3. To determine the factors, especially those of living conditions, that facilitate infection in these communities.
4. To get an insight into the causes of the high tuberculosis mortality in Puerto Rico.

*Methods of Procedure.*—The survey was carried out under the direction of a committee composed of the Commissioner of Health, the Director of the School of Tropical Medicine, the Chief of the Department of Bacteriology of the School of Tropical Medicine, the Director of the Public Health Units and the Chief of the Bureau of Tuberculosis of the Health Department.

A physician with special tuberculosis training was employed to carry out the field work, with the cooperation of the personnel of the Public Health Units. During the Adjuntas survey a special nurse was employed.

The physician in charge of the field work visited every house included in the survey, made a physical examination of all suspicious cases and applied the intradermic tuberculin test to all children under 15. One-tenth mgm. Old Tuberculin was the dose injected. Those that did not react were given 1 mgm. A commercial brand of tuberculin manufactured by Meister Lucius and Bruening, Germany, and sold by H. A. Metz of New York, was used. Reactions were interpreted as +, ++, +++ and +++, according to the standard

scale used at the Henry Phipps Institute of Philadelphia.\* Suspect cases as well as all contacts had X-ray pictures of the chest taken. These were made at the X-ray laboratories of the Health Department in San Juan and Ponce, and the pictures were interpreted by a committee composed of the Radiologist of the Health Department, the Chief of the Bureau of Tuberculosis, and the Field Physician. Oblique pictures were taken in some cases.

*Presentation of Data.*—We are presenting first the data relating to Cataño, then those gathered at Adjuntas, with a comparison of the results obtained in both surveys.

#### CATAÑO

*Location.*—Cataño is located on the northern coast of the Island of Puerto Rico, across the bay from the City of San Juan. It is a poverty-stricken municipality with a large proportion of urban population. On account of the limited number of houses in the country district, the survey area was extended to include part of one rural *barrio* of the adjacent municipality of Bayamón.

The survey area has an extension of about 3,200 acres, and holds a population of about 9,500 inhabitants. It is a plain with 17 per cent of marshy land, where mosquitoes abound. In some of the poorer *barrios* the huts are built on land reclaimed from the sea, and when the tide is high they are surrounded by water.

The average temperature in the summer months is 80.4°F., and in winter, 75.0°F. The average rainfall is about 60 inches.

Eighty-two per cent of the inhabitants of Cataño live in the urban area, and 17.2 per cent in the rural. Thirty-six and two-tenths per cent are colored (negroes or mulattoes—mostly the latter).

There are in the municipality of Cataño 3,941 males and 4,563 females. The great majority of the inhabitants are very poor and work as laborers on the surrounding farms, or eke out a living in some minor business enterprise in town. The better classes work in offices in San Juan. Some 470

\* The scale used was as follows: Reactions of less than 10 mm. in diameter were called +; from 10 to 15 mm., ++; of more than 15 mm., +++; of more than 15 mm. with necrosis, ++++.

work in the tobacco-stripping plants, when these are open. The percentage of literacy is 70.8 per cent, which is higher than that of the Island as a whole.

Two great hurricanes have struck the town in the last five years; one on September 13, 1928, and the other on September 26, 1932, both inflicting great misery and suffering upon the inhabitants. The last destroyed 527 houses.

*Municipal Government.*—The municipal budget of Cataño for 1933-34 was \$32,796.20, of which \$4,030, or about 17 per cent, was spent in medical attendance on the poor.

There is one municipal physician, who is at the service of the indigent people of the town, and who runs a small dispensary where clinics are held every morning; but there is no hospital, and patients in need of hospitalization must seek it for themselves in Bayamón or San Juan.

Since 1928 there has been a Public Health Unit in Cataño. It has been supported by the Insular Department of Health, together with some help from the municipality. The unit is in charge of a full-time physician and a full-time nurse. Weekly clinics for tuberculosis, prenatal cases and small children are held, and school children are examined and vaccinated against small pox. Sanitary police work is also a function of the Public Health Unit, and appropriate personnel is provided for this purpose.

*Health Conditions.*—During the years from 1928 to 1932 the average reported tuberculosis death rate in Cataño was 429.0 per 100,000 population, or 53.4 per cent higher than the Island tuberculosis death rate. Forty deaths from tuberculosis occurred during the year of the survey (1932).

TABLE III  
TUBERCULOSIS DEATHS IN CATAÑO

Year	No. of deaths	Death rates
1928.....	41	494.2
1929.....	30	356.6
1930.....	32	375.1
1931.....	40	462.6
1932.....	40	456.4

The death rates from all diseases tend to be higher after a hurricane. This can be noticed in the following table:

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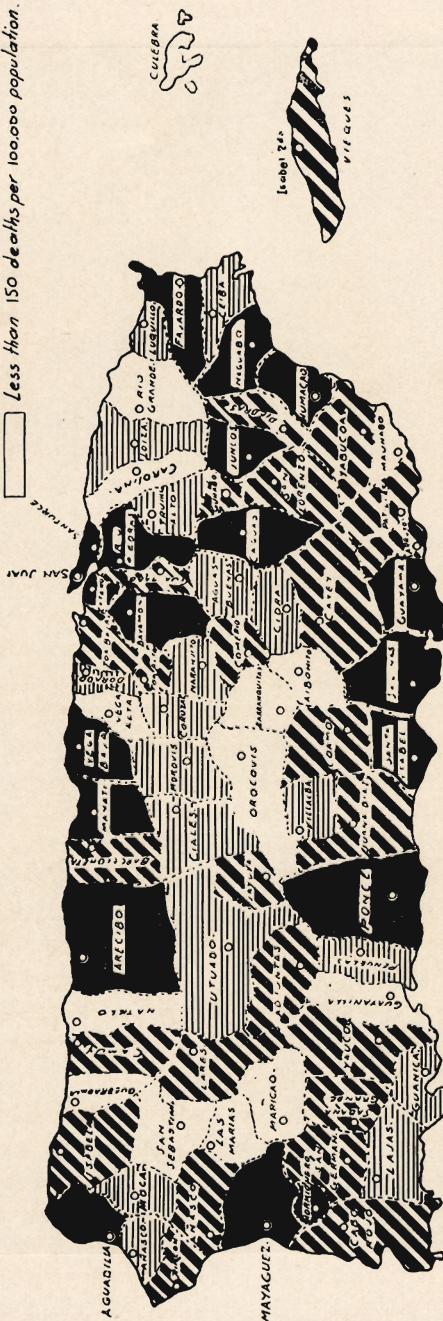
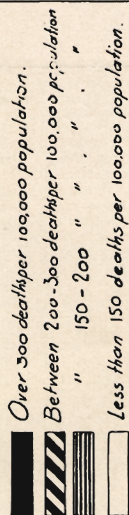
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# Tuberculosis Mortality in Puerto Rico

— 1930-1934 —



CULEBRA

VIEQUES

TABLE IV  
INFLUENCE OF THE HURRICANES OF 1928 AND 1932 ON DEATH RATES  
IN PUERTO RICO

Year	General death rates (deaths per 1,000 population)	Death rates from diarrhea and enteritis (2 years & over) Deaths per 100,000 population	Death rates from tuberculosis (deaths per 100,000 population)
1924 .....	19.4	100.6	203.8
1925 .....	23.4	110.2	226.3
1926 .....	22.6	120.4	248.7
1927 .....	20.6	135.3	252.6
1928 Hurricane .....	23.6	171.7	261.3
1929 .....	25.3	249.9	301.4
1930 .....	18.6	132.2	263.2
1931 .....	20.4	116.7	275.5
1932 Hurricane .....	22.3	161.3	297.3
1933 .....	22.6	204.0	337.2

The two main problems in Cataño are tuberculosis and malaria. The tuberculosis mortality in Cataño is one of the highest in the Island. One thousand eight hundred and forty-three cases of malaria were reported from Cataño in 1932, a morbidity rate of 210 per 1,000, which is the highest in Puerto Rico. The proportion of people with malarial parasites in the blood is estimated to be about 25 per cent.

The marshy lands that surround the town are extensive breeding places of the anophelene mosquito, as well as for other varieties that torment the inhabitants. In this connection, it is interesting to note that the first town founded by the Spaniards in Puerto Rico (named Caparra, and built in 1509) was located not far from Cataño, but had to be moved, after some years, across the bay to where San Juan is now situated, because of the insufferable mosquito nuisance. This was, according to an author, "the first public health measure undertaken in the New World."

Cataño uses the San Juan aqueduct, which has a good filtration and chlorination plant and is therefore a modern and reasonably safe water-system. The municipality has recently constructed a modern sewage system that is not yet in use. Only a few of the houses in the town have sanitary installations, the majority of them having latrines.

*Tuberculosis Dispensary.*—The work done at the tuberculosis dispensary of the Cataño Public Health Unit during the

years 1931-32 and 1932-33 can be judged from the following figures:

TABLE V

	Year 1931-32	Year 1932-33
Clinic attendance.....	2,645	385
New patients examined.....	245	139
New cases of tuberculosis found.....	58	16
Contacts examined.....	148	71
Visits made by nurses.....	1,241	733

Most of the 2,645 persons who attended the tuberculosis dispensary during 1931-32 were presumably brought in because of the tuberculosis survey which was being carried out during this time.

The case-finding machinery of the Public Health Unit of Cataño was found to be notably deficient, since only 7 of the 61 cases of tuberculosis located during the survey were found to be registered in the tuberculosis clinic.

According to the standard set forth by the American Public Health Association, the number of contacts examined in a tuberculosis clinic should not be less than three for each new case of tuberculosis registered in the clinic, while the annual number of nurses' visits should amount to 50 visits for each tuberculosis death. The Cataño tuberculosis clinic, then, examined the proper number of contacts, but the number of visits to cases of tuberculosis should not have been less than 2,000 each year.

*Reporting of Cases of Tuberculosis.*—Out of the 40 tuberculosis deaths that occurred in Cataño during the year of the survey (1932), only 15 (37.5%) had been reported to the Health Department as cases. One of the reports came in one day after the death of a patient; three cases were reported less than one month before death; five were reported from one to six months before death; four were reported from one to two years before death, and two, from two to three years before death.

Eleven of the 15 cases were reported by the Public Health Unit, 3 by the field physician in charge of the survey, and 1 by the municipal physician.

From this it may be seen that tuberculosis case reporting is inefficient, since 9 of the 15 cases apparently came under

the control of the physician presumably long after the disease had begun, and possibly after many people had been infected through the ignorance or carelessness of the patient and his family.

A total of 84 new cases of tuberculosis was reported from Cataño to the Health Department in 1932. This was over twice the number of deaths from tuberculosis that occurred in the municipality that same year.

*Study of the Homes.*—Every fifth house was visited in the town and every second house in the rural area. The total number of houses visited was 456, of which 289, or 63 per cent, were in the town, and 167, or 37 per cent, were in the country. In tenement houses we found 35.6 per cent of the urban homes, and 7.8 per cent of the rural homes. Two thousand four hundred and seventy people lived in the homes visited, making an average of 5 people in each urban home, and 6 in each rural home. The average number of people per room was 2.3 in the town, and 4.1 in the country, and the average number of rooms in each house was 1.9. The average size of each room was about 8'  $\times$  9'. Mitchell<sup>2</sup> quotes Sir Arthur Newsholme as saying "a house is overcrowded when the number of occupants exceeds double the total number of rooms in the house". Judging by this standard there exists great overcrowding in Cataño, especially in the rural area.

*Economic Condition of Inhabitants.*—The economic condition was classified as "desperate" (no known income of any kind) in 20 per cent of the families. Forty-one per cent of the families owned their own homes; in 20 per cent, the house was given free of rent to the householder, and 39 per cent of the families paid rent.

Out of the total of 174 families who paid rent, 59 per cent paid from \$5 to \$10 per month; 34 per cent paid \$10 to \$20, and 7 per cent paid over \$20 per month. The type of house that can be rented for from \$5 to \$10 in Cataño, has usually from one to two rooms and a kitchen.

*Tuberculosis History in the Family.*—Thirty-four per cent of the families studied gave a history of one or more members having had tuberculosis.

Eighty-four per cent of the families having a positive history of tuberculosis lived in the town, and 16 per cent in the country.

Of the families with tuberculosis history, 73 per cent had had four or more members with the disease. The proportion of positive history families with four or more tuberculosis cases was greater in the country (80%) than in the town (70.3%).

*Cases of Tuberculosis.*—The total population of the surveyed homes was 2,470, of whom 1,448 lived in the urban and 1,022 in the rural area.

Sixty-one cases of tuberculosis were found, 51 of which resided in the town and 10 in the country. The proportion of cases of tuberculosis in relation to the population of the homes surveyed was 2.4 per cent. This proportion was nearly four times higher in the town, where it was 3.5 per cent, than in the country, where it was 0.9 per cent.

On the basis of a survey of every fifth urban, and every second rural home, the probable number of cases of tuberculosis in the survey area is 275.

All of the 61 cases were resident. According to age, sex and race, the cases of tuberculosis are classified as follows:

TABLE VI

Age	Urban	Rural	Urban (51)						Rural (10)					
			Male			Female			Male			Female		
			*W	M	B	W	M	B	W	M	B	W	M	B
Under 1 year			8	8	5	9	16	5	...	2	...	3	3	2
1 to 5 years	8													
6 to 9 years	2	1												
10 to 14 years	1													
15 to 24 years	8	3												
25 to 34 years	7	1												
35 to 44 years	9	3												
45 or over	16	2												

\*W indicates White; M indicates Mulatto; B indicates Black.

According to the form of tuberculosis, the following classification was made:

Latent apical	4
Minimal	7
Moderately advanced	20
Far advanced	7
Fibroid	14
Pulmonary infiltration of the childhood type	7
Undetermined	2

Six hundred and ninety-nine persons had X-ray examinations of the chest made. These included 343 contacts. Besides the above cases, the following findings were noted from the study of the X-ray pictures taken:

Pulmonary nodule calcified.....	11
Tracheo-bronchial lymph nodes calcified.....	117

No cases of non-pulmonary tuberculosis were found.

Eighteen of the 61 cases of tuberculosis had been attended by a private physician; 20 had received care from the municipal physician; 7 had been attended at the Public Health Unit, and 16 had had no medical care of any kind. None of them had ever been in a sanatorium.

Seventeen of the 61 cases gave positive sputum, with the following Gaffky counts:

8 were Gaffky	I
1 was Gaffky	II
4 were Gaffky	III
2 were Gaffky	V
1 was Gaffky	VI
1 was Gaffky	X

*Tuberculin Test.*—One thousand and fourteen children under 15 received the intradermic tuberculin test. Of these, 670, or 66.1 per cent reacted positively. The proportion of positive reactions in the town was 63.6 per cent, and in the country, 54.4 per cent.

TABLE VII  
REACTIONS ACCORDING TO AGE

Total	Examined	Positive
Total.....	1,014	66.1
0-1 year.....	63	35.6
1-4 years.....	264	58.7
5-9 years.....	380	63.4
10-15 years.....	307	81.8

REACTIONS ACCORDING TO AGE AND RESIDENCE

Total	Urban	Rural
	Percent Positive	Percent Positive
Total.....	63.6	54.4
0-1 year.....	32	38.4
1-4 years.....	63.2	52.3
5-9 years.....	70.1	53.5
10-15 years.....	89.3	73.6

TABLE VI—Continued  
REACTIONS ACCORDING TO SEX AND COLOR

Total	Male	Female
	Percent Positive	Percent Positive
Total.....	68.7	66.8
White.....	64.4	61.3
Mulattoes.....	66.8	66.4
Black.....	75.6	72.7

The above results are indicative of a higher degree of tuberculous infection than is found in most European and North American communities. The intensity of the reactions was greater in the older age groups.

TABLE VIII  
INTENSITY OF REACTION TO TUBERCULIN ACCORDING TO AGE IN CATAÑO

Age Groups	Number tested	Positive		+		++		+++		++++	
		No.	%	No.	%	No.	%	No.	%	No.	%
0-1 year.....	63	23	35.6	15	65.2	8	34.8	.....	.....	.....	.....
1-4 years.....	264	155	58.7	80	51.6	28	18.1	33	23.2	11	7.1
5-9 years.....	380	241	63.4	81	33.6	40	16.6	115	47.7	5	2.1
10-15 years.....	307	251	81.8	56	22.3	42	16.7	132	52.6	21	8.4
Total.....	1,014	670	66.1	232	34.6	118	17.6	283	42.2	37	5.5

Besides the high proportion of reactors encountered among children living in the urban area, it is interesting to note that the percentage is somewhat higher in negro children, but only slightly higher in mulattoes than in whites. Males gave a slightly higher proportion of reactors than females.

One hundred and forty-five children under 15 lived with cases of tuberculosis having tubercle bacilli in the sputum. Of these, 75.8 per cent gave positive tuberculin reactions. Among 112 children who lived with tuberculous cases having negative sputum, 73.2 per cent were reactors.

#### ADJUNTAS

Adjuntas is located in the interior of the Island. It is a mountain municipality at an altitude of about 2,500 feet,