

The following table (table 13) indicates the consumption of milk per capita.

TABLE 13
PER CAPITA CONSUMPTION OF MILK PER DAY IN AREA

Daily consumption of milk per family (pts.)	No. of families	Total No. of members in families	Per Cent	Total quantity of milk consumed(pts.)	Per capita consumption of milk per day (pts.)
TOTAL.....	860	4,400	100.0	1,173.50	*0.40
None.....	345	1,530	40.1	.....	.....
Less than 1 pt.....	158	740	18.4	74.25	0.10
1 pt.....	107	543	12.4	112.25	0.21
2 pts.....	115	676	13.4	232.00	0.35
3 pts.....	24	155	2.8	72.50	0.47
4 pts.....	42	284	4.9	169.00	0.60
5 pts. & over.....	62	439	7.2	513.50	1.18
Not specified.....	7	33	.8	.....	.....

*Families not consuming milk have been excluded from this average.

Deficiency Diseases:

The nutritional needs of this people are great, and the limited kind and small quantity of food grown makes it impossible to meet them. The resulting diet usually lacks calories and does not meet energy requirements; it is low in essential minerals and generally deficient in vitamin content.

Although occasionally typical deficiency diseases may be found, such as pellagra, this is not frequent. However, you find a more or less undetermined nutritional syndrome in which nutritional edema with pigmentation of the skin, weakness, marked anemia or a combination of these, may be the most prominent symptoms. The result is a state of general debility and malnutrition, and great susceptibility to disease.

Health and Medical Agencies:

The agencies for the prevention of disease and for the care of the sick in the municipalities of Arroyo, Patillas and Maunabo are the types of organization commonly found in Puerto Rico for that purpose. The Department of Health has a Public Health Unit in Guayama which covers the municipalities of Guayama, Arroyo and Patillas. There is another Public Health Unit for Yabucoa and Maunabo. The central offices of these Units are located at Guayama and Yabucoa, respectively. The physician in charge of the Public

Health Unit of Guayama visits Patillas and Arroyo two or three times during the week; the physician in charge of the Public Health Unit at Yabucoa attends also the municipality of Maunabo.

The personnel of the Public Health Unit of Guayama consists of a physician for the three municipalities, three nurses, four sanitary inspectors and one clerk microscopist for Guayama, and one nurse and one sanitary inspector each for both Arroyo and Patillas. The personnel of the Public Health Unit of Yabucoa and Maunabo consists of a physician for both municipalities, two nurses, two sanitary inspectors and one clerk microscopist in Yabucoa, and one nurse and one sanitary inspector in Maunabo.

In each of the municipalities there is established a milk station supported jointly by the respective Municipal Governments and the Department of Health. The milk stations furnish milk for a limited number of indigent children, which is apparently distributed mainly in the urban sections, as only one family was found in the surveyed area who was receiving three pints of milk daily from the milk station at Patillas.

The municipal health organization in the three municipalities consists of the municipal physician or *Médico de Beneficencia*, in each one of them, who has to render service to the whole population, urban and rural. A limited amount of money is set aside in the municipal budget each year for the purchase of medicines for the poor. The deficiency of this service all over the Island is well known, and we shall not enter into it in detail. Suffice to say that most of the people needing medical care either do not receive it, or receive it very inadequately.

The Central itself provides a physician on a part-time basis, who visits the colonias periodically but, as there are no facilities for diagnosis and treatment, it may be assumed that such service is far from being efficient. The Central has also a nurse in charge of an emergency room (obligatory by law), and pays for the medicines for the sick when required to do so.

General Health Conditions:

The general health conditions of the municipalities of Arroyo, Patillas and Maunabo, as may be judged from avail-

able statistics, do not differ greatly from those observed in the rest of the Island—particularly from those existing in the municipalities of the coast. The disease most prevalent is malaria, with gastro-intestinal disorders and tuberculosis next in importance.

Prevailing diseases: Examining the morbidity of these municipalities (table 14), it may be readily seen that though the reporting of cases of transmissible diseases is very deficient, the highest number of cases reported are from malaria and tuberculosis. For instance, 70.4 per cent of the cases reported from Arroyo, 52.7 per cent of the cases reported from Patillas, and 92.1 per cent of the cases reported from Maunabo in 1935 are cases of malaria, and the disease following next in order as to the number of cases reported, is tuberculosis, except in Maunabo, where 43 cases of influenza and 21 of tuberculosis were reported during that year.

TABLE 14

NUMBER OF CASES OF TRANSMISSIBLE DISEASES REPORTED FROM ARROYO, PATILLAS AND MAUNABO AND IN PUERTO RICO: 1935

Disease	Diseases Reported							
	Puerto Rico		Arroyo		Patillas		Maunabo	
	Cases	Per Cent	Cases	Per Cent	Cases	Per Cent	Cases	Per Cent
ALL CASES.....	31,473	100.0	159	100.0	203	100.0	947	100.0
Malaria.....	13,975	44.4	112	70.4	107	52.7	872	92.1
Tuberculosis (all forms)....	9,575	30.4	36	22.6	37	18.2	21	2.2
Whooping-cough.....	2,234	7.1	2	1.2	10	4.9	.....	.....
Diphtheria.....	867	2.8	1	0.6	.....	.....	3	0.3
Measles.....	734	2.3	.....	.....	2	1.0	.....	.....
Mumps.....	708	2.2	5	3.1	3	1.5	.....	.....
Influenza.....	700	2.2	.....	.....	7	3.4	43	4.5
Typhoid fever.....	590	1.9	.....	.....	1	0.5	.....	.....
Syphilis.....	517	1.6	.....	.....	.....	.....	.....	.....
Dysentery.....	297	0.9	.....	.....	8	3.9	7	0.7
Puerperal fever.....	67	0.2	1	0.6	.....	.....	.....	.....
Infantile tetanus.....	64	0.2	.....	.....	1	0.5	.....	.....
All other diseases.....	1,145	3.6	2	1.2	27	13.3	1	0.1

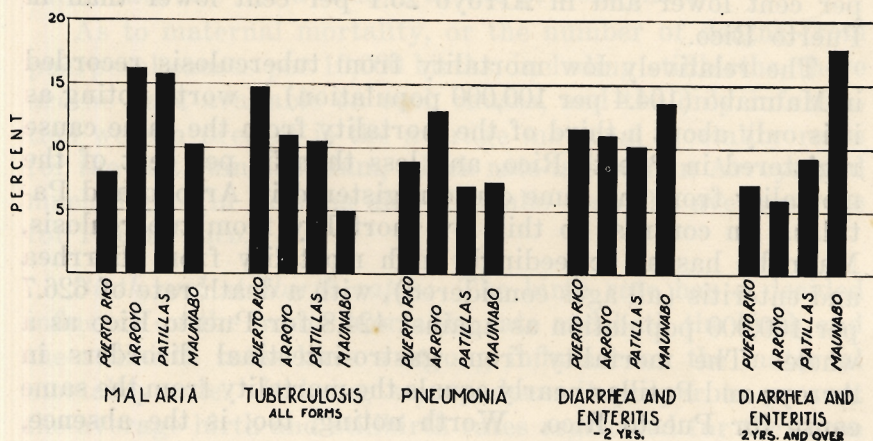
The findings of the present survey confirm this situation as to the prevalence of malaria, for 411, or 89.9 per cent of the 456 sick persons found in the surveyed area were suffering from it.

It is possible that the high prevalence of malaria might tend to obscure or conceal many other causes which are present both in the surveyed area and in the three municipalities at large, but, judging from the data at hand the problems of malaria, intestinal parasites, tuberculosis and syphilis take precedence over all other health and medical problems.

General mortality: The average general mortality during the years from 1931 to 1935 was 21.9, 22.0 and 20.0 deaths per 1,000 population in Arroyo, Patillas and Maunabo, respectively, as compared with a death rate of 20.3 for Puerto Rico as a whole during the same period.

Mortality from important causes: The disease causing most deaths in Arroyo and Patillas is malaria, with recorded death rate of 358.2 and 348.1 per 100,000 population, respectively, from 1931 to 1935 (table 15). In Maunabo the highest death rate registered during the same period is from diarrhea and enteritis in persons 2 years of age and over (351.6 per 100,000 population), with diarrhea and enteritis in children under 2 years of age in second place, and malaria, third place, with a recorded death rate of 210.1 per 100,000 population. The highest death rates recorded in Arroyo besides those from malaria are from pneumonia (286.6), diarrhea and enteritis under 2 years of age (245.9), and tuberculosis (243.9).

PRINCIPAL CAUSES OF DEATH -
PUERTO RICO, ARROYO, PATILLAS AND MAUNABO
1931-1935



In Patillas the highest death rates recorded, besides malaria, are from tuberculosis (231.9), diarrhea and enteritis under 2 years of age (228.3), and diarrhea and enteritis in persons 2 years of age and over (205.9).

TABLE 15

AVERAGE DEATHS AND DEATH RATES FROM IMPORTANT CAUSES FOR ARROYO, PATILLAS, MAUNABO AND FOR PUERTO RICO: 1931-1935

Causes of Death	Puerto Rico		Arroyo		Patillas		Maunabo	
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
ALL CAUSES.....	33,397.0	2,031.1	192.2	2,194.6	331.2	2,203.2	196.6	2,005.2
Malaria.....	2,778.8	169.4	31.4	358.2	52.4	348.1	20.4	210.1
Tuberculosis (all forms)...	4,949.0	300.3	21.4	243.9	34.8	231.9	10.2	104.4
Pneumonia (all forms)...	2,981.8	181.8	25.0	286.6	23.0	153.5	14.6	150.3
Diarrhea & Ent. (-2 yrs.)	3,868.8	234.9	21.6	245.9	34.4	228.3	26.8	275.1
Diarrhea & Ent. (2 & over)	2,435.4	189.9	11.6	132.1	31.0	205.9	34.8	351.6
Nephritis.....	2,197.4	133.4	15.0	169.9	23.8	158.9	10.2	103.8
Syphilis.....	464.0	28.1	3.0	34.0	8.2	53.6	0.8	8.1
Cancer (all forms).....	752.6	45.6	6.2	71.0	4.6	30.5	1.4	14.1
Influenza.....	442.8	26.8	0.6	6.8	4.6	29.8	4.8	47.7
Diseases of the heart.....	1,682.8	102.2	7.0	80.1	7.4	48.6	3.6	36.6
Uncinariasis.....	521.6	31.7	.....	.....	3.4	22.8	2.4	24.7
Typhoid fever.....	92.2	5.6	.....	.....	0.6	3.9	.....	.....
All other causes.....	10,229.8	581.4	49.4	566.1	103.0	687.4	66.6	678.7

All rates per 100,000 population according to the censuses of 1935 and 1930.

Source: Bureau of Epidemiology and Vital Statistics, Department of Health of Puerto Rico.

The mortality from malaria in Arroyo and Patillas is 111.4 per cent and 105.5 per cent higher, respectively, than the mortality from the same cause registered in Puerto Rico. In Maunabo, the mortality from malaria is 24 per cent higher than in Puerto Rico. On the other hand, the mortality from tuberculosis is lower in all three municipalities than in Puerto Rico. In Maunabo it is 187.6 per cent lower, in Patillas 29.5 per cent lower and in Arroyo 23.1 per cent lower than in Puerto Rico.

The relatively low mortality from tuberculosis recorded in Maunabo (104.4 per 100,000 population) is worth noting as it is only about a third of the mortality from the same cause registered in Puerto Rico, and less than 50 per cent of the mortality from the same cause registered in Arroyo and Patillas. In contrast to this low mortality from tuberculosis, Maunabo has an exceedingly high mortality from diarrhea and enteritis (all ages considered), with a death rate of 626.7 per 100,000 population as against 424.8 for Puerto Rico as a whole. The mortality from gastro-intestinal disorders in Arroyo and Patillas nearly equals the mortality from the same cause for Puerto Rico. Worth noting, too, is the absence,

or the low death rates, presented by uncinariasis (hookworm disease) and typhoid fever. Of the latter, only one death was registered in Patillas during the five-year period in question.

Infant and maternal mortality: The five-year average infant mortality rate in Arroyo (143.9) is higher by 14.2 per cent than the rate recorded for Puerto Rico as a whole (126.0); in Patillas and in Maunabo the infant mortality rate is below the average rate for the Island (table 16).

TABLE 16

AVERAGE INFANT AND MATERNAL MORTALITY RATES IN ARROYO, PATILLAS AND MAUNABO AND IN PUERTO RICO: 1931-1935

Area	Infant mortality rate	Maternal mortality rate
PUERTO RICO.....	126.0	57.0
Arroyo.....	143.9	49.7
Patillas.....	118.6	76.8
Maunabo.....	96.6	63.8

Infant mortality rates: deaths under 1 year per 1000 live births.

Maternal mortality rates; deaths from puerperal causes per 10,000 births, including stillbirths.

An examination of the causes of death of infants under one year of age in the three municipalities would undoubtedly throw light on the infant mortality recorded. Unfortunately, these data are not available at the present time.

As to maternal mortality, or the number of deaths from puerperal causes per 10,000 births, including stillbirths, there are no data available on such causes, and the only information we can present is the average maternal mortality rates for the last quinquennium, which rate is lower in Arroyo and much higher in Patillas and Maunabo than the average rate for Puerto Rico.

Birth and stillbirth rates: The birth rate has a decided influence on the infant mortality rate and both the birth and the stillbirth rates have a strong influence on the maternal mortality rate. It being so, we deem it proper to present the average birth and stillbirth rates registered for the three

municipalities and for Puerto Rico during the quinquennium from 1931 to 1935 for purposes of comparison (table 17).

TABLE 17

AVERAGE BIRTH AND STILLBIRTH RATES IN ARROYO, PATILLAS AND MAUNABO AND IN PUERTO RICO: 1931-1935

Area	Birth rate	Stillbirth rate
PUERTO RICO.....	39.7	68.2
Arroyo.....	38.4	70.6
Patillas.....	42.4	56.5
Maunabo.....	43.6	55.5

Birth rates per 1000 population according to the Censuses of 1935 and 1930.
Stillbirth rates per 1000 births, including stillbirths.

The birth rate is high in all three municipalities. Arroyo has a birth rate of 38.4 per 1,000 population, which is slightly below the rate recorded for Puerto Rico as a whole (39.7). Patillas shows a birth rate of 42.4 per 1,000 population and Maunabo a rate of 43.6 per 1,000 population. The stillbirth rate, or the number of stillbirths per 1,000 births (including stillbirths) is in Arroyo slightly above the average rate for the Island, while in Patillas and Maunabo it is much lower than the average for Puerto Rico.

Caution should be used in the interpretation of rates for each municipality taken separately, because great variability is liable to occur in rates based on small numbers, and also because of the different factors that may influence such rates in one section or another. This, of course, applies to death rates and all others. However, the fact that the rates have been computed for five-year periods tends to make them more reliable.

General Morbidity:

A total of 456 morbidity forms with a preliminary diagnosis was obtained. Bearing in mind that sick persons were considered only as those lying in bed with symptoms of any disease, this total overstates the number of sick persons, as there were many cases in which the morbidity form was filled only after a positive laboratory report was received. This applies especially to cases of apparently healthy carriers of

malaria who presented few or no symptoms, and who were considered as cases recorded on the morbidity form only after the said laboratory report was received. There were 357 of these cases. Thus the clinical cases were 99, with the following diagnoses:

Disease	Cases
TOTAL.....	99
Malaria.....	54
Tuberculosis.....	15
Syphilis.....	4
Diarrhea & Enteritis.....	6
Intestinal parasites.....	2
Conjunctivitis.....	3
Bronchitis.....	2
Nephrosis.....	1
Chronic rheumatism.....	1
Diphtheria.....	1
Myocarditis.....	1
Mycoses.....	1
Cretinism.....	1
Left ovarian cyst.....	1
Congenital malformations.....	1
Hernia.....	1
Insanity.....	1
Idiocy.....	2
Epilepsy.....	1

The classification of these 456 cases by age, sex and color is shown in table 18.

TABLE 18

AGE, SEX AND COLOR OF SICK PERSONS FOUND IN AREA

Age	Total	White		Colored	
		Male	Female	Male	Female
ALL AGES.....	456	145	156	77	78
PER CENT.....	100.0	31.8	34.2	16.9	17.1
Under 1 year.....	4		3		1
1—4 years.....	62	20	21	14	7
5—9 years.....	82	24	23	15	20
10—14 years.....	81	24	26	15	16
15—19 years.....	42	16	11	11	4
20—24 years.....	49	13	17	9	10
25—29 years.....	24	4	12	1	7
30—34 years.....	15	5	6	2	2
35—44 years.....	50	23	17	5	5
45—54 years.....	23	10	8	3	2
55—64 years.....	15	4	8		3
65—74 years.....	9	2	4	2	1

Relationship of patients to householder: Of the 456 cases, 73 or 16 per cent were heads of families; in 75 cases or 16.4 per cent the patient was the wife of the head of the family; in 225 cases or 49.3 per cent the patients were sons or daughters of the householder, and in 83 or 18.2 per cent the patient was some other relative of the householder.

Duration of sickness: Fourteen patients, or 3.1 per cent of the total, informed us that they had been sick for less than one week; 130 patients, or 28.5 per cent said that they had been sick from one to four weeks, and 312 patients, or 68.4 per cent of the total, rated sickness at more than four weeks.

Medical attendance: The deficiency of the medical attendance in the rural areas of Puerto Rico may be further appreciated by the information gathered through the present survey; 290 out of 456 persons sick, or 63.6 of the total, declared that they were not receiving any kind of medical care. In 165 of the cases, or 36.2 per cent the patients said that they were being attended by physicians.

Of those patients not being attended by physicians, 260, or 89.7 per cent were not taking medicines of any kind; and 30, or 10.3 per cent were taking medicines.

The Malaria Problem:

The most important health problem in the area studied and in the municipalities of Arroyo, Patillas and Maunabo is, without any doubt, the malaria problem.

The control of malaria, as it is at present scientifically recognized, can be accomplished in two ways: (1) by the control of the causative organism through the treatment of the diseased individuals; (2) by the control of the carrying agent, the anopheles mosquito. The first is a curative process while the second is a preventive measure, and, in the long run, the one of major importance. The control of the incidence of the anopheles mosquito will lead to a diminution in the possibilities of infection, in the same manner that the isolation of actual cases will diminish the possibilities of transmission of the disease.

The methods of effectively controlling the incidence of the mosquito will be those tending to prevent its propagation. Three out of four periods of the life cycle of the mosquito take place in water. Now, the most appropriate water for

the anopheles mosquito to breed in is clear and pure water, as found in swamps around the coast in Puerto Rico. In general, they will also breed in water with certain concentration of salt (NaCl), but they will not breed in waters with heavy deoxidized organic matter as those of cesspools, latrines, factory discharges, etc.

Thus, it appears certain that the drainage of wet lands with the purpose of suppressing the breeding places together with the use of larvicides wherever drainage is not possible, would end in the permanent control of the disease. Moreover, the drainage of the wet regions will result in a permanent improvement of the land from the agricultural point of view, and, in all probability, would be sufficient to pay for, if not all, a considerable amount of the work to be done.

Having this in mind, it was considered proper to make a brief study of the malaria problem from an engineering standpoint, not only in the surveyed area but in the three municipalities at large.

Description of malarial places: * The swampy area in the vicinity of Arroyo, property of Central Lafayette, is a relatively long and narrow strip of land, about 2,500 ft. wide and 6,000 ft. long, covering approximately 350 acres of land. This portion of land, although connected by means of open canals on its extreme and central parts with the sea, is separated from it by an average distance of about 1,000 to 1,500 feet. The land separating the swampy area and the sea lies at a level ranging from 3 to 7 feet above mean tide elevation, while the swampy area is nearly at mean tide elevation.

High-tide inflows are liable to occur, but due to the normal outflow of seepage water toward the sea, the effect on the soil is only that of raising the seepage water level, this water eventually gaining its way into the sea.

At the present time, the swampy area belonging to Central Lafayette and part of the swampy land owned by private proprietors, are partially drained by means of a pumping system which lowers the ground water elevation about $3\frac{1}{2}$ feet below an approximate low-tide level in the vicinity of the pumping station. This pumping station is located midway

* Mr. Ramón P. Pérez, S. M. in P. H. Engineering, studied the malarial places in Arroyo, Patillas and Maunabo and rendered a report on the subject.

in the swampy area along its longest dimension, where an outlet pump canal discharges into the sea. The drainage system at present consists of main open canals and small open ditches, which act as laterals.

Sugar cane has been grown in this partially drained area, but this season's crop was destroyed by a flood which occurred early in the year, due to very heavy rains.

Farther towards the west of the swampy land belonging to Central Lafayette there is a strip of land held by other owners, of which the lower portion is cultivated and wet, and which in its extreme boundary on the Caribbean Sea is covered by mangroves. These mangrove swamps are so low as to permit tide fluctuations, but they are sweetened by underground and rainfall inflows.

To the west of the town of Arroyo, and in the neighborhood of its municipal cemetery, there is property leased by Lafayette which covers about 50 acres of arable land and which is a possible danger from the malarial standpoint.

Another engineering problem noted in the vicinity of Arroyo is the Arroyo River. It has been observed elsewhere that during the dry season of the year the normal water content of the river lowers to a point where numerous small pools are left along the river bed to become anopheline breeding places. This problem may be solved by means of a tile drainage system along the river bed initiated from the extreme lower portion with a designated size of drain tiles and continuing with diminishing diameters. These tiles are designed to lower the water level and assure the elimination of the pools.

Besides the area already described there exist numerous disseminated small areas that could be controlled properly if some definite steps could be taken as to the control of the larger areas.

The antimalarial work, from the permanent control point of view, in the municipality of Patillas presents as its major problem the control of two rivers and two *caños*, located between the two rivers, in which actual breeding places of considerable importance were found during the present survey.

Around the lower region of the municipality there exist several fields of wet land with a total of about 50 acres

of land. This land is under cultivation and it is thought that a tile drainage system could be established by a direct gravity method. The northern part of the municipality, or that to the north of the Insular Road, does not present malarial problems of importance.

The rivers referred to above are the Río Pollo or Río Chico on the east, and Río Patillas on the south. The mouths of these rivers and of the *caños* act as lakes because of the wave action on the sea sand in times of low river water. Furthermore, the mouths of the *caños* have been closed with low levees so that the lakes can be used as pump intakes for irrigation purposes, thus becoming ideal mosquito-breeding places.

There exists also the lowland covered with mangroves in Colonia San Isidoro, leased by Central Lafayette to a private individual. This land lies at the south of said colonia. Of the three towns under consideration, Patillas contains the least amount of swampy land.

In the municipality of Maunabo there is the contrast of relatively high mountains ending abruptly at the plains which extend to the sea. This explains the erosive power of the water from the mountain streams and the marked sedimentation observed in the lowlands.

There are about 150 acres of low and wet land in Colonia Bordelaise and about 200 acres of such land in Colonia Garonne in Maunabo. Almost all of the wet land in Colonia Bordelaise is plain land, while in Colonia Garonne there are about 100 acres of wet and flat land, and over 100 acres in semiplain or high land.

It was noted that while in Colonia Bordelaise there are some changes in soil type and texture, Colonia Garonne presents very diversified changes, from loam, sand and gravel to *tosca* and rock. This indication is of value if it is kept in mind that drainage systems vary with the type of soil found.

Although the Maunabo River runs through this town, it does not constitute a problem from the malaria point of view, due, first, to the large sedimentation constantly taking place, and, second, to a larger annual rainfall than in the other towns.

Malaria morbidity: The cases of malaria found in the surveyed area were 428. These cases were classified as

active cases and carriers, of which there were 54 active cases and 374 carriers, or 12.6 per cent and 87.4 per cent, respectively. A further classification of the cases of malaria, according to whether or not they were on the sick list or had had a laboratory examination, is the following: 379 cases were on sick list and were found positive on blood examination; 32 were clinical cases or on the sick list and were either negative on laboratory examination, or had had no laboratory examination, and 17 cases were positive on laboratory examination and were not listed. Besides, there were 32 positive samples sent from the surveyed area, the corresponding names of which did not appear on the investigation sheets and which, it is presumed, belonged to people from outside the area. These 32 samples have been excluded from this analysis although they have been included in the laboratory table.

Therefore, we are presenting data based on the 411 cases which are on sick list, notwithstanding the fact that there are 17 additional cases positive on laboratory examination but which are not listed.

The 411 cases were classified by sex and color, with the following results (table 19):

TABLE 19
AGE, SEX AND COLOR OF MALARIA PATIENTS

Age	Total	White		Colored	
		Male	Female	Male	Female
TOTAL.....	411	127	140	74	70
PER CENT.....	100.0	30.9	34.1	18.0	17.0
Under 1 year.....	3		2		1
1—4 years.....	54	17	19	14	4
5—9 years.....	81	24	23	15	19
10—14 years.....	75	22	25	13	15
15—19 years.....	41	15	11	11	4
20—24 years.....	46	13	16	8	9
25—29 years.....	23	4	11	1	7
30—34 years.....	15	5	6	2	2
35—39 years.....	19	13	3	1	2
40—44 years.....	17	4	8	4	1
45—49 years.....	12	4	4	3	1
50—54 years.....	9	5	3		1
55—59 years.....	5		3		2
60—64 years.....	5	1	3		1
65 years & over.....	6		3	2	1

Types of malaria: A total of 3,835 samples of blood for malaria were examined from the surveyed area. Of these, 3,407 or 88.8 per cent gave a negative result, and 428 or 11.2 per cent gave a positive result. The 428 positive samples are classified according to the plasmodium found as follows:

	Positive Cases	Per Cent
TOTAL	428	100.0
<i>P. falciparum</i>	202	47.2
<i>P. vivax</i>	201	47.0
<i>P. malariae</i>	25	5.8

Length of residence: Considering the length of residence of the inhabitants in the surveyed area, the population is very stable, the proportion of people who have resided in the community for more than one year being very large (94.9 per cent), and the proportion of people having resided in the community for one year or under, very small (5.1 per cent). Naturally, the length of residence in house and in community of the malaria patients has to conform to the length of residence of the population at large. Nevertheless, a table is presented (table 20) showing the length of residence in house and in community of the 411 malaria patients, for the importance that the length of residence in one place has when considering the incidence of malaria in a malaria district. We find that 80.8 per cent of the patients had resided in the same house for more than one year and that 96.4 per cent of them had resided in the community for more than one year.

TABLE 20

LENGTH OF RESIDENCE OF MALARIA PATIENTS IN HOUSE AND IN COMMUNITY

Area	Total	1 yr. or under	2 yrs.	3 yrs.	4 yrs.	Under 5 years	5 yrs. & over	Not Speci- fied
TOTAL:								
In house.....	411	79	32	35	31	177	230	4
Per Cent.....	100.0	19.2	7.8	8.5	7.5	43.0	56.0	1.0
In community.....	411	15	11	13	12	51	360	.....
Per Cent.....	100.0	3.6	2.7	3.2	2.9	12.4	87.6	.....
ARROYO:								
In house.....	130	18	10	15	8	51	77	2
In community.....	130	3	.....	6	6	15	115	.....
PATILLAS:								
In house.....	71	20	5	2	10	37	34	.....
In community.....	71	1	3	.....	2	6	65	.....
MAUNABO:								
In house.....	210	41	17	18	13	89	119	2
In community.....	210	11	8	7	4	30	180	.....

Former residence of patients: An examination of the former residence of the patients shows that only four patients had resided in municipalities other than Arroyo, Patillas and Maunabo four or five weeks before the attack they were suffering from at the time of the investigation.

Use of mosquito nets: Two-hundred and sixty-nine patients, or 65.5 of the total, did not use mosquito nets: 142, or 34.5 per cent of the total, did use mosquito nets.

History of previous attacks: Two-hundred and eighty-nine patients, or 70.2 per cent of the total, had had previous attacks of the disease; 122 patients, or 29.7 per cent had had no previous attacks.

Spleen index: In 85 cases, or 20.7 per cent of the total, it was stated in the morbidity form that the spleen was palpable; in 315, or 76.6 per cent of the cases, it was stated that the spleen was not palpable; in 11 cases, or 2.7 per cent of the total, there was no information.

Geographical distribution of cases: The malaria cases were distributed as follows:

	Cases	Per Cent
TOTAL.....	411	100
ARROYO:.....	130	31.6
Enriqueta-Concordia.....	61	
Lafayette.....	28	
Palmas 4 Calles.....	41	
PATILLAS:.....	71	17.3
Felicita.....	13	
Catalina.....	20	
Providencia-Perú.....	38	
MAUNABO:.....	210	51.1
Bordelaise.....	122	
Garonne.....	88	

Intestinal Parasites:

Although only two cases harboring intestinal parasites were clinically diagnosed during the present survey, the problem of intestinal parasitism in the surveyed area is by no means unimportant, for 79.3 per cent of the persons whose stools were examined harbored parasites of one kind or another in their intestines. Samples of feces were taken indiscriminately from all persons found at home, a total of 2,445 samples, of which 1,939 were positive and 506 negative (table 21). Of the positive samples, 939, or 38.4 per cent, had a mixed infestation and 1,132, or 46.3 per cent, were positive for uncinaria.

The stools of 46 suspected cases of bilharzia were sent to the laboratory of the School of Tropical Medicine for examination. Only one of them gave a positive result.

TABLE 21
SAMPLES OF FECES EXAMINED

Examinations	Number	% positive
TOTAL NUMBER OF SAMPLES.....	2,445	
Positive any parasite.....	1,939	79.3
Mixed infestation.....	939	38.4
Uncinaria (hookworm).....	1,132	46.3
<i>A. lumbricoides</i>	289	11.8
<i>T. trichiura</i>	1,529	62.5
<i>Tenia</i>	1	0.04