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AN ACCOUNT OF LEPROSY IN THE VIRGIN ISLANDS OF THE UNITED STATES*

1841 - 1940

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I. GENERAL DESCRIPTION OF THE ISLANDS

The Virgin Islands of the United States lie in the Lesser Antilles, part of that curving crescent of the West Indies which bounds the Caribbean Sea on the north and east. They are situated about 40 miles east of Puerto Rico and 1400 miles south of New York at approximately longitude, 64° West and latitude, 18° North. There are more than 50 islands and Cays in the group but only three are of any size or importance. These are St. Croix, St. Thomas and St. John, which include practically all of the land area of 133 square miles and of the population of 25,000. St. Thomas and St. John lie close together near the British Virgin Islands, while St. Croix is 40 miles to the south in the Caribbean (Figure 1).

St. Thomas, which is rugged and mountainous with peaks rising more than 1500 feet above sea level and a negligible amount of coastal plain, extends nearly 14 miles from east to west and four miles from north to south. The outline is irregular, and there are many deep indentations and bays which are said to have been used in the past by smugglers and pirates. The island of St. John, three miles east of St. Thomas and somewhat smaller, is equally rugged, mountainous and irregular. Most of St. Thomas and St. John is thickly covered with trees interspersed with dense, thorny underbrush and vines, although there are cleared areas used for pasture in the eastern part of St. Thomas. St. Croix, which is about 24 miles long from east to west and six miles wide in its western half, has a range of mountains and low hills along the north dropping in the south to extensive plains which slope gently down to the sea. The highest point on St.

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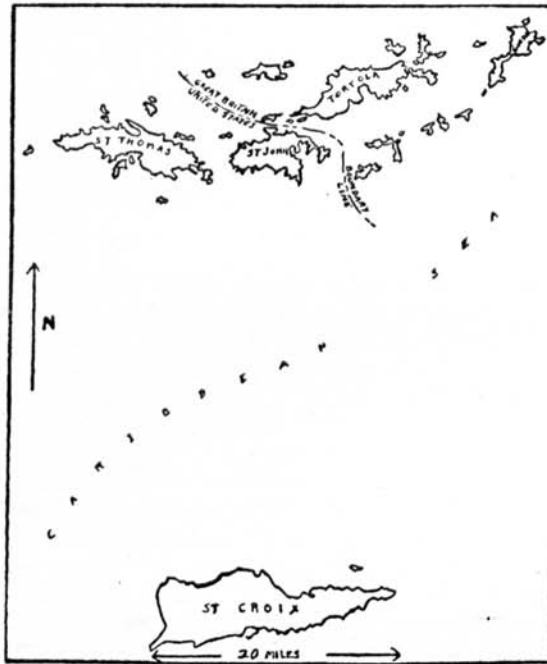


FIG. 1. Map of the Virgin Islands

Croix is about 1160 feet above sea level. The vegetation varies from fairly dense tropical forest in the northwestern region to thickets of acacia and cactus in the eastern section and to pasture grasses and sugar cane in the south and west portions. There are no permanent rivers or streams on St. Thomas or St. John and only a few on St. Croix and these become mere trickles after a prolonged drought.

The climate of the Virgin Islands is mild and agreeable, the average annual temperature being about 80° F. with an extreme range from a minimum of 68° F. to a maximum of about 92° F. There are seldom any uncomfortably warm days or nights, for the brisk trade winds blow across the islands almost constantly except during the hurricane season in the late summer and fall months when there are periods of dead calm and fitful, varying winds. The average rainfall amounts to about 46 inches although it is slightly higher in some parts of the islands and lower in others. The wettest months are generally September, October and November, and the driest, January, February and March. This amount of precipitation, which ordinarily would be ample for a flourishing agricultural economy where the soil is fertile, is inadequate in the Virgin Islands because of the sudden torrential character of the rains with a consequent high run off, rapid evaporation, and frequent and prolonged droughts. Consequently, parts of the islands are semi-arid, and agriculture as a means of livelihood is discouraging and precarious.

The inhabitants of the Virgin Islands numbered nearly 25,000 in 1940,

of which only 722 lived on St. John while the remainder were about equally divided between St. Croix and St. Thomas (Table 1). Negroes make up nearly 80 per cent of this total; mixed Negro and white strains about 10 per cent, and there are slightly less than 10 per cent classed as whites. During the past decade several thousand Puerto Ricans have moved to the Virgin Islands, mainly to St. Croix. These are classified, racially, as "mixed" for they represent mixtures of Negro, white and Caribbean Indian stocks. There is considerable interchange of populations among the three U. S. Virgin Islands, with the neighboring British Virgin Islands and with other islands further to the south and east.

St. Thomas has long been the trading center for the Virgin Islands and most of its inhabitants are engaged in commerce and in shipping. More than 90 per cent are centered in the one town of Charlotte Amalie. The population of St. John lives almost entirely by fishing and by raising cattle, some garden produce and fruit. St. Croix is primarily an agricultural island and the majority of the inhabitants live in rural areas where they cultivate sugar cane or raise cattle.

Economically, the inhabitants are very poor and for many years have been far from self-supporting. That they consume much more than they produce is shown by trade figures for 1920 to 1933, during which period imports amounted to more than 32 million dollars and exports to a little more than 15 million dollars (1). These figures do not, of course, take account of local produce consumed locally, but the value of this is not great. For years, most of the population lived at a starvation level but this condition has been greatly improved during the past eight years through various government agencies which have provided much employment.

Housing conditions on the islands are generally poor. The peasant population, which makes up the vast majority of the total, lives in crowded, insanitary houses of one or two rooms. In St. Croix, the two main towns of Christiansted and Fredericksted account for about one-third of the inhabitants while the rest live almost entirely in estate-villages dating back to the days of slavery. In St. Thomas, where economic conditions are on a higher level due to the shipping, tourist travel and a higher wage scale, the houses are somewhat better and there is possibly somewhat less crowding in the individual households. But even here, there are many squalid, dark structures each providing shelter for many families.

The literacy rate for the islands is fairly high. The 1930 census lists only 16 per cent of persons over 10 years of age as illiterate. There has been a good educational system on the islands for a long time and all children are expected to go to school until they are 14 years old. Among the lower classes legal marriage is a rarity and more than half of all children born on the island are illegitimate. Common-law marriages are the rule and while the partners to such an agreement are generally faithful for the duration of the partnership, the duration may be brief and it is common for women to have several children by as many different mates. It is probable that under the easy code of morals, females have as varied sexual experience as males.

The diet of the inhabitants is very limited and while usually adequate

in quantity is deficient in vitamins, particularly "A" and "B". This results from the local conditions of poverty and the relative barrenness of the soil. Few fruits or vegetables are raised and no cereal grains are grown except a little corn. The average weekly expenditure for food in the lower classes is little more than a dollar per person. The staple diet of the majority is fried fish, or salt fish, and "fungi" (cornmeal) supplemented at times with various kinds of "bush tea," cow's milk, a bit of beef or pork, seldom chickens or eggs, and occasionally, vegetables such as potatoes, yams, carrots, beets or beans. Bananas and citrus fruits are seldom eaten, but mangoes are plentiful during the season.

One of the greatest needs of the islands is an abundant and unailing supply of fresh water. Rivers and streams are almost entirely lacking, and there are few wells. The inhabitants must depend upon collected rainwater to supply their drinking and bathing requirements. Nearly every better class house has its collecting gutters and masonry or concrete cisterns. The poorer houses often have no cistern but collect the water in rain barrels, oil drums or kerosene tins.

II. HISTORICAL SKETCH (2, 3)

For nearly four and a half centuries, since the time the Spaniards established the first settlements in the Caribbean, the West Indies have played an important part in the history of the Western Hemisphere because of strategic position and mineral and agricultural resources. The larger and more important islands were first occupied and developed by the great nations of the time while the smaller were taken up gradually by less powerful European countries in their quest for riches and a short trade route to the wealth of the Indies.

The Virgin Islands were first discovered by Europeans in 1492 when Columbus made a landing on St. Croix in search of fresh food and water. At that time the only inhabitants were parties of Carib Indians. The first occupation by Europeans occurred about 1625 when a group of Dutch and English settled on St. Croix. They were later joined by a party of French from St. Kitts, but evidently racial animosities developed for, in 1650, civil war resulted in the expulsion of the Dutch and French by the English. Later in the same year the English were driven out by a Spanish expedition from Puerto Rico, while a few years later another party of French from St. Kitts expelled the Spanish and took possession. The French, however, deserted the island about 1695 and there is no record of a permanent settlement until September, 1734, when the Danes formally took possession. St. Thomas was permanently settled in 1673 by a party of Danes, although previously there had been temporary occupation by roving groups of other nationalities.

Modern history of the Virgin Islands begins with the settlement of St. Thomas by the Danes in 1673. Two years previously a charter had been granted to the Danish West India Company to occupy and administer the Island of St. Thomas and such other unoccupied territory in the vicinity as might seem desirable. The West India Company continued its direction of the Virgin Islands until 1754 when the Danish crown took over

and maintained control until 1917 when the territory was sold to the United States.

This outline of broad historical events can be filled in briefly with some details of important happenings during the past two and a half centuries. During the first year of occupation of St. Thomas, the population numbered a scant 200 persons of whom half were Negro slaves brought in to perform the hard labor. The population increased slowly and in 1680 there were 156 whites and 175 Negroes. In 1691 there were 844 inhabitants. In 1717 the neighboring island of St. John, previously uninhabited, was claimed and settled by emigrants from St. Thomas. As years passed, more slaves were brought in from Africa, and English, Dutch and French joined the colony. Land was cleared, sugar cane planted, mills put up to grind the cane and a brisk trade in slaves and merchandise soon developed. The hilly character of St. Thomas and St. John, however, was unfavorable for expansion of the cane fields and the island of St. Croix was purchased from the French in 1733 and was settled by the first colonists from St. Thomas in 1734. This new settlement grew very rapidly. A census of 1773 showed nearly 22,000 inhabitants on St. Croix, only about 4,300 on St. Thomas and 2,400 on St. John. The Virgin Islands were occupied by British forces during the years 1801-1802 and 1807-1815, while the Napoleonic wars were in progress. In 1823 the first steamship to arrive in the Virgin Islands put into St. Thomas, and about 1838 the first steam-powered sugar mills were introduced, rendering obsolete the windmills and treadmills.

The dominant factor influencing the economy and the type of civilization in the West Indies was the introduction of African Negroes. The continued addition of a large number of Africans along with their natural increase very soon made the population predominately Negro and such it has remained to the present day. Records of the Danish West India Company show that during the period 1687 to 1699 more than 4,000 new African slaves arrived in St. Thomas, and 12,000 more in the period 1700 to 1754. By and large the Negroes were probably treated very well by the slave owners, for they represented valuable property, but various injustices and cruelties on the part of a few masters together with a growing sense of race and class consciousness led to frequent rebellions. For example, a mass revolt occurred in St. John in 1733 and many persons, both whites and Negroes, were killed. In St. Croix, in the years 1740 and 1759 there were serious uprisings; many lives were lost and much property was destroyed. In 1792, King Christian VII issued an edict prohibiting the slave trade between Africa and the colonies but it was not until more than 50 years later, in 1848, that a serious rebellion in St. Croix led to the final emancipation. The sudden transition from slavery to freedom, from an ordered life with necessities provided by the masters to a chaotic condition of laboring for wages and finding their own food and shelter, caused further trouble and in 1878 there was a serious revolt of the laborers on St. Croix, who burned and pillaged nearly half the island. Finally, after new agreements with the plantation owners, peace was restored.

The increase in labor troubles after the slaves were freed led to the introduction of contract labor sometime about 1870. Each estate owner contributed to a fund which was used to pay the expenses of importing

labor. Most of the contract laborers came from other parts of the West Indies, chiefly from the British islands of the southeast, but some were brought from India. Importation of labor continued until nearly the end of the Danish regime in 1917.

The number of inhabitants grew very rapidly during the first few years after St. Croix was settled and continued to increase until the peak was reached in 1835, when the population numbered more than 43,000 (Table 1). Subsequent to 1835 there was a gradual decline until in 1930 the census showed only 22,000 inhabitants. There are certain obvious reasons for the decline. During the early days when the price of sugar was high and labor was cheap and abundant, the islands were prosperous and immigration exceeded emigration. In the latter part of the 19th century labor conditions were unfavorable and the price of sugar became ruinously low due to development of better sugar lands elsewhere. As a result immigration dropped off and a general decline in economic conditions probably led to increased mortality and a lowered birth rate. In the first two decades of this century the crude mortality rate greatly exceeded the birth rates (4). But between 1930 and 1940, the artificial stimulation of government spending to avert actual starvation resulted in a 10 per cent increase in population. Fewer people left the islands to live in continental United States, large numbers of Puerto Ricans moved in, the death rate declined still further and the birth rate increased.

III. GENERAL MEDICAL CONDITIONS IN THE VIRGIN ISLANDS

A few outstanding points in the medical history of the islands have been gleaned from the very meager amount of information available. Cholera and yellow fever occurred in frequent, severe epidemics during the last century. Cholera caused a great many deaths in 1853, 1854, 1855, 1857 and in 1866 and 1867. Yellow fever occurred in epidemic form in St. Thomas in 1852 and again in 1866, but it is seldom mentioned after 1880. Epidemics of smallpox occurred, and in 1866 St. Thomas and St. John were devastated by smallpox, cholera and yellow fever. Malaria has frequently been an important cause of death during years of excessive rainfall only to disappear during dry years. The last malarial years were 1932 to 1934 when there were perhaps a thousand cases and many deaths. Filariasis has been prevalent on St. Croix for a long time, probably since the early days of Danish occupation, and pellagra has been an important disease at least since 1900. Dysentery and typhoid fever have doubtless been prevalent in the past, but during recent years the reported cases have been few. Leprosy has existed in the islands as far back as our available medical records go, and in 1884 St. Croix adopted a Sanitary Code which provided for the isolation of all leprosy cases either in quarters provided by the government for that purpose or at home if conditions were favorable. It was not until 1888 that the first leprosarium in the Islands was opened in St. Croix (5, 6, 7). This could accommodate only a fraction of the cases of leprosy, for there was space for only 35 patients. In 1903 a Sanitary Code was adopted for St. Thomas

and for St. John similar to that of 1884 for St. Croix. In 1910, the old leprosarium on St. Croix was replaced by a new one with much more spacious grounds, better living quarters and accommodations for about 70 patients. Recent additions and remodelling have enlarged the capacity to nearly 90 patients.

Available mortality and morbidity records permit an evaluation of the general trend of health conditions since the beginning of the present century. The crude mortality rates for St. Croix have declined rapidly from a level of about 40 per 1000 in 1900 to slightly more than 20 per 1000 in 1940 (Figure 2). The islands of St. Thomas and St. John show a

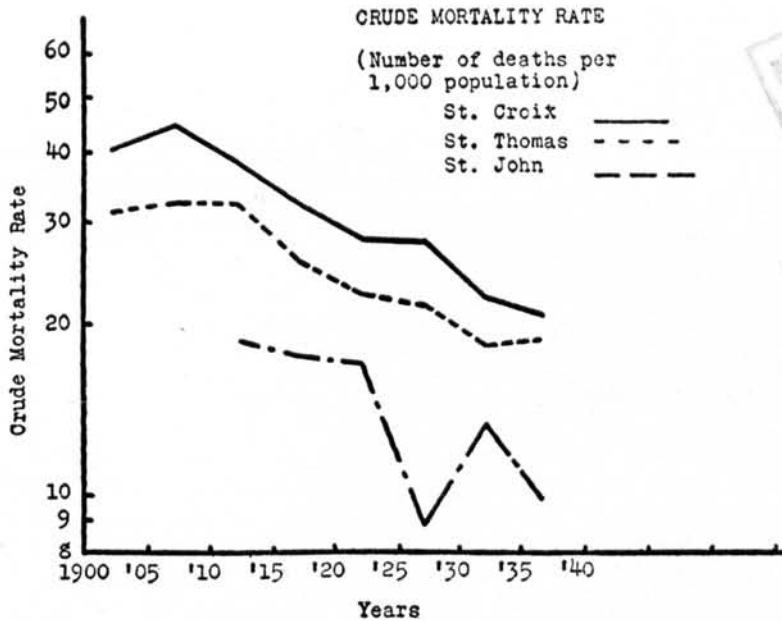


FIG. 2. Crude mortality rates, Virgin Islands, (semi-logarithmic scale)

parallel decrease but at a much lower level. The infant mortality rates which were very high during the first 15 years, nearly 400 for St. Croix and 250 for St. Thomas, have also shown a marked decline to slightly more than 100 per 1000 live births (Figure 3). Mortality figures which are available for St. Croix since 1841 indicate that crude mortality rates were maintained at a high level of 30 to 40 per 1000 until the early years of the 1900's. The striking features are the marked decline since 1900 and that St. Croix has constantly shown appreciably higher rates than St. Thomas, indicating the generally lower standards of hygiene for that island. The greater part of the decrease in mortality rates has occurred since the American occupation in 1917, and much credit must be given to the naval medical officers of the early days.

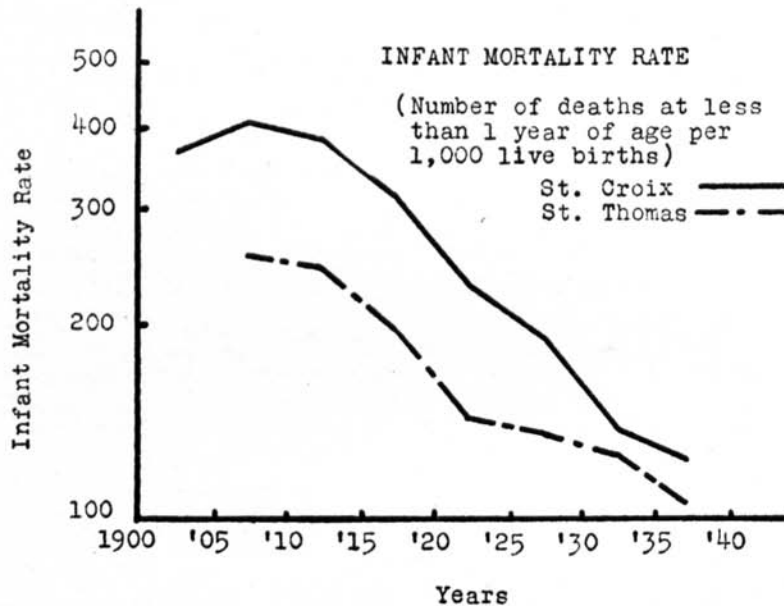


FIG. 3. Infant mortality rates, Virgin Islands, (semi-logarithmic scale)

The prevalence of certain diseases in a population group may be taken as a rough measure of the general level of hygienic health conditions. For example, a high prevalence of malaria, dysentery, tuberculosis and pellagra is indicative of an insanitary, unhygienic environment and an inadequate diet, with concomitant high general mortality rates. Table 2 shows a high level for these conditions for the Virgin Islands when compared with the United States Registration Area, and here again the rates for St. Croix are greatly in excess of those for St. Thomas. It will be important to remember these differences when considering the prevalence of leprosy in the Virgin Islands.

IV. THE PREVALENCE OF LEPROSY

SOURCES OF DATA. The data upon which this study of the prevalence of leprosy is based were obtained from several different sources; namely, the official Danish and unofficial church burial records; the leprosarium records; personal communications, and a leprosy survey of 1939-1940. A brief discussion of these sources of information follows:

A. Official Danish and Church Records. A record of burials was kept by the churches during the Danish regime, and in 1840 the local government required the churches to report all burials in a certain way and to list, among other things, the name and age of the individual and the cause of death. The church records were later copied into large registers which served as the official record. These official registers for the island

of St. Croix were available from 1841 to the end of the Danish regime in 1917. The official records for St. Thomas for the period 1876 to 1904 were found among the hospital archives, but the reports for other years were missing for St. Thomas and for the entire period for St. John. However, we were able to supplement the data for St. Thomas and St. John from some of the original church registers for some of the missing years.* Since the time of American occupation in 1917 the official death certificates are available. The cause of death was given in most instances for the period 1841-1885, but specific causes were listed infrequently from 1885 to about 1900, when "natural causes" was the common entry. Hence, in tabulating persons dying with leprosy, the numbers will be much too small for the period 1885 to 1900. One may well question the accuracy of diagnosis in the early years when, as is obvious from a study of the records, they were usually kept by non-medical persons. It is probable, however, that advanced stages of leprosy would be well recognized by the Danes and that considerable reliance may be placed upon the records. The Danish word for leprosy, "spedalskhed," was the one customarily used, although the Moravian and English churches used the English word.

B. *Leprosarium Records.* There has been a leprosarium in St. Croix since 1888. The records for the Danish period, 1888-1917, are in the form of a register which states the person's name, age, residence, dates of admission and discharge or death with, occasionally, additional data. Since 1917, individual clinic records are available for nearly all admissions.

C. *Personal Communications.* In a few instances we were able to get reliable information from the old residents of the Islands about people who had died of leprosy in the Virgin Islands, but who did not appear in any of the written records.

D. *Leprosy Survey 1939-1940.* During the years 1939 and 1940 a survey for leprosy in the Virgin Islands revealed a number of cases which were not previously on record (8).

GENERAL PREVALENCE. For the entire period from 1841 to 1930 we have record of 930 cases of leprosy, which represent only a part of the true number since the data are deficient for many years. The present status of the 930 cases follows:

Dead	758
Living	147 (includes 20 suspects)
Lost	25
Total	930

The number of leprosy persons dying with leprosy during any given period must bear some relationship to the number of cases

* *St. Croix*—Official Danish records for 1841 to 1917, except for 1854, 1855, 1856, the records for which were so badly mutilated as to be illegible. Official government records for 1918 to 1939.

St. Thomas—Moravian Church records for one church for period 1850-1862; for two churches for period 1853-1881; official Danish records for 1876-1904; official government records for 1918-1939.

St. John—Moravian Church records for one church for period 1846-1881; another church for periods 1850-1854, 1858-1876. Official government records for 1918-1939.

in the entire population, and an increase or decrease in leprosy death rates might indicate a corresponding increase or decrease in cases of leprosy. However, the situation is affected somewhat by changes in the general mortality, and a drop in leprosy mortality rates might merely reflect a decline in crude mortality and not a decline in leprosy incidence. The number of leprosy deaths for the Virgin Islands for 20 year periods during the past 99 years, together with the mean population for each period and the annual leprosy death rate are given in Table 3. This table indicates a fairly steady decline in leprosy deaths from 1841 to 1900. But during this entire period the returns were only partial, because records for St. Thomas and St. John were found for only certain years and from those of the years 1885 to 1900, specific causes of death were frequently omitted in all the islands. Also the records for three years, 1854 to 1857, are missing for St. Croix. Therefore, leprosy death rates were doubtless actually much higher than stated in the table especially for the years 1880 to 1899. Since 1900 interest in leprosy has grown. The new leprosarium, opened in 1910, could accommodate nearly all cases of the disease. Consequently, accuracy of diagnosis probably has increased, so that the stated numbers of leprosy deaths each year represent an increasingly larger proportion of the actual leprosy deaths. But this is partially offset by the fact that the crude mortality rates which remained at a high level of nearly 40 per 1000 from 1841 to 1900 have decreased from 40 to 20 per 1000 in the past 40 years. Considering all factors, it is probable that there has been a continued decrease in leprosy death rates during the past century, a decrease which is greater than would be caused by the decline in crude mortality.

The vast majority of the cases were diagnosed in St. Croix as shown by the following tabulation:

Residence at time of diagnosis	Number of cases
St. Croix	824
St. Thomas	83
St. John	15
Unknown	8
Total	930

The great preponderance of St. Croix cases is partly attributable to more complete mortality reports and to a larger population, but, in addition, St. Croix has undoubtedly had a much higher incidence of leprosy than the other islands.

An estimate may be made of the relative incidence in the three islands by comparing the ratios of deaths from leprosy to total deaths for each locality. This has been done for an "early" period, during the last half of the last century, and for a "late" period, the past 20 years, and the results are given in Table 4. Judging from the proportional mortality figures, which are admittedly subject to the criticism that other causes may have declined at different

rates in the various islands, it appears that there has been a decrease in prevalence of leprosy in St. Croix and St. John, but an increase in St. Thomas. The figures for the earlier period represent reports on the deaths obtained from certain old church records. Leprosy deaths for St. Croix have been considered separately in Table 5 which again indicates a decline in the leprosy death rate during the past century, a decline which has been greater than indicated by the figures because of more complete reporting during the past 30 or 40 years.

PLACE OF BIRTH

Of persons developing leprosy in the Virgin Islands, 83 per cent were natives and 10 per cent were born in other West Indies Islands, mainly in the British islands of Barbados, Nevis, St. Kitts and Anguilla. Of the remainder some were born in Africa, a few in British India and some in South America (Table 6). The proportion born outside the Virgin Islands is probably approximately the same as the proportion of foreign born in the population as a whole, which indicates that leprosy incidence was no greater among immigrants than in the indigenous population. This is further borne out by the fact that the average duration of residence in the Virgin Islands of 50 foreign-born patients at the time of diagnosis was about 18 years. An appreciable proportion of those found in St. Thomas were natives of St. Croix but on the other hand those found in St. Croix or St. John were almost exclusively natives of their respective islands. Analysis of case histories of those born in St. Croix and diagnosed in St. Thomas makes it evident that in many infection took place in St. Croix, while it is probable that most of the St. John cases developing in St. Thomas were actually infected in St. Thomas.

THE AGE AT DIAGNOSIS OF LEPROSY IN THE VIRGIN ISLANDS

The age at which signs of disease first appeared or when a diagnosis was made is not given in the records for 1841 to 1888. Since 1888, the age of admission to the leprosarium gives a general idea of the age at which the disease was appearing. Table 7 shows that the average age at admission has increased slightly, and that a greater proportion of persons admitted during recent years have been less than 15 years of age, or more than 50 years of age. One way to interpret these findings is that the disease is tending to develop later in life, but that earlier diagnosis has brought in childhood cases which were formerly being missed.

AGE AT DEATH OF PERSONS WITH LEPROSY IN THE VIRGIN ISLANDS

Table 8 shows that the average age at death for persons with leprosy in the Virgin Islands has increased from 38 years during the period 1841 to 1859, to about 46 years for the period 1930 to 1939. The increase is the same in males and females although the males die about eight years younger than females. We have com-

puted the average age at death for the general population of St. Croix for those dying at 10 years of age or over and the average age at death for persons with leprosy who died at 10 years of age or over. It is necessary to exclude the large number of deaths which occur at early ages in the general population because leprosy deaths do not occur, as a rule, in early childhood. For the general population the average age at death increased from 48 years to nearly 57 years, and for persons with leprosy from 39 years to 46 years during the past century (Table 9). Thus, it is evident that persons who had leprosy died at an earlier age than the general population but that they have shared in the general increase in life expectancy. Although their age at death was about 10 years younger than that of the general population, it is to be remembered that persons who contract leprosy are a selected group drawn largely from the lower economic and social levels.

SEX DISTRIBUTION OF CASES

In the entire group of 930 cases there were 499 males and 431 females. But females have always made up more than half of the total population of the islands, and for the years 1841 to 1899 the gross leprosy attack rate for the 60 year period was 18.9 per 1000 males, and 13.7 per 1000 females. For the 40 year period from 1900 to 1939, the male rate was 15.6 per 1000 and the female rate was 13.7 per 1000. Considering only cases living in 1940, the prevalence per 1000 is found to be 4.9 for males, and 5.2 for females. In other words, there seems to have been a shift from the higher male incidence to a higher female incidence. The male preponderance may be more apparent than real in the period 1888 to 1910 because before 1910 conditions in the leprosarium were so bad that females might have objected more than males to being isolated. Table 10 shows the number of admissions to the leprosarium in St. Croix since 1888. The high point in the period 1900 to 1910 is due to the opening of the new and larger leprosarium in 1910 when 52 cases were admitted in that one year, but since then admissions have generally declined. Before 1910 more males were admitted than females, but since 1910 there have been 89 male and 92 female admissions.

RACE

The race or color of the patients was seldom stated before 1917, but the vast majority were certainly Negroes. There have been a few from the East Indies, and a number of white patients, probably about in proportion to the total numbers in the population as a whole.

TYPE OF LEPROSY

The type of leprosy could be determined with some accuracy only since 1888 and only in a part of the cases. Of 239 patients, 132 or 55 per cent were classed as neural. There was very little differ-

ence between the sexes, for of 121 cases in males 57 per cent were classed as neural and of 118 cases in females 53 per cent.

Of 127 cases living in 1940, 59 were in males and 68 in females. Of the cases in males, 73 per cent and of those in females, 69 per cent were of the neural type. The great increase in neural cases over the previous period is attributable to the fact that a leprosy survey in 1939 and 1940 permitted the diagnosis of many early neural cases, the majority of which would doubtless not have been diagnosed in the absence of such a survey.

THE PREVALENCE OF LEPROSY IN 1940

In addition to the 127 cases known at the end of the survey there were 20 persons in whom leprosy was suspected but a definite diagnosis could not be made, three of whom had been paroled from the leprosarium after short stays there, and 17 of whom had never been admitted. Counting only the 127 definite cases, the known prevalence for the Virgin Islands was 5.1 per 1000; that for St. Croix 8.6 per 1000 and for St. Thomas, 1.4 per 1000.

V. DISCUSSION

Leprosy has been present in the Virgin Islands for at least a century, and probably since the early days of permanent occupation, in a population group which generally has had a low standard of living. Where the first cases came from is impossible to state with certainty, but it is very likely that the slave trade was responsible for introduction of many cases. It is possible that some of the European settlers developed leprosy in the Virgin Islands after originally being infected in Europe where the disease was still fairly common in the early days of the 19th century, especially in the Scandinavian countries. We do not know if the Caribs suffered from leprosy, but we can be relatively certain that they were not responsible for the introduction of the disease into the Virgin Islands in modern times, because they had abandoned the islands before permanent settlements were established.

The level of infection has apparently not been the same in the three islands. A century ago, there was a relatively high incidence in St. Croix, less in St. John, while St. Thomas seems to have had only a moderate incidence. The disease declined very rapidly in St. John until it was practically absent, and there has not been a case reported from that island for more than 20 years, possibly due to the fact that the inhabitants have diminished to such a small number that cases would not be expected often. In St. Croix there appears to have been a decrease in prevalence. There has been little evident change in the level of infection in St. Thomas as indicated by a comparison of the ratio of total deaths to leprosy deaths during the last half of the 19th and the first part of this century. But in this connection it must be remembered that St. Thomas has always had many imported cases while the other

islands have not; in fact, St. Croix doubtless helps to keep up the level in St. Thomas.

Two probably significant factors have been associated with decline in prevalence during the past 40 years: (1) The elevation of the social and economic level has led to a general decrease in mortality and morbidity in which leprosy has shared; (2) The isolation of cases of leprosy which began in 1888, was very incomplete until 1910 but has been fairly complete since then. This has permitted the removal from the population of a large proportion of the sources of infection which should in time effect a decrease in prevalence. The effect of isolation measures, however, are delayed for decades after their initiation due to the long incubation or latent period of the disease, and it is likely that the full effects were beginning to be felt only during the past decade. It would seem logical to predict a continued decrease in leprosy prevalence.

CONCLUSIONS

1. Leprosy has been present in the Virgin Islands for at least 100 years.
2. Incidence has diminished since 1841 and the decline has probably been more rapid during the past 30 years.
3. The average age at death for persons with leprosy has increased steadily during the past century, males dying considerably earlier than females. The average age at death for the whole population has run parallel to that for persons with leprosy, but at a higher level.
4. At the present time the highest prevalence is found in St. Croix with more than eight cases per 1000; next highest in St. Thomas with about 1.5 cases per 1000; and no cases are known in St. John.
5. At present there is a slightly greater prevalence in females than in males although formerly the reverse seems to have been true.

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TABLE 1. *The number of inhabitants of the Virgin Islands for selected census years, 1773 to 1940*

Year	St. Croix	St. Thomas	St. John	Total
1773	21,809	4,371	2,402	28,582
1796	28,803	4,734	2,120	35,657
1835	26,681	14,022	2,475	43,178
1901	18,590	11,012	925	30,527
1917	14,901	10,191	959	26,051
1930	11,413	9,834	765	22,012
1940	12,896	11,256	722	24,874

TABLE 2. *Annual specific mortality rates per 100,000 population for certain conditions for the Virgin Islands and for the U. S. Registration Area*

Cause of Death	St. Croix 1924 to 1938 (Average)	St. Thomas and St. John 1924 to 1938 (Average)	Virgin Islands 1924 to 1938 (Average)	U. S. Registration Area	
				1930	1929
Malaria	22.4	9.8	16.4	2.9	3.5
Dysentery	26.6	5.9	16.7	2.8	2.4
Tuberculosis all forms	126.4	101.5	119.0	71.5	76.0
Pellagra	146.5	65.0	119.0	5.3	5.8

TABLE 3. *Number of deaths from leprosy in the Virgin Islands by 20-year periods from 1841 to 1939; the mean population for each period and the average annual leprosy death rate*

Period	No. leprosy deaths	Mean population	Leprosy death rate per 100,000
1841 - 59	247	39,614	32.81
1860 - 79	173	37,864	22.84
1880 - 99	104	32,786	15.87
1900 - 19	126	27,428	22.96
1920 - 39	98	23,672	20.70
Unknown	10		
Total	758		

TABLE 4. *The number of total deaths and the number of leprosy deaths with the ratio of leprosy deaths to total deaths for each island for the period 1920 to 1939 and for an earlier period.*

Island	Period	Total deaths	Leprosy deaths	Ratio $\frac{\text{Leprosy deaths}}{\text{Total deaths}} \times 1000$
St. Croix	1841 - 1860	14,294	235	16.4
	1920 - 1939	6,342	82	12.9
St. Thomas	1850 - 1904	13,178	31	2.35
	1920 - 1939	4,136	16	3.9
St. John	1846 - 1876	1,263	15	11.9
	1920 - 1939	196	0	0.0

TABLE 5. Number of deaths of persons with leprosy in St. Croix by 20 year periods, 1841 to 1939, with the mean population and the average annual leprosy death rate.

Period	Number of leprosy deaths	Mean population	Leprosy death rate per 100,000
1841 - 53	235	33,720	43.55
1857 - 59			
1860 - 79	157	22,803	34.42
1880 - 99	83	19,783	20.97*
1900 - 19	109	15,779	34.54
1920 - 39	82	12,454	32.92

* During this period specific causes of death were seldom given. The stated figure is doubtless much too low.

TABLE 6. Place of birth of 930 cases of leprosy recorded in the Virgin Islands from 1841 to 1940, with residence at time of diagnosis

Place of Birth	Island of residence at time of diagnosis							
	St. Croix		St. Thomas		St. John		Virgin Islands	
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
St. Croix	457	82.6	9	13.2	0	0	466	73.3
St. Thomas	0	0.0	43	63.3	0	0	43	6.8
St. John	2	0.4	4	5.9	15	100.0	21	3.3
British West Indies	61	11.0	2	2.9	0	0	63	9.9
Other	33	6.0	10	14.7	0	0	43	6.7
Total known	553	100.0	68	100.0	15	100.0	636	100.0
Unknown	271		15		0		286	
Total	824		83		15		922	

Residence and birthplace unknown
Total 8
930

TABLE 7. *The average age in years at admission to the leprosarium and the per cent of admissions at certain ages for the periods: 1888-1909, 1910-1939, and 1920-1939*

Age in years	1888 - 1909 (Original leprosarium)	1910 - 1939 (New leprosarium)	1920 - 1939 (American period)
Average	32.88 years	34.65 years	35.06 years
0 - 14	8.4%	16.0%	13.7%
15 - 49	74.8%	61.0%	63.2%
Over 50	16.8%	23.0%	23.1%

TABLE 8. *The average age at death in years of persons with leprosy in the Virgin Islands by 20-year periods, 1841 to 1939*

Period	Average age at death		
	Male	Female	Total
1841 - 59	34.54	41.96	38.04
1860 - 79	33.99	44.70	38.66
1880 - 99	35.59	39.54	37.14
1900 - 19	39.32	49.00	43.77
1920 - 39	42.08	49.56	45.82
1841 - 1939	36.03	44.22	39.73

TABLE 9. *Average age at death for persons dying at 10 years of age and over, for general population of St. Croix and for persons with leprosy in the Virgin Islands by 20-year periods, 1841 to 1939*

Period	Average age at death	
	Total St. Croix	Virgin Islands
1841 - 59	48.28	38.87
1860 - 79	50.30	38.84
1880 - 99	51.02	37.41
1900 - 19	56.71	43.77
1920 - 39	56.55	45.82

TABLE 10. *Number of admissions to leprosarium by periods from 1888 to 1940*

Year of admission	Male	Female	Total
1888 - 90	27	12	39
1891 - 1900	30	22	52
1901 - 10	57	46	103
1911 - 20	30	35	65
1921 - 30	29	35	64
1931 - 40	30	22	52
1888 - 1940	203	172	375