PUBLIC HEALTH REPORTS

VOL. 53 MARCH 11, 1938 NO. 10

THE HENRY R. CARTER MEMORIAL LABORATORY

A New Laboratory Dedicated to the Study of Malaria Control

On February 8, 1938, the Henry R. Carter Memorial Laboratory of the United States Public Health Service, at Savannah, Ga., was formally dedicated. It is the purpose to study there the various problems of malaria control, with special attention to the development of new methods and the improvement of old methods with reference to efficacy and economies. This work is being conducted under the supervision of the Office of Malaria Investigations, a subdivision of the Division of Infectious Diseases of the National Institute of Health, and is under the direction of Senior Surg. L. L. Williams, Jr.

Many observations have been made which indicate the possibility of controlling malaria or preventing the production of the mosquito vector of the disease by means of some method other than mechanical. The Public Health Service therefore decided to make an intensive search for a natural or biological method of controlling production of the malaria-carrying mosquito. During the malaria investigations, stations and laboratories were established at Memphis, Tenn.; Columbia, S. C.; Jacksonville and Miami, Fla.; Washington, D. C.; and Panama, Canal Zone. None of these stations, however, were well suited for detailed biological researches. As the region around Savannah, Ga., offered exceptional opportunities for studying the mosquito in question under many different breeding conditions, a laboratory unit was set up there in 1937. Senior Surg. Thomas H. D. Griffitts was placed in immediate charge of the laboratory and was given a staff of two entomologists, a limnologist, a physicist, and a medical officer. Dr. Griffitts operated this laboratory in temporary quarters until the city of Savannah provided a new laboratory, the one which has just been dedicated. It is hoped that, through the studies conducted there, refinements of old methods will be developed and new and cheaper methods for the control of malaria may be discovered.

The adequacy of draining malaria mosquito breeding places has been well established and the utility of larvicides, such as paris green, light oils, and pyrethrum extract, in killing mosquito larvae has been demonstrated. These measures, however, entail certain expenses which are prohibitive for protection of small groups of people living

close to large breeding areas. Therefore, for many years malariologists have been searching for easier and cheaper methods of controlling the disease or of controlling production of the mosquito which transmits it, the *Anopheles*, especially the *quadrimaculatus* in the South. Some of the measures suggested have been partially successful; none of them entirely so. Top minnows eat mosquito larvae, but they cannot be depended upon to control mosquito production unless aided by expensive clearing operations. Wholesale drug administration to the population is successful only in controlling clinical attacks of the disease and does not affect the infection rate nor prevent chronic malaria. Screening is effective only for people who stay behind screens all night, and every night.

At the Henry R. Carter Memorial Laboratory, studies are under way to determine the physical and entomological requirements for mosquito production. The physical characters (soil, light and shade, temperature, and similar conditions) are analyzed, and the effect of each is tested; larvae food is identified, and food requirements are determined; eggs and their hatching are investigated; and an insectory is operated to supply large numbers of insects to be used in conducting the numerous experiments. In addition, the local prevalence of malaria is closely watched, and certain sections will be used to test the efficacy of drugs suggested as likely to have value in the prophylaxis against the disease. It is the aim of the laboratory to secure malaria control, or mosquito control, at the lowest cost and, if possible, by biological rather than engineering methods.

It is fitting that this laboratory, devoted to the study of malaria control, should bear the name of and honor the late Dr. Henry R. Carter, Assistant Surgeon General of the Public Health Service, who conducted with conspicuous success the first campaign for the control of malaria attempted in this country. He was one of the first investigators to call attention to the effect of impounded waters on the prevalence of malaria; and during the World War he was in charge of the control of malaria in the extra-cantonment areas of the camps east of the Rocky Mountains.

Great as they were, Dr. Carter's contributions to malariology were equalled by his work in other fields of public health. In 1900–1901, in a brilliant epidemiological study, he discovered the extrinsic incubation of yellow fever, which, alone, would accord him a high place among investigators, while his institution of precautions for vessels at ports of departure has been described as the greatest advance in maritime quarantine since the method of maritime quarantine was established by the Venetians.

Dr. Carter was well qualified by education and innate ability for the study of tropical diseases. He was graduated at the University of Virginia as a civil engineer, with special work in chemistry and

mathematics, and later graduated in medicine at the University of Maryland. He was born in Virginia on August 25, 1852, and died in Washington, D. C., on September 14, 1925. He was in active service in the Public Health Service for more than 40 years—from 1879 until he was placed on waiting orders in 1920.

PREVALENCE OF TRICHINOSIS IN THE UNITED STATES

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INTRODUCTION

Knowledge of the strength of the enemy is as necessary in the control of human parasites as it is in a war between nations (*1*). In order to obtain information regarding the distribution of *Trichinella spiralis*, an investigation was made to determine the extent to which this nematode has already invaded human territory in the United States.

In 1915, Ransom (*2*) summarized the reported cases of trichinosis in the United States up to 1915, but the data since then are scattered throughout the literature. In this paper an attempt has been made to ascertain the present status of human trichinosis in the United States. This survey is necessarily incomplete and fragmentary, as are the reports on which the statistics are based. Only 32 States required the reporting of trichinosis in 1933 (*3*), and even in these States the figures are incomplete, as shown by the number of *Trichinella* infections revealed by autopsy surveys. Although these autopsy findings may have revealed infections which did not show characteristic clinical symptoms in so far as these are known at present, the number found in autopsy cases is representative of the rate of occurrence of the infection in the general population (*4*). To find figures for the other States, it is necessary to refer to papers on trichinosis in medical journals.

These restrictions limit conclusions. The tables, curves, and maps in this paper showing prevalence, geographic distribution, and seasonal fluctuation, therefore, only approximate the true picture of the present status of *Trichinella spiralis* infections in human beings.

SOURCES OF MATERIAL

While most of the data given in this paper have been obtained from the literature, some information has been secured by personal communications with Dr. Robert Olesen, Assistant Surgeon General, Division of Sanitary Reports and Statistics, United States Public Health Service, Dr. E. C. Joss, Chief, Meat Inspection Division, Bureau of Animal Industry, and the administrative officers of the

departments of health of the 32 States in which trichinosis is a reportable disease, viz, Alabama, California, Colorado, Connecticut, Delaware, Florida, Georgia, Illinois, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana, New Jersey, New Mexico, New York, North Dakota, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Utah, Washington, West Virginia, Wyoming.

The writer wishes to express his thanks to these officers for their kind cooperation.

INCIDENCE OF TRICHINOSIS

In table 1 the number of clinical cases of trichinosis is given by months for the years 1915–36 *as reported* to the United States Public Health Service (*5*). The figures for 1929–36 have been checked by the Public Health Service, Division of Sanitary Reports and Statistics, and corrections not originally published in the Public Health Reports have been made. The figures obtained from the State Board of Health of Connecticut for the years 1924–36 do not agree with those given in the Public Health Reports for the following months:

December 1926	1 (our figure 2).
April 1929	1 (our figure 2).
April 1930	2 (our figure 1).
March 1933	13 (our figure 10).
February 1935	5 (our figure 0).
May 1935	4 (our figure 0).
July 1935	3 (our figure 2).

TABLE 1.—*Cases of trichinosis reported to the U. S. Public Health Service for the years 1915–36, tabulated by States and by months*

Year and State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1915													
Oregon												10	10
1916 (none)													
1917 (none)													
1918 (none)													
1919													
California							7						7
Georgia							6	1					7
South Dakota	2												2
Total	2						13	1				10	26
1920													
California	1	1									1		3
Connecticut												2	2
Florida								1					1
Illinois			7										7
Massachusetts	3			3									6
New Jersey									1		2	3	6
Total	4	1	7	3	0	0	0	1	1	0	3	5	25
1921													
Connecticut	13		1		1								15
Massachusetts				2	5		1		1		1		10
New Jersey	2			2	1							2	7
New Mexico									1				1
Total	15	0	1	4	7	0	1	0	2	0	1	2	33

TABLE 1.—*Cases of trichinosis reported to the U. S. Public Health Service for the years 1915–36, tabulated by States and by months*—Continued

Year and State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1922													
Connecticut	4								1				5
Florida											1	5	6
Kansas				1									1
Massachusetts		6	1			2			1	4	1	2	17
New Jersey		26	1									2	29
Total	4	32	2	1	0	2	0	0	2	4	2	9	58
1923													
Alabama	1												1
Connecticut			2	1				4		2			9
Florida					1								1
Massachusetts		1	2	1		1		2	1		2	2	12
New Jersey										1	1		2
Total	1	1	4	2	1	1	0	6	1	3	3	2	25
1924													
Colorado									1				1
Connecticut	2	2	1	3		1		1		2			12
Georgia									1				1
Kansas	1												1
Massachusetts	13	9	3	1	3		2	2		1	3	2	39
New Jersey		2	5		1					1			9
Oregon		5											5
Total	16	18	9	4	4	1	2	3	2	4	3	2	68
1925													
Connecticut	3	4		1			1			2			11
Georgia					1				2				3
Massachusetts	9	4	2	2		4		2			2	1	26
New Jersey	1		8		1	2						1	13
Washington			8										8
Total	13	8	18	3	2	6	1	2	2	2	2	2	61
1926													
California			2										2
Connecticut				1								2	3
Illinois										1			1
Massachusetts	1	3		3		3	2		2		2	2	18
New Jersey				3									3
Oregon												1	1
South Dakota											1		1
Total	1	3	2	7	0	3	2	0	2	1	3	5	29
1927													
California	8	3	2	19							2	2	36
Connecticut			1						2	1	3		7
Illinois									2				2
Iowa			3										3
Minnesota		1				3							4
Montana								1					1
New Jersey										1	2	13	16
Pennsylvania		4	6	2									12
Total	8	8	12	21	0	3	0	1	4	2	7	15	81
1928													
California	3	3	10	3					1			2	22
Connecticut			4	2						1	2		9
Illinois			1										1
Massachusetts	9				1			4					14
New Jersey	1	14	1			1			3			2	22
Pennsylvania					1	1							2
Total	13	17	16	5	2	2	0	4	4	1	2	4	70

TABLE 1.—*Cases of trichinosis reported to the U. S. Public Health Service for the years 1915–36, tabulated by States and by months*—Continued

Year and State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1929													
California			1	1								23	25
Connecticut	9			2						1		2	14
Georgia					2	1							3
Illinois					1				1				2
Massachusetts	1		6	2	2	1	2				1		15
New Jersey			1	3									4
New York										1			1
Ohio		4			8							1	13
Pennsylvania			6				2	2			2		12
South Dakota									2				2
Washington		1											1
Total	10	5	14	8	13	2	4	2	3	2	3	26	92
Total, 1915–29	87	93	85	58	29	20	23	20	23	19	29	82	568
1930													
California	65	19	5	31	4	1	3	4	2	5	2	2	143
Colorado								1					1
Connecticut				1				3	1		1	1	7
Georgia		1									3		4
Illinois							1	1			3	1	6
Kansas				1									1
Maryland	1												1
Massachusetts		5				3	2		3	1	2	3	19
Minnesota		17											17
New Jersey	1	4		1					1		5		12
Ohio		1											1
Pennsylvania		2		17	3	2	11		1		4	10	50
South Dakota				4								1	5
Total	67	49	5	55	7	6	17	9	8	6	20	18	267
1931													
California	3	5		3	1		6		2	18	2		40
Connecticut	1			2	7		1		1		1	2	15
Illinois		3						1		2			6
Iowa				1									1
Maryland			2	2									4
Massachusetts		1	1		5	1			1	1	2	1	13
New Jersey			3					1		3	2	1	10
New York	18	6	8	6	10		3	3	5	9	5	2	75
Ohio					1					1			2
Pennsylvania		11	3					1		6			21
South Dakota		2											2
Tennessee							1						1
Total	22	28	17	14	24	1	11	6	9	40	12	6	190
1932													
California	10	2	6	1		2	14	34		1	10	1	81
Connecticut	1	2				2					1	5	11
Illinois	1	1	1						2	1	1	2	9
Iowa	1	1											2
Maine							1						1
Maryland	1							1				2	4
Massachusetts				1		2	1	8	1	2			15
Montana										1			1
New Jersey							6			1	1	9	17
New York	16	3	6	3	2	2	6	6	2	8	8	6	68
North Dakota			11										11
Ohio	11				1			2	2				16
Oregon									17				17
Pennsylvania			1			2			2			1	6
South Dakota					1	1	1			1			4
Total	41	9	25	5	4	11	29	51	26	15	21	26	263
1933													
California	3	1	4	4	5	5	2	1	4	13	7	2	51
Connecticut		3	10	1	1				1			1	17
Illinois	3	1	3	7			1		1				16
Iowa					1								1
Maryland				1						2			3
Massachusetts		21	1	1		4		2		7	4	1	41

TABLE 1.—*Cases of trichinosis reported to the U. S. Public Health Service for the years 1915–36, tabulated by States and by months*—Continued

Year and State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1933													
Michigan										1		1	2
Minnesota									1				1
New Jersey		3	2	1	1	3			1		2	10	23
New York	10	8	18	12	10	1	2	2	17	24	12	16	132
Ohio				8		1						1	10
Oregon			1										1
Pennsylvania	1	4	3					1	4		1		14
South Dakota					1			1					2
Total	17	41	42	35	19	14	5	7	29	47	26	32	314
1934													
California	1	11	2	4	4	1	3	1	3	10	9	3	52
Connecticut	1	2	4		1	2	3	1	1	1	6	6	28
Illinois	3	3	2	1			1	1			1		12
Iowa	1		5	3							2		11
Maryland	1		1	1									3
Massachusetts	1	4	1	1	2	1	4	1	3	1	14	13	46
Michigan			9			2			1	6	1	1	20
Minnesota		6			13								19
Montana			1										1
New Jersey	3	14	1	6		2	3		1	4	1	4	39
New York	23	20	30	9	16	10	6	10	9	12	23	29	197
Ohio		1		2		2	1			1		1	8
Pennsylvania		1	9	2	4								16
South Dakota							1						1
Total	34	62	65	29	40	20	22	14	18	35	57	57	453
1935													
California	5	6	8	8	6	2	2	5	6	15	6	2	71
Connecticut	3		2	2			2		1	4	2	3	19
Georgia									1				1
Illinois	3	1	3	3	1		4			5			20
Iowa	10	1											11
Maine			9	43	2			1		1	6		62
Maryland			1						2				3
Massachusetts	5	22	4	1		1	1	2	3	3	3	2	47
Michigan	3	15		1	1	2						1	23
Minnesota		1		2	4					2	1		10
New Jersey	2		2	2						2	3		11
New York	35	32	16	12	55	24	14	7	11	6	22	6	240
Ohio	12	12	7	1				1	1	3			37
Oregon						2			1				3
Pennsylvania	4	3	2	1							1	1	12
Rhode Island	6									1			7
South Dakota	2				1		1						4
Virginia								1					1
Total	90	93	54	76	70	31	24	17	26	42	44	15	582
1936													
California	11		2	2	2	3	2	1	1	12	2	2	40
Connecticut	1	1	4			2	1		1			1	11
Georgia		1							1				2
Illinois		4						1	3			1	9
Maryland	6											1	7
Massachusetts	2	2				1		5	3				13
Michigan	1		32			4		1					38
New Jersey	3	1					1		1	1		2	9
New York	37	25	18	8	15	12	1	5	11	6	13	21	172
Ohio		7				1							8
Pennsylvania	10	1	1		1						1		14
Rhode Island			1										1
South Dakota			2							1			3
Tennessee	3		1										4
Total	74	42	61	10	18	23	5	13	21	20	16	28	331
Total, 1930-36	345	324	269	224	182	106	113	117	137	205	196	182	2,400
Total, 1915-36	432	417	354	282	211	126	136	137	160	224	225	264	2,968

In figure 1 is presented graphically the annual number of cases of human trichinosis reported to the Public Health Service for the years 1915–36.

This curve (fig. 1) shows a definite rise beginning in 1930. Prior to 1930 the number reported annually remained below 100; since that time it has been higher, with a peak of 582 cases in 1935.

For trichinosis, as for other diseases, the increase in reported cases may represent a true increase in incidence or only an increase in the

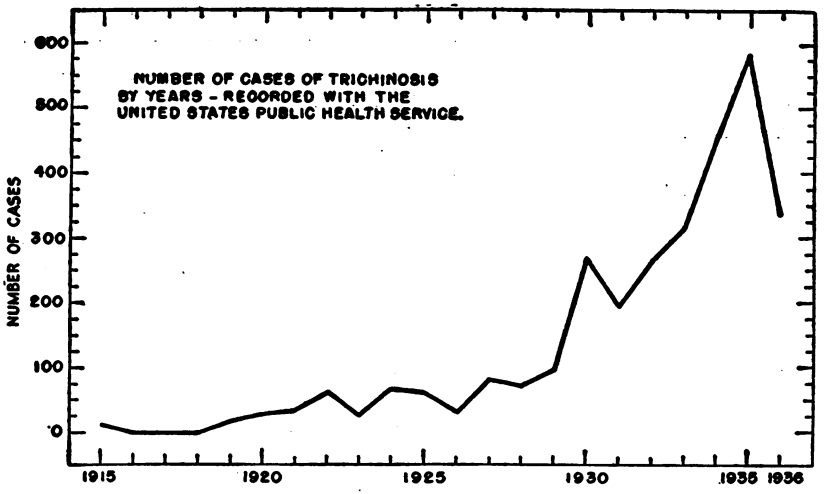

FIGURE 1.

number of cases diagnosed and reported, owing to expansion of the reporting area, to better diagnostic methods, or greater interest in and better reporting of the disease.

The number of States which require the reporting of trichinosis has increased from year to year, and the increase in reports may be partly due to this fact. If this factor is eliminated by calculating the annual ratio of the reported cases to the population in the reporting States, an increase in the morbidity rate is still shown. In the following table the populations are included only for those States requiring the reporting of trichinosis during the periods under consideration. The number of cases of trichinosis reported in those States during the years 1915–36 are given.

Year	Cases	Population	Cases reported per 1,000,000 population	Year	Cases	Population	Cases reported per 1,000,000 population
1915	10	[1] 20,945,000	0.47	1926	27	[1] 43,323,000	0.62
1916	0	[1] 21,274,000	0	1927	42	[1] 47,882,000	.87
1917	0	[1] 21,700,000	0	1928	48	[1] 54,904,000	.87
1918	0	[1] 22,849,000	0	1929	66	[1] 60,276,000	1.09
1919	9	[1] 28,744,000	.39	1930	266	[2] 79,075,000	3.36
1920	12	[2] 27,546,000	.43	1931	189	[1] 80,119,000	2.35
1921	32	[1] 30,236,000	1.05	1932	261	[1] 80,609,000	3.23
1922	51	[1] 32,502,000	1.57	1933	313	[1] 81,058,000	3.86
1923	24	[1] 39,882,000	.60	1934	442	[1] 81,549,000	5.41
1924	66	[1] 40,608,000	1.62	1935	563	[1] 82,088,000	6.85
1925	61	[1] 41,195,000	1.48	1936	330	[1] 84,292,000	3.91

[1] Estimated. [2] Census.

The curve plotted from these rates is almost parallel to the curve in figure 1, indicating that the rise in trichinosis cases cannot be explained solely by the increasing number of reporting States.

No new diagnostic method for trichinosis was used during the years under consideration. The biopsy method was in use soon after Zenker, Virchow, and Leuckart (*6*, *7*, *8*) published their first studies on trichinosis in 1860. The marked eosinophilia was found by Brown in 1897 (*9*) to be of importance in the diagnosis of trichinosis. Although the skin test was discovered by Bachmann (*10*) in experimental trichinosis in 1927–28, it was first applied to the diagnosis of human trichinosis under controlled conditions by Augustine and Theiler (*11*) in 1932. The precipitin test was not a reliable diagnostic method in man during the time here concerned. New diagnostic methods, therefore, are not essentially responsible for the increase in reported cases.

An increase in the number of cases of a disease always stimulates an increased interest in it, with the result that more cases are diagnosed. For trichinosis the beginning of this cycle cannot be definitely determined and the part that this increased interest plays in the number of reported cases is unknown. Therefore, the question cannot be answered as to whether the statistical increase indicates a true increase. That in recent years more mild cases of trichinosis were diagnosed and reported can be shown by the decreasing mortality rate, as shown in the following reports:

Years	Reported by—	Number of cases	Number of deaths	Case mortality, percent
1842–1914	Ransom (*2*)	1,558	240	15.4
1915–25	Medical journals (see table 3)	212	17	8.0
1931	U. S. Public Health Service	190	13	6.8
1932	do	263	19	7.2
1926–36	Medical journals (see table 3)	1,372	61	4.4

Since no successful treatment for trichinosis is known, the declining mortality rate indicates either that such mild cases formerly occurred but were overlooked or that they now occur more frequently. No proof can be offered for either one of these possibilities, but an explanation for the increasing number of mild cases reported recently can be derived from that given by Ransom (*2*) and by Hall (*12*) for the increase in nonclinical trichinosis. Formerly pork products were usually prepared from one animal. Should the animal have been infected, an epidemic of great severity, but limited to the few consumers, might result. At present, sausages and other pork products are made up by mixing meat from as many as 100 or more hogs. If one of these animals is infected, more people are exposed to infec-

tion, but the severity of the infection is necessarily diminished because of the "dilution" of the infected meat.

SEASONAL FLUCTUATION

The 2,968 cases reported to the Public Health Service during the period 1915–1936 were distributed by months as follows:

Month	Number	Percent
January	432	14.5
February	417	14.1
March	354	11.9
April	282	9.5
May	211	7.2
June	126	4.2
July	136	4.6
August	137	4.6
September	160	5.4
October	224	7.5
November	225	7.6
December	264	8.9
Total	2,968	100.0

Figure 2 shows graphically the seasonal fluctuation, with the percentage distribution being plotted on the ordinate axis.

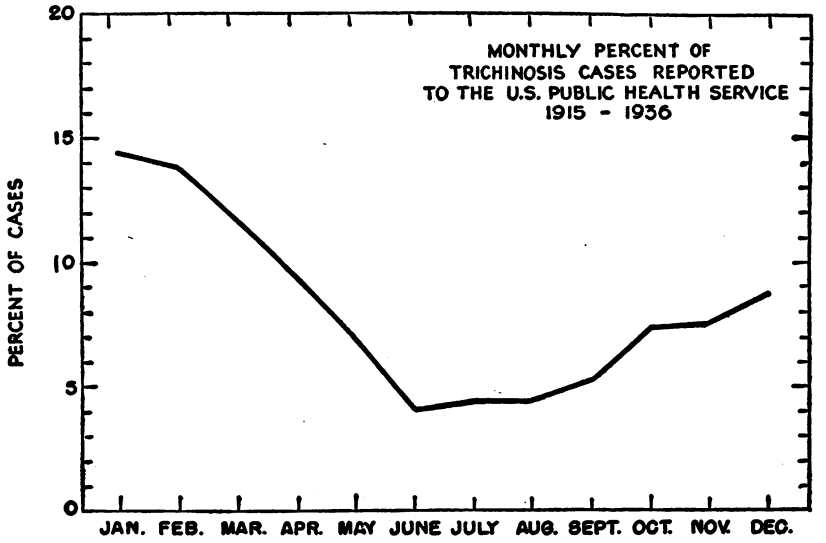

FIGURE 2.

That the seasonal form of this curve (fig. 2), with its peak in winter and its decline in summer, is not accidental can be shown by dividing the data into two periods and plotting separate curves—one for the years 1915–29 and one for 1930–36.

The figures are as follows:

Month	1915-29		1930-36		Month	1915-29		1930-36	
	Number	Percent	Number	Percent		Number	Percent	Number	Percent
January	87	15.0	345	14.4	August	20	3.3	117	4.9
February	93	16.4	324	13.5	September	23	4.2	137	5.7
March	85	15.0	269	11.2	October	19	3.3	205	8.5
April	58	10.2	224	9.3	November	23	5.1	196	8.3
May	29	5.5	182	7.5	December	82	14.4	182	7.6
June	20	3.5	106	4.4					
July	23	4.1	113	4.7	Total	568	100.0	2,400	100.0

Figure 3 shows these percentage incidences graphically.

As pork is the usual source of *Trichinella* infection, the seasonal fluctuation would be explained by assuming that pork consumption

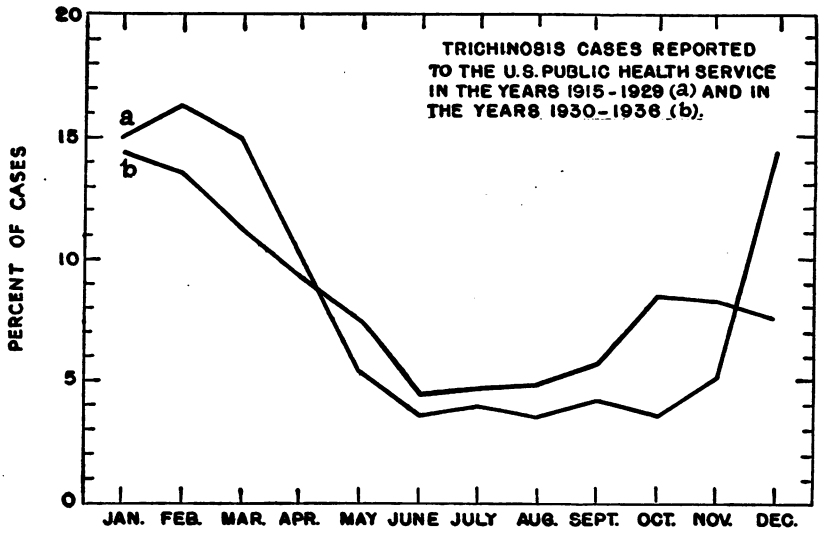

FIGURE 3.

in winter is higher than in summer. Unfortunately, there are no figures available showing the number of hogs consumed monthly in the United States or figures on the total number of hogs slaughtered. Through the kind cooperation of Dr. E. C. Joss, of the Bureau of Animal Industry, United States Department of Agriculture, figures have been obtained for hogs slaughtered during the years 1933, 1934, 1935, and 1936, at establishments where Federal meat inspection is maintained in the following States: California, Georgia, Illinois, Iowa, Kansas, Minnesota, Missouri, Nebraska, New York, Ohio, Oregon, Pennsylvania and Washington. Although these figures do not represent the total amount of pork consumed, they may serve to some degree as an indicator of pork consumption.

The total number of hogs included in these figures is 115,447,678. The numbers slaughtered by months are as follows:

Month	Number	Percent	Month	Number	Percent
January	11,945,786	10.4	July	8,623,126	7.4
February	8,603,390	7.5	August	7,240,571	6.3
March	8,150,150	7.1	September	6,793,214	5.9
April	8,588,363	7.4	October	8,745,908	7.6
May	9,667,403	8.3	November	11,344,898	9.8
June	9,605,405	8.3	December	16,139,964	14.0

In figure 4 this percentage curve is plotted with the curve representing the number of cases reported monthly to the Public Health Service (fig. 2).

Both curves show a peak in December and January, the pork curve anticipating the curve of human trichinosis. For the small rise in

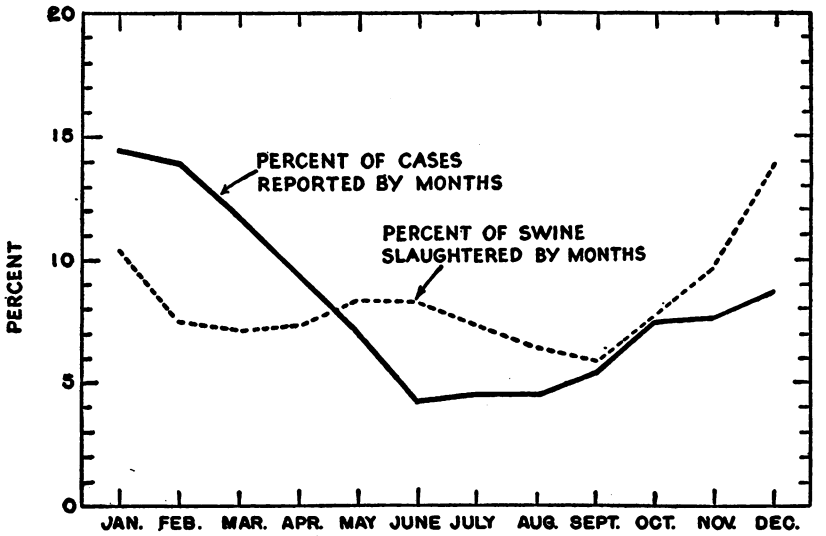

FIGURE 4.

the pork curve in the months of May and June, market prices, prices of feed, seasonal supply of hogs of market age, and many other factors may be responsible.

A summary of trichinosis incidence by States is given in table 2. In column 1 is shown whether trichinosis is a notifiable disease in the State, and, if so, when it was made notifiable and whether by law or regulation. In column 2, the figures reported by Ransom (*2*) for the years 1842–1914 are given. In 1842 the first case of trichinosis in the United States was reported by Bowditch (*13*). Seventeen cases, with 4 deaths which were recorded in 1902–1903 in Richland Parish, La., (*14*) omitted by Ransom, have been added by the writer to the figure for the State of Louisiana. In columns 3–10, the figures from

table 1 are summarized; column 11 presents the totals. In columns 12–14, the annual average for the years 1930–36 has been found by dividing the total number for the 7 years by 7 and calculating this figure in relation to the population in the respective State in the proportion of 1:1,000,000.

TABLE 2.—*Trichinosis incidence, by States*

State	Reportable disease since—	Cases given by Ransom 1842 to 1914	Clinical cases reported to the U. S. Public Health Service								Average morbidity 1930–36		
			1915 to 1929	1930	1931	1932	1933	1934	1935	1936	Total	Population, census 1930 (revised)	Total 1930 to 1936	Annual rate per 1,000,000
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Alabama	1919 (L)*	-----	1	----	----	----	----	----	----	----	1	2,646,248	-----	------
Arizona	----------	-----	----	----	----	----	----	----	----	----	----	435,573	-----	------
Arkansas	----------	-----	----	----	----	----	----	----	----	----	----	1,854,482	-----	------
California	1930 (R)*	91	95	143	40	81	51	52	71	40	664	5,677,251	478	12.028
Colorado	1927 (R)	-----	1	1	----	----	----	----	----	----	2	1,035,791	1	0.138
Connecticut	1921 (R)	14	87	7	15	11	17	28	19	11	209	1,606,903	108	9.601
Delaware	1931 (R)	-----	----	----	----	----	----	----	----	----	----	238,380	-----	------
District of Columbia	----------	1	----	----	----	----	----	----	----	----	1	486,869	-----	------
Florida	1936 (L)	-----	8	----	----	----	----	----	----	----	8	1,468,211	-----	------
Georgia	1919 (R)	-----	14	4	----	----	----	----	1	2	21	2,908,506	7	0.340
Idaho	----------	-----	----	----	----	----	----	----	----	----	----	445,032	-----	------
Illinois	1923 (R)	90	13	6	6	9	16	12	20	9	181	7,630,654	78	1.460
Indiana	----------	64	----	----	----	----	----	----	----	----	64	3,238,503	-----	------
Iowa	(R) prior to 1931.	48	3	----	1	2	1	11	11	----	77	2,476,939	26	1.500
Kansas	(R) prior to 1917.	-----	2	1	----	----	----	----	----	----	3	1,880,999	1	0.076
Kentucky	1927 (R)	-----	----	----	----	----	----	----	----	----	----	2,614,589	-----	------
Louisiana	----------	{ 1 / 17 }	----	----	----	----	----	----	----	----	18	2,101,593	-----	------
Maine	1918 (R)	3	----	----	----	1	----	----	62	----	66	797,123	63	11.292
Maryland	1922 (R)	25	----	1	4	4	3	3	3	7	50	1,631,526	25	2.189
Massachusetts	1893 (L)	145	157	19	13	15	41	46	47	13	496	4,249,614	194	6.522
Michigan	1929 (R)	75	----	----	----	----	2	20	23	38	158	4,842,325	83	2.448
Minnesota	1913 (R)	101	4	17	----	----	1	19	10	----	152	2,563,953	47	2.619
Mississippi	----------	-----	----	----	----	----	----	----	----	----	----	2,009,821	-----	------
Missouri	(R) prior to 1928.	17	----	----	----	----	----	----	----	----	17	3,629,367	-----	------
Montana	1921 (R)	-----	1	----	----	1	----	1	----	----	3	537,606	2	0.530
Nebraska	----------	18	----	----	----	----	----	----	----	----	18	1,377,963	-----	------
Nevada	----------	-----	----	----	----	----	----	----	----	----	----	91,058	-----	------
New Hampshire	----------	-----	----	----	----	----	----	----	----	----	----	465,293	-----	------
New Jersey	1895 (L)	35	111	12	10	17	23	39	11	9	267	4,041,334	121	4.277
New Mexico	1922 (R)	-----	1	----	----	----	----	----	----	----	1	423,317	-----	------
New York	1930 (R)	355	1	----	75	68	132	197	240	172	1,240	12,588,066	884	10.247
North Carolina	----------	1	----	----	----	----	----	----	----	----	1	3,170,276	-----	------
North Dakota	1913 (R)	-----	----	----	----	11	----	----	----	----	11	680,845	11	2.310
Ohio	1928 (R)	70	13	1	2	16	10	8	37	8	165	6,646,697	82	1.784
Oklahoma	----------	-----	----	----	----	----	----	----	----	----	----	2,396,040	-----	------
Oregon	1891 (R)	19	16	----	----	17	1	----	3	----	56	953,789	21	3.147
Pennsylvania	1909 (L)	261	26	50	21	6	14	16	12	14	420	9,631,350	133	1.854
Rhode Island	----------	4	----	----	----	----	----	----	7	1	12	687,497	8	1.662
South Carolina	(?)	-----	----	----	----	----	----	----	----	----	----	1,738,765	-----	------
South Dakota	1913 (R)	19	5	5	2	4	2	1	4	3	45	692,849	21	4.335
Tennessee	1926 (R)	7	----	----	1	----	----	----	----	4	12	2,616,556	5	0.273
Texas	----------	14	----	----	----	----	----	----	----	----	14	5,824,715	-----	------
Utah	1927 (R)	2	----	----	----	----	----	----	----	----	2	507,847	-----	------
Vermont	----------	24	----	----	----	----	----	----	----	----	24	359,611	-----	------
Virginia	----------	8	----	----	----	----	----	----	1	----	9	2,420,851	1	0.059
Washington	1915 (R)	7	9	----	----	----	----	----	----	----	16	1,563,391	-----	------
West Virginia	(R) (?)	5	----	----	----	----	----	----	----	----	5	1,729,205	-----	------
Wisconsin	----------	34	----	----	----	----	----	----	----	----	34	2,939,006	-----	------
Wyoming	(R) (?)	-----	----	----	----	----	----	----	----	----	----	225,565	-----	------
Total	----------	1,575	568	267	190	263	314	453	582	331	4,543	----------	2,400	------

* R=by regulation. L=by law.

GEOGRAPHIC DISTRIBUTION OF TRICHINOSIS

Figures 5 and 6 are maps of the United States showing the rates of the annual average for the years 1930–36 in proportion to the population for the respective States.

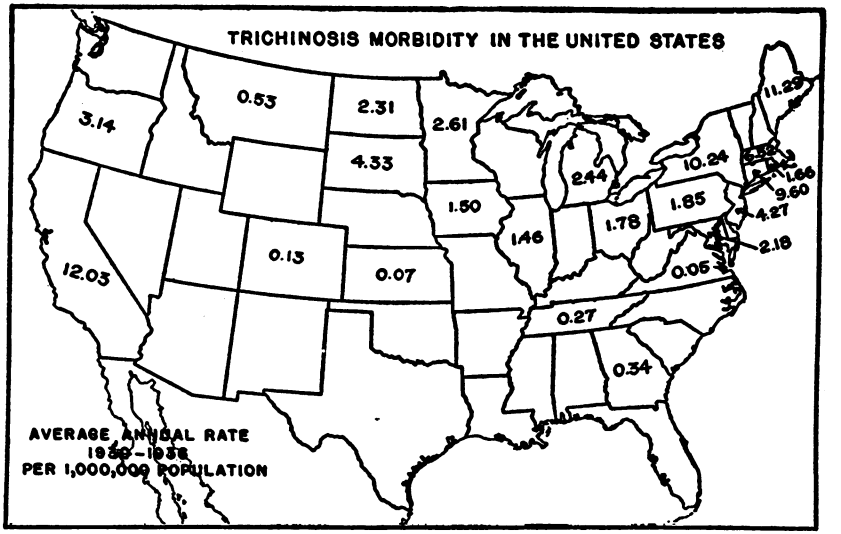

FIGURE 5.

As the reports on which these maps are based are incomplete, the maps give only a rough picture of the true trichinosis situation. Furthermore, those States in which no case was reported to the Public Health Service cannot be considered *Trichinella*-free. Table 3

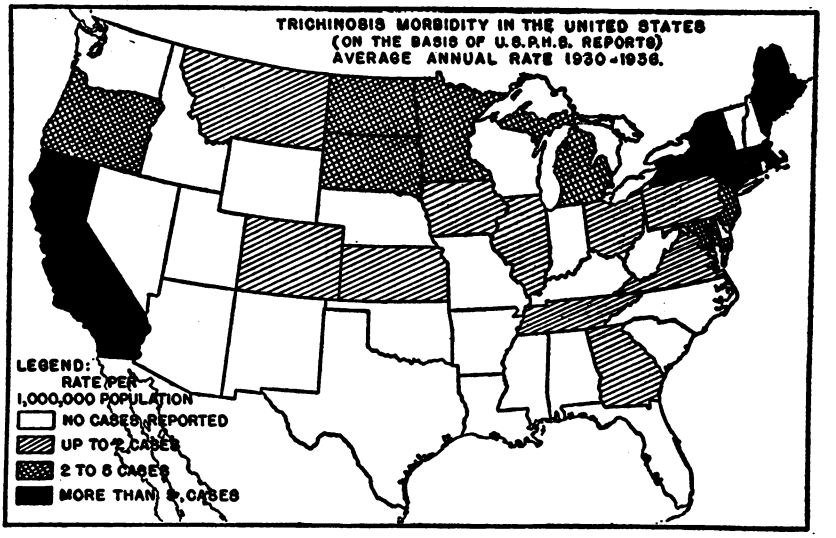

FIGURE 6.

includes all cases recorded in medical literature during 1915–36. It may be seen that there are included records of trichinosis cases not reported to the Public Health Service. The year given is always the year in which the cases occurred.

TABLE 3.—*Clinical cases of trichinosis reported in medical journals, 1915–1936*

State	City	Year	Cases	Deaths	Reference
Arkansas	Pine Bluff	1926	3	1	Pittman, W. G.: J. Arkansas Med. Soc., 23: 109–115 (1926).
California	San Francisco	1916	1		Cummins, W. T., and Carson, G. R.: J. Am. Med. Assoc., 66: 1856–1857 (1916).
	do	1916	15	1	Cummins, W. T., and Carson, G. R.: J. Am. Med. Assoc., 67: 806–808 (1916).
	San Rafael	1918	12		Cumming, J. G.: New York Med. J., 107: 441–443 (1918).
	Palo Alto	1923	1		Thomas, J. B., and Cooper, W.: Am. J. Ophth., 7: 511–512 (1924).
	San Francisco	1926	1		Cheney, G.: J. Am. Med. Assoc., 86: 1004 (1926).
	do	1929	15		Medical News: J. Am. Med. Assoc., 94: 110 (1930).
		1930	151	9	Current Comment: J. Am. Med. Assoc., 95: 40 (1930).
	Vallejo	1931	5	1	Walker, A. T.: J. Am. Med. Assoc., 98: 2051–2053 (1932).
	Vallejo, Oakdale, San Francisco.	1931	16	1	Medical News: J. Am. Med. Assoc., 97: 1804 (1931).
	Vallejo, San Francisco	1924 to 1932	[1]	[1]	McCoy, O. R., Miller, J. J., and Friedlander, R. D.: J. Immunol., 24: 1–23 (1933).
Colorado	Denver	1934	12		Stettheimer, C. J.: Colorado Med., 33: 880–887 (1936).
Connecticut	Waterbury	1920	44	1	Alexander, M. E.: Am. J. Med. Sci., 165: 567–577 (1923).
	Hartford	1928	3		Stoll, H. F.: J. Am. Med. Assoc., 92: 791–793 (1929).
	Waterbury	1929	8	1	Foster, J. H.: Proc. Connecticut Med. Soc., 137: 123–137 (1929).
Georgia		1933	1	1	Pund, M. D., and Mosteller, R.: J. Am. Med. Assoc., 102: 1220–1222 (1934).
Illinois	Chicago	1915	1		Bloch, L.: J. Am. Med. Assoc., 65: 2140–2141 (1915).
	do	1915	1		Preble, R. B.: Med. Clin. Chicago, 1: 1163–1171 (1916).
	do	1915	1		Williamson, C. P.: Med. Clin. Chicago, 1: 737–743 (1916).
	do	1916	29	4	Bloch, L.: Ill. Med. J., 29: 369–373 (1916).
	do	1918	3		Meyer, J.: J. Am. Med. Assoc., 70: 588–590 (1918).
	do	1923	1		Grove, J. S.: J. Am. Med. Assoc., 85: 349–350 (1925).
	do	1924	3	1	Hassin, G. B., and Diamond, I. B.: Arch. Neurol. and Psychiat., 15: 34–47 (1926).
	do	1931	4		Birch, C. L.: Med. Clin. North America, 15: 791–796 (1931).
	do	1933	10	4	Medical News: J. Am. Med. Assoc., 101: 146 (1933).
Iowa		1935	24		Kampmeier, R. H.: New Orleans Med. and Surg. J., 88: 448–451 (1936).
Kentucky	Louisville	1930	1		Frazier, H. R.: Kentucky Med. J., 30: 272 (1932).
Louisiana	Shreveport	1929	1		Hargrove, M. D.: Tri-State Med. J., 2: 288–290 (1930)
Maine		1935	56	2	Drake, E. H., Hawkes, R. S., and Warren, M.: J. Am. Med. Assoc., 105: 1340–1343 (1935).
Maryland	Baltimore	1933	15		Otto, G. F., and Janney, J. H.: Am. J. Hyg., 25: 76–85 (1937)
		1935	12		
	do	1936	55	1	Heathman, L. S.: Am. J. Hyg., 23: 397–409 (1936).

[1] See Rochester, Williamsville, N. Y.

TABLE 3.—*Clinical cases of trichinosis reported in medical journals, 1915–1936*—Continued

State	City	Year	Cases	Deaths	Reference
Massachusetts	Boston	1922	5		Garland, J.: Boston Med. and Surg. J., 188: 773–776 (1923).
	Lynn	1928	1	1	Horlick, S. S., and Bicknell, R. E.: New Eng. J. Med., 201: 816–819 (1929).
	Boston	1928	1		Cabot case 14292: New Eng. J. Med., 199: 484–486 (1928).
	do	1929	1		Cabot case 15242: New Eng. J. Med., 200: 1257–1259 (1929).
	do	1932	7		Augustine, D. L., and Theiler, H.: Parasitol., 24: 60–86 (1932).
	do	1931 to 1935	7		Morrison, H.: New Eng. J. Med., 213: 531–532 (1935).
	do	1932 to 1935	35		Spink, W. W., and Augustine, D. L.: J. Am. Med. Assoc., 104: 1801–1805 (1935).
	do	1932 to 1935	65	1	Spink, W. W., and Augustine, D. L.: New Eng. J. Med., 213: 527–531 (1935).
	do	1934 to 1935	2		Merritt, H. H., and Rosenbaum, M.: J. Am. Med. Assoc., 106: 1646–1649 (1936).
	do	1935	1		Cabot case 19161: New Eng. J. Med., 208: 847–849 (1935).
	do	1936	35		Spink, W. W.: Arch. Int. Med., 56: 238–249 (1936).
	do	1936	25		Spink, W. W.: New Eng. J. Med., 216: 5–8 (1937).
	do	1936	14		Augustine, D. L.: Am. J. Hyg., 24: 170–176 (1936).
Michigan	Ann Arbor	1924	4		Bettison, W. L.: J. Am. Med. Assoc., 86: 609–613 (1926).
	Benton Harbor	1932	3	1	Sowers, C. N.: J. Michigan State M. Soc., 31: 479–481 (1932).
Minnesota	Rochester	1923	1		Magath, T. B.: Minnesota Med., 9: 558–561 (1926).
	do	1933	1		Masson, D. M.: Proc. Staff Meet., Mayo Clin., 8: 701–703 (1933).
Missouri	St. Louis	1914 1916	3	1	Hempelman, L. H.: J. Missouri State M. A., 14: 111–113 (1917).
	do	1929	20	1	Willett, J. C., and Pfau, C. L.: J. Am. Med. Assoc., 94: 1060–1061 (1930).
Nebraska	West Point	1934	46	1	Anderson, A. W.: Nebraska State M. J., 19: 379–382 (1934).
	Pender	1934	2	1	Buis, J.: Nebraska Med. J., 20: 179–180 (1935).
New Jersey	Warren County	1922	34	1	Blanchard, C. K.: Public Health News, 7: 118–123 (1922).
	Newark	1926 to 1929	67		Mancusi-Ungaro, L.: J. Med. Soc. New Jersey, 26: 671–673 (1929).
	Caldwell	1930	3		Halprin, H.: J. Med. Soc. New Jersey, 29: 217–220 (1932).
	Atlantic City	1933	43	1	Kilduffe, R. A., Barbash, S., and Merendino, A. G.: Am. J. Med. Sci., 186: 794–802 (1933).
	Trenton	1934	8	1	Ragany, J.: Med. Rec., 142: 335 (1935).
New York	New York	1915	3		Pratt, E. L.: J. Am. Med. Assoc., 65: 1277 (1915).
	Brooklyn	1916	3		Lintz, W.: J. Am. Med. Assoc., 66: 1856 (1916).
	Far Rockaway	1916	14		Salzer, B. F.: J. Am. Med. Assoc., 67: 579–580 (1916); Med. Rec., 91: 261 (1917).
	New York	1921	7	3	Vance, B. M., and Ryder, M.: Proc. New York Path. Soc., 23: 97–100 (1922).
	Rochester	1924	12	4	Aikman, J.: New York State J. Med., 26: 20–24 (1926).
	Brooklyn	1925	1	1	Moses, H. M.: Long Island Med. J., 20: 7–13 (1926).
	Binghamton	1926	6		Weiss, M.: New York State J. Med., 27: 402–404 (1927).
	New York	1927	1		Key, B. W.: Am. J. Ophth., 12: 178–186 (1929).
	do	1927	1		Salan, J., and Schwartz, B.: J. Am. Med. Assoc., 90: 611 (1928).

TABLE 3.—*Clinical cases of trichinosis reported in medical journals, 1915–1936*—Continued

State	City	Year	Cases	Deaths	Reference
New York	Albany, Mechanicville	1928	43	1	McDonald, E. P. and Waddell, K. C.: J. Am. Med. Assoc., 92: 449–453 (1929).
	Binghamton	1929	5		Weiss, M.: New York State J. Med., 29: 1113–1116 (1929).
		1929	4		Conner, L. A.: Ann. Int. Med., 3: 353–359 (1929).
	Clyde	1930	11		Reifenstein, E. C., Allen, E. G., and Allen, G. S.: Am. J. Med. Sci., 183: 668–678 (1932).
	Williamsport	1931	15		Medical News: J. Am. Med. Assoc., 96: 781 (1931).
		1931	24		Medical News: J. Am. Med. Assoc., 96: 1882 (1931).
	Rochester, Williamsville.	1924 to 1932	[1]88	[1]3	McCoy, O. R., Miller, J. J., and Friedlander, R. D.: J. Immunol., 24: 1–23 (1933).
	Staten Island	1932	1		Kenler, M. D., and Silverman, J. J.: New York State J. Med., 33: 752 (1933).
	New York	1929 to 1933	166	3	Frant, S.: Pub. Health Rep., 49: 869–875 (1934).
		1933	8		Goldschlager, A. I.: Ann. Int. Med., 8: 939–950 (1935).
		1933	1		Brooks, H. T.: Med. Rec., 143: 140–142 (1936).
	Brooklyn	1934	6	1	Gordon, M. B., Cares, R., and Kaufman, B.: J. Pediat., 6: 667–675 (1935).
	New York	1934	2	1	Most, H., and Abeles, M. M.: Arch. Neurol. and Psychiat., 37: 589–616 (1937).
	do	1934	2	2	Globus, J. H.: Arch. Neurol. and Psychiat., 37: 614 (1937).
	do	1931 to 1935	8	1	Sobel, I. P.: Am. J. Dis. Child., 51: 367–388 (1936).
	Newark	1933 to 1935	10		Baumgartner, E. A., and Cowles, A.: J. Lab. and Clin. Med., 22: 484–489 (1937).
North Carolina	Durham	1936	1		Hanes, F. M.: Internat. Clin., 4: 67–73 (1936).
Ohio		1928	5 (?)	5	Medical News: J. Am. Med. Assoc., 91: 254 (1928).
	Cleveland	1934	1		Doran, F. J.: Ohio State M. J., 31: 267–268 (1935).
		1928 to 1936	96	8	Hall, A. A.: Ann. Int. Med., 10: 1544–1550 (1937).
Pennsylvania	Pittsburgh	1916	1		Booth, B. A., Goehring, W. N., and Kahn, M.: J. Am. Med. Assoc., 67: 2000 (1916).
	do	1919	10		Maclachlan, W. W. G.: Pennsylvania M. J., 23: 665–667 (1920).
	Philadelphia	1919	1		Carpenter, H. C.: Tr. Am. Pediat. Soc., 31: 184–186 (1919).
	Wayne	1930	29	2	Aldridge, F. C.: Am. J. M. Sc., 181: 312–323 (1931).
	Reading	1930	38	4	Jaisohn, P.: Pennsylvania M. J., 34: 16–17 (1930).
	Philadelphia	1931	1		Kirby, D. W.: Hahneman Monthly, 67: 110–113 (1932).
	do	1931	6		Pepper, O. H. P.: Med. Clin. North America, 15: 271–277 (1931).
	do	1931	1		Pepper, O. H. P.: South Med. and Surg., 94: 415–420 (1932).
Utah		1935	7		Kampmeier, R. H.: New Orleans Med. and Surg., 88: 448–451 (1936).
Virginia		1930	5	1	Swineford, O., and Waddell, W. W.: Virginia Med. Monthly, 59: 28–34 (1932).
Washington	Tacoma	1915	1		McNerthney, J. B., and McNerthney, W. B.: J. Am. Med. Assoc., 67: 1086 (1916).

Totals:
1915–25, 212 cases with 17 deaths, or 8.0 percent mortality.
1926–36, 1,372 cases with 61 deaths, or 4.4 percent mortality.
1915–36, 1,584 cases with 78 deaths, or 4.9 percent mortality.

[1] With cases from California.

POST-MORTEM STATISTICS ON TRICHINELLA INFECTIONS

From tables 2 and 3 it is apparent that between 5,000 and 6,000 trichinosis cases have been diagnosed and reported in the United States since 1842. A very different picture of the incidence of trichinosis is presented if we consider the statistics of *Trichinella* infections found in autopsies. Up to the present time the following autopsy findings have been recorded:

California.—In 1881 Glazier (*15*) reported to the Treasury Department of the United States that Kerber (*16*) in San Francisco found the incidence of trichinosis in 13 autopsies to be zero. No method is given nor is any evidence furnished that trichinellae were really looked for. (Quoted from Williams (*17*).)

In 1936 McNaught and Anderson (*18*) found 48 cases of infection with *Trichinella* in 200 autopsies in San Francisco, an incidence of 24 percent. The method used was the digestion of 50 grams of diaphragm. Twenty-five children found negative were not included in the 200 cases.

Colorado.—In 1901 Williams (*17*) found, in Denver, one case of trichinosis in 10 autopsies, an incidence of 10 percent. Pieces of diaphragm, sternocleido-mastoid, intercostal, rectus abdominis, and psoas magnus muscles were examined microscopically in the compressor.

District of Columbia.—In 1937 Hall and Collins (*19*), using the compressor and digestion method on diaphragm, found 41 positives in 300 autopsies, an incidence of 13.67 percent. These cases include autopsy material from Washington, D. C., and Baltimore, Md.; the number from each is not stated.

Louisiana.—In 1936 Hinman (*14*) found 7 positives in 200 autopsies in New Orleans, an incidence of 3.5 percent. Two square inches of diaphragm were digested.

In 1937 Sawitz (*4*) found 10 trichinous cases in 200 autopsies in New Orleans, an incidence of 5 percent. Fifty grams of diaphragm and 20 grams of pectoral muscle were examined by both the compressor and the digestion method.

Maryland.—In 1898 Osler (*20*) published his findings in 1,000 autopsies in Baltimore and elsewhere. No real survey, however, was made. Osler states that his notes show that in 1,000 consecutive autopsies trichinae were present in 6 instances.

In 1901 Williams (*17*) found an incidence of 3.96 percent in Baltimore in 126 autopsies The compressor method was used in examining diaphragm, sternocleido-mastoid, intercostal, rectus abdominis, and psoas magnus muscles.

In 1937 Hall and Collins (*19*) found 41 positives in 300 autopsies in Baltimore and in Washington, D. C., the number from each not stated, an incidence of 13.67 percent.

Massachusetts.—In 1901 Mallory reported 2 cases of trichinosis in 1,103 autopsies in Boston City Hospital. No especial search was made for the parasites (personal communication from Mallory to Williams (*17*)).

In 1931 Queen (*21*), in 58 autopsies in Boston, found 16 positives, an incidence of 27.6 percent. The method used was the digestion of 50 grams of diaphragm.

Minnesota.—In 1934 Riley and Scheifley (*22*) examined 117 autopsy cases in Minneapolis and found 20 positives, an incidence of 17.09 percent. (In the paper by Riley and Scheifley (*22*) the percentage 17.9 seems to be a misprint.) Diaphragm was examined in the compressor.

In 1937 Magath (*23*) found 17 positives in 220 autopsies in Rochester, an incidence of 7.7 percent. The compressor method was employed, using 2 grams of diaphragm, intercostal, sternocleido-mastoid, and rectus abdominis muscles.

Missouri.—In 1891 Whelpley (*24*) found 1 case of trichinosis in 20 autopsies in St. Louis, an incidence of 5 percent. Microscopic examination was used.

In 1910 Simonds (*25*) found 2 cases of trichinosis in 100 autopsies in the same city, an incidence of 2 percent.

In 1937 Pote (*26*), in 1,037 autopsies in St. Louis by means of more than 12,000 sections of diaphragm, intercostal, pectoral, and rectus abdominis muscles, found 159 positives, an incidence of 15.33 percent.

New Jersey.—In 1881 Glazier (*15*) reported a personal communication from Newark, stating that in 100 autopsies 1 positive case had been found. No real survey was made.

New York.—In 1881 Glazier (*15*) reported that personal communications from pathologists and anatomists of New York showed that in 150 autopsies 3 positives had been found. No real survey was made.

In 1897 Thornbury (*27*), in Buffalo, found microscopically 3 positives in 21 autopsies, an incidence of 14.29 percent.

In 1901 Williams (*17*) examined diaphragm, sternocleido-mastoid, intercostal, rectus abdominis, and psoas magnus muscles in the compressor, in 362 autopsies from Buffalo, and found 21 positive, an incidence of 5.64 percent.

In 1931 Queen (*21*) digested 50 grams of diaphragm of 344 cadavers in Rochester and found 59 trichinous, an incidence of 17.5 percent.

Pennsylvania.—In 1881 Glazier (*15*) reported the findings of pathologists of Philadelphia that, in 40 cadavers, 1 was found positive. No real survey was made.

In 1901 Williams (*17*) found in 7 cadavers in Philadelphia none positive by examining diaphragm, sternocleido-mastoid, intercostal, rectus abdominis, and psoas magnus muscles in the compressor.

Virginia.—In 1881 Glazier (*15*) reported that communications from the University of Virginia indicated that in 150 autopsies 1 trichinous case was found. No real survey was made.

In table 4 only those reports are included in which a real survey for *Trichinella* was made.

TABLE 4.—*Trichinella findings in cadavers in the United States*

Author	Year	Place	Number of cases	Number positive	Percent positive
Whelpley	1891	St. Louis, Mo	20	1	5.0
Thornbury	1897	Buffalo, N. Y	21	3	14.29
Williams	1901	do	362	21	5.64
		Philadelphia, Pa	7	0	0.00
		Baltimore, Md	126	5	3.96
		Denver, Colo	10	1	10.00
Simonds	1910	St. Louis, Mo	100	2	2.0
Queen	1931	Rochester, N. Y	344	59	17.5
		Boston, Mass	58	16	27.6
Riley and Scheifley	1934	Minneapolis, Minn	117	20	17.09
Hinman	1936	New Orleans, La	200	7	3.5
McNaught and Anderson	1936	San Francisco, Calif	200	48	24.0
Hall and Collins	1937	Washington, D. C., Baltimore, Md.	300	41	13.67
Magath	1937	Rochester, Minn	220	17	7.7
Sawitz	1937	New Orleans, La	200	10	5.0
Pote	1937	St. Louis, Mo	1,037	159	15.33
Total			3,322	410	12.34

If we apply this average percentage of 12.34 in post-mortem cases to the living population of 130,000,000 in the United States, 16,000,000 people would be infected with *Trichinella spiralis*, a figure which is higher than is known for any other country throughout the world. It indicates that in the United States *Trichinella spiralis* has already occupied a very extensive human territory and should be considered a serious public health problem.

SUMMARY AND CONCLUSIONS

1. The number of clinical cases of trichinosis reported to the United States Public Health Service for the years 1915–36 (*5*) is 2,968. This figure, together with the 1,575 cases compiled by Ransom (*2*) for the years 1842–1914, indicates that 4,543 cases of trichinosis have been diagnosed and recorded in the United States during 94 elapsed years.

2. Statistically, the yearly incidence of trichinosis has considerably increased in recent years. Since the annual morbidity rate of trichinosis cases for the population for which it was reportable shows a parallel increase, the numerical increase cannot be explained solely by the expansion of the reporting area. Although no new diagnostic method was used during the time concerned, the stimulated interest in the disease might have played a part in the increase in reported cases.

3. The mortality rate for trichinosis cases has decreased from 15.4 percent for 1842–1914 to 4.4 percent for 1926–36, indicating that more mild cases are now diagnosed and reported than formerly. These cases were either formerly overlooked or occur now more frequently. Assuming the latter, an explanation for it could be derived from the fact that nowadays pork products are usually made up from several hogs, and thus a *Trichinella*-infected hog has the chance of infecting more people than formerly, while at the same time the infection is less severe.

4. There is a definite seasonal fluctuation in the occurrence of trichinosis, with the peak in winter and a decline in summer. The explanation that pork consumption is higher in winter than in summer is supported by monthly figures on slaughtered hogs.

5. The geographic distribution of the trichinosis cases shows the highest incidence in the eastern and western parts of the United States.

6. To supplement the trichinosis reports of the United States Public Health Service, a compilation of all cases of trichinosis published in medical journals has been made. The total number of all clinical cases of trichinosis recorded in the United States since 1842 amounts to between 5,000 and 6,000.

7. In post-mortem examinations by various authors and in various parts of the United States, 410 *Trichinella*-infected cases were found

out of 3,322 cases examined, an incidence of 12.34 percent. This average percentage, applied to the living population of the United States, would mean that 16,000,000 people in this country are infected with *Trichinella spiralis.*

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A STUDY OF *TRICHINELLA SPIRALIS* IN THE HAWAIIAN ISLANDS [1]

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INTRODUCTION

Trichinella spiralis, a parasite of man and various other mammals, occurring in many parts of the world, was recently shown, by positive biopsy findings, to be present in Hawaii. The finding was made in April 1936, when Dr. W. N. Bergin, on the island of Hawaii, noted symptoms of trichinosis in three patients, and suspected the source of infection to be a locally-made "Portuguese pork-sausage" which the patients had eaten. Dr. Bergin secured a sample of the sausage and submitted it to Dr. E. A. Fennel in Honolulu to be examined for trichinae. Dr. Fennel, in turn, submitted the sausage to the writer, whose examination of it revealed trichina larvae, some of which showed slight motility. Several days later, Dr. Fennel received a section of the gastrocnemius muscle removed at biopsy from one of the three patients, which, on examination, was found to contain trichinae. Mr. Joseph S. Caceres, health officer of the island of Hawaii, ascertained that the suspected pork sausage was made of pork from wild hogs captured in the North Kona District of Hawaii. This finding was also extended by the demonstration of trichinae in wild hogs captured in North Kona; a preliminary report relative to this finding was made by the writer in December 1936 (*1*).

In making inquiries concerning cases of human trichinosis that might have been noted by physicians in the Territory previous to those just mentioned, it was found that two cases had been recognized on the island of Maui in 1930. These diagnoses were made from clinical findings by Dr. F. A. St. Sure, who, in a personal communication, stated: "I have been looking up the records at the hospital [Paia, Maui] and find that we had a case of trichinosis in May 1930. This patient gave a history of having eaten pork sandwiches at a lunch counter on Maui a short time before the onset of his trouble. He had the usual symptoms of the disease. His white blood count was 15,700 with 42 percent eosinophiles. There was another case at the hospital shortly after this and I am having the records of this case looked up." More recently, in January 1936, Dr. Fred Irwin made a clinical diagnosis of this disease in two patients on the island of Hawaii. In March 1936, a nurse, also from Hawaii, developed symptoms of trichinosis. She attributed the source of infection to a locally-manufactured pork product which she had eaten.

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[1] The present survey was conducted through special funds from the Social Security Act appropriation. An abstract of this paper was presented at the meeting of the Territorial Medical Association, Honolulu, T. H., May 1, 1936.

As a consequence of the above findings, studies were conducted by the writer for the Territorial board of health to ascertain the prevalence of trichinae in local hogs and rodents, animals which serve as reservoir hosts for the parasite.

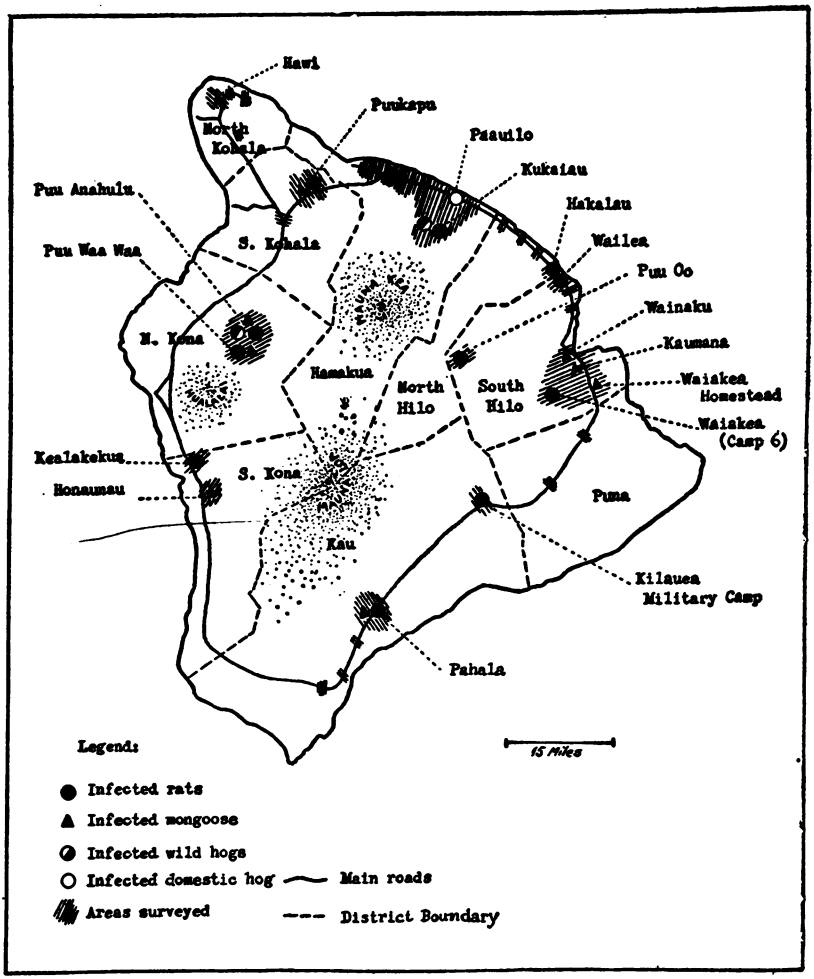

FIGURE 1.—Outline map of the Island of Hawaii showing localities where animals were found infected with trichinae. Shaded portions indicate approximate areas surveyed.

PRESENT SURVEY

1. EXTENT AND METHODS OF INVESTIGATION

The survey, which began on September 9, 1936, and continued up to July 1937, was conducted on the islands of Hawaii, Maui, Oahu, and Kauai. The approximate areas surveyed are shown in figures 1 and 2. The animals which were examined included rats, mice, mongooses (*Mungos birmanicus*), and wild and domestic hogs. The

rats, mice, and mongooses were trapped with snap-traps in all sorts of localities, including open fields, sugarcane fields, and areas near slaughter houses, piggeries, and farm buildings. The wild hogs were obtained directly or indirectly from special hunters who captured the

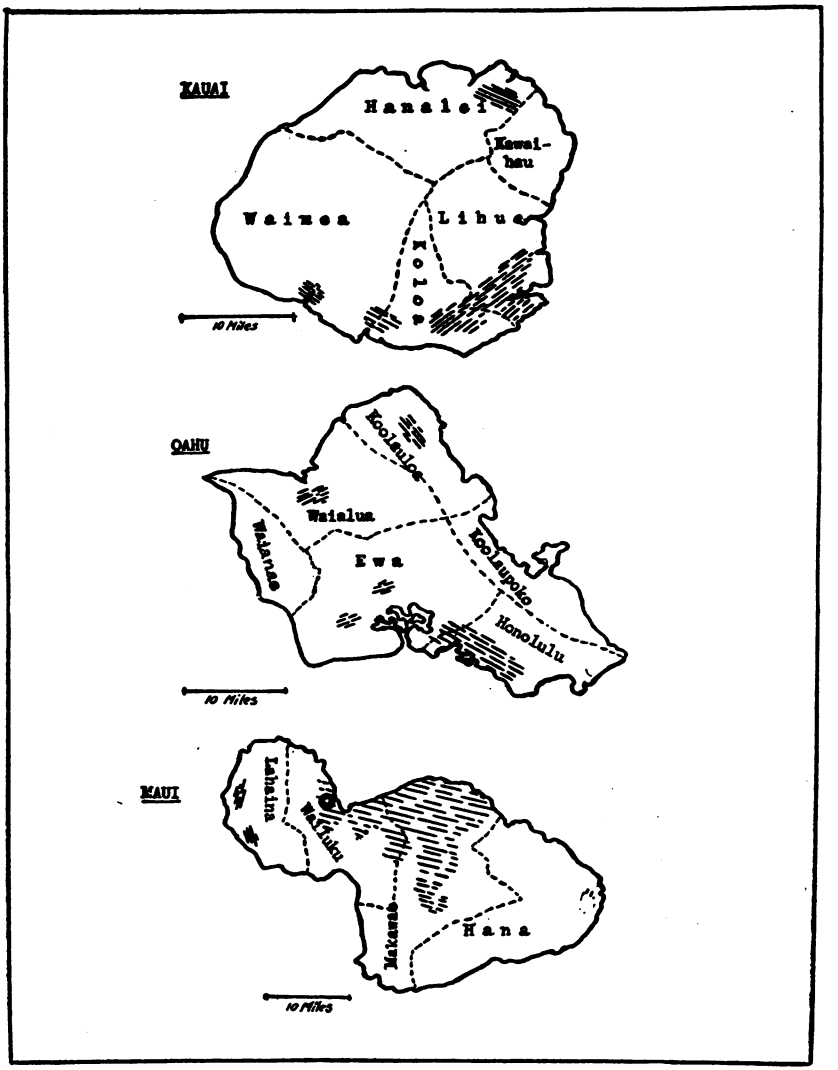

FIGURE 2.—Outline sketches of the Islands of Kauai, Oahu, and Maui, showing the various districts. The shaded portions indicate the approximate areas surveyed for trichinae; the circle indicated in the Wailuku district of Maui shows the locality in which a rat and two mongooses were found infected with trichinae.

animals in various districts as indicated in tables 1 and 2. Specimens of the domesticated hogs were secured in most instances from meat stores and slaughter houses; whenever possible, the actual place where the animal had been raised was ascertained.

2. METHODS OF DIAGNOSIS

In the present investigation, for the most part a combination of the common press preparation and digestion methods was used in examining the muscles of the various animals. In examining rodents and mongooses, the first procedure was the removal of most of the diaphragm and masseter muscles. The diaphragm was spread out and cut in two or three pieces. Each piece was then pressed between two microscope glass slides and examined with both a low-power Spencer binocular microscope, using 12X paired oculars and 2.3X or 4.8X objectives, for detecting encysted larvae, and a compound microscope for detecting unencysted larvae that might be present. Owing to the thinness of the diaphragm of these animals, it was possible to detect easily any encysted larvae. In examining the masseter muscle, it was first cut in several pieces and each piece teased apart to spread out the fibers. These fibers were then pressed between two glass slides and examined as noted above. In case of failure to find trichinae by these methods, the anterior portion of the body of each animal, including the head and thorax, was skinned, and the carcass ground in a meat grinder and digested in an incubator at 37.5° C. in artificial gastric juice (H_2O, 1,000 cc; HCl, 5 cc; pepsin, 7 gm). Each mongoose was digested separately. In the cases of rodents, in order to save time, the head and thorax of five rats of each species from the same locality were mixed and digested together. After digestion for approximately 24 hours, the material was passed through 20- and 40-mesh wire screens to remove particles of bone and undigested material. The filtrate was poured into a 250-cc sedimentation glass cone and allowed to settle. After three washings the sediment was poured in small amounts into small Petri dishes and examined for larvae with a wide-field binocular microscope.

In examining swine, most of the masseter muscle from one side of the head of each hog was used. Pieces of muscle were cut, teased apart, and examined as press preparations. If no larvae were found, the whole masseter muscle was ground and artificially digested as above described.

In comparing the findings by the two methods used, it is of interest to note that no cases of trichinae were discovered with the digestion method that were not discovered with the press preparation method.

3. INCIDENCE OF TRICHINA INFECTION

In tables 1 and 2 are tabulated the results for all the animals examined in each district of the islands surveyed, and the percentage of trichina infection. The data show that trichinae were found in rats, mongooses, and domestic and wild hogs on the island of Hawaii, and in mongooses and rats on the island of Maui. The findings on Hawaii indicate that the parasite is widely distributed, having been found in

eight of the nine districts. On Maui the infection seems to be restricted to the north central part of the Wailuku district. For the purpose of clarity, each group of animals will be discussed separately.

TABLE 1.—*Incidence of trichina infection in animals on the island of Hawaii*

District	Rats			Mice			Mongooses			Wild hogs			Domestic hogs		
	Ex.[1]	Pos.[1]	% Pos.	Ex.	Pos.	% Pos.	Ex.	Pos.	% Pos.	Ex.	Pos.	% Pos.	Ex.	Pos.	% Pos.
Hamakua	402	15	3.7	16	0	0	13	0	0	20	3	15	4	1	25
N. Kohala	151	0	0	225	0	0	5	1	20	0	0	0	7	0	0
S. Kohala	51	9	17.6	3	0	0	2	2	100	0	0	0	3	0	0
N. Kona	309	15	4.9	59	0	0	9	2	22.2	11	3	27.2	2	.0	0
S. Kona	219	5	2.3	0	0	0	4	1	25	0	0	0	0	0	0
Kau	162	5	3.1	2	0	0	7	2	28.6	3	0	0	8	0	0
Puna	172	0	0	0	0	0	0	0	0	0	0	0	5	0	0
S. Hilo	450	7	1.5	1	0	0	26	7	26.9	6	0	0	16	0	0
N. Hilo	214	1	.5	0	0	0	4	0	0	0	0	0	2	0	0
Total	2,130	57	-----	306	0	-----	70	15	-----	40	6	-----	47	1	-----
Percent of total	-----	-----	2.7	-----	-----	0	-----	-----	21.4	-----	-----	15	-----	-----	2.1

[1] Ex-Examined; pos-positive.

TABLE 2.—*Incidence of trichina infection in animals on the island of Maui*

District	Rats			Mice			Mongooses			Wild hogs			Domestic hogs		
	Ex.[1]	Pos.[1]	% Pos.	Ex.	Pos.	% Pos.	Ex.	Pos.	% Pos.	Ex.	Pos.	% Pos.	Ex.	Pos.	% Pos.
Wailuku	360	1	0.3	6	0	0	16	2	12.5	0	0	0	32	0	0
Lahaina	62	0	0	2	0	0	0	0	0	0	0	0	26	0	0
Makawao	669	0	0	25	0	0	6	0	0	2	0	0	12	0	0
Hana	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown locality	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0
Total	1,094	1	-----	33	0	-----	22	2	-----	2	0	-----	92	0	-----
Percent of total	-----	-----	.09	-----	-----	0	-----	-----	9.1	-----	-----	0	-----	-----	0

[1] Ex.=Examined; pos.=positive.

A number of animals caught on the islands of Oahu and Kauai were examined, but no trichinae were found. The numbers of each species by districts in which caught are listed in table 3.

TABLE 3.—*Animals on the islands of Oahu and Kauai that were examined for trichina infection*

ISLAND OF OAHU

District	Animals examined				
	Rats	Mice	Mongooses	Wild hogs	Domestic hogs
Honolulu	328	2	1	0	130
Ewa	14	0	0	0	0
Waialua	5	0	0	0	0
Koolauloa	5	0	0	0	0
Total	352	2	1	0	130

ISLAND OF KAUAI

Hanalei	63	0	0	1	8
Lihue	451	2	0	0	2
Koloa	85	0	0	0	0
Hanapepe	2	0	0	1	17
Unknown					3
Total	601	2	0	2	30

INCIDENCE OF TRICHINAE IN RATS

Of 2,130 rats examined on the island of Hawaii, the average incidence of trichinae was found to be 2.7 percent, although there was a variation from none in the Puna district to 17.6 percent in the South Kohala district. Only one rat was found infected on the island of Maui, and none on Oahu or Kauai. The rats examined included the four species known to be found in Hawaii, and these are mentioned below. Although these rats are found on all the islands surveyed, there was considerable variation in the proportions of species on the various islands and in the various districts of each island. Whenever these different species of rats were more or less evenly distributed in a district or locality, it was planned to examine approximately the same number of each kind.

It is of interest to compare the incidence of trichina infection in the different species of rats on the island of Hawaii, these representing all the species present in the Territory.

Species of rat	Number examined	Number infected	Percent positive
Rattus norvegicus (gray rat)	820	39	4.8
Rattus rattus rattus (black rat)	511	15	2.9
Rattus rattus alexandrinus (alexandrine rat)	397	2	.5
Rattus hawaiiensis (Hawaiian rat)	402	1	.2

Of the total positive rats (57), the percent positive represented by each kind of rat was as follows: Gray rat, 68.4 percent; black rat, 26.3 percent; alexandrine rat, 3.5 percent; Hawaiian rat, 1 percent.

HABITS OF RODENTS IN RELATION TO TRICHINOSIS

The incidence of trichina infection in the various species of rats may bear a relationship to their habits of living and feeding, or possibly may be accounted for by the frequency of certain species in an endemic area. For example, in the North Kona district of Hawaii the majority of rats trapped were black rats, and most of the positive rats were of this kind, presumably because of their frequency.

In regard to the habits of rats in Hawaii, a considerable discussion is given by Eskey (*2*) in connection with other subjects relative to a study of plague in Hawaii. *R. norvegicus*, although usually believed to be found in or near buildings, is in some localities, as on Kauai, the most common rat in the fields. Of 39 rats of this species found infected, 14 were trapped near slaughter houses and piggeries, especially in the South Kohala district. The other 25 were trapped mostly in the Kukaiau section of the Hamakua district near ranch buildings.

The two subspecies of *Rattus rattus* are known to live afield and nest in trees and at times under floors; they also frequent buildings. Of

the 17 rats of this group found infected, all were trapped in open fields, mostly in the North Kona district, where wild pigs also were found infected.

Of the *R. hawaiiensis* examined, only one, trapped under a house in a village in the South Hilo district, was found infected. This species of rat is usually considered a field type, nesting in underground burrows or rock piles, and is rarely found in buildings or very close to them. Their food is believed to be mainly seeds and fruits.

Of the rats examined on Maui, the only rat (*R. rattus alexandrinus*) found infected with trichinae was trapped about 2 miles north of the town of Wailuku. In this area, there were found also 2 infected mongooses; and out of 179 additional rats trapped, none showed trichina larvae.

Of all the mice (*Mus musculus*) examined in the various islands, none was found positive for trichinae. These mice are known to frequent both buildings and open fields.

INCIDENCE OF TRICHINAE IN MONGOOSES

Table 1 shows that trichina infection in mongooses on Hawaii was found in all eight districts in which rats were found infected. Of 70 mongooses examined, 15 (21.4 percent) were positive. On Maui only 2 mongooses were found infected. The percentage of positive mongooses on Hawaii (21.4 percent) appears very high when compared with that of rats (2.7 percent). The high incidence is probably due to the feeding habits of the mongooses. These animals are believed to prey extensively on rodents and consequently are very likely to become infected from diseased rats. Except in South Kohala, where the number is too small to afford a significant incidence, there is apparently little difference in the percentage of infection in mongooses in those districts in which trichinae were found, varying only from 20 to 28.6 percent. In South Kohala only two animals were examined and both were infected, the indicated high incidence being in line with a high incidence in rats in that area.

INCIDENCE OF TRICHINAE IN WILD HOGS

The "wild hogs" found in the Territory are descended, it is believed, from domesticated swine (*Sus scrofa domestica*) which escaped and now roam wild in the mountainous, swampy, or waste lands on many of the islands. Wild hogs were caught in four districts on the island of Hawaii, and in two of these districts infection was found, namely, the Kukaiau section of the northeast portion of the Hamakua district, with 15 percent infection, and the Puuanahulu section of North Kona district, with 27.2 percent infection. However, in the Kau and South Hilo districts the number of hogs examined was small, and a more extensive survey would probably reveal the presence of

trichinae. No trichinae were found in two wild hogs captured in the Makawao District on the island of Maui, and in one from Hanalei and one from Waimea on Kauai.

The source of trichina infection in wild hogs is not definitely known, but possibly they become infected as a result of eating diseased carcasses of other hogs, rats, or other carnivorous mammals. Hogs under domestication are known to feed occasionally on carcasses of animals that die on the farm, and this habit may be more common in their wild state.

In view of the high incidence of infection among wild hogs, and of the large numbers of these animals which are used for human consumption in Hawaii, it is believed that wild swine may be of considerable importance in connection with trichinosis here. In this connection we note that three cases of trichinosis in man on Hawaii, in 1936, were attributed to pork sausage made from wild hogs. According to personal information furnished by Mr. L. W. Bryan, Forester for the island of Hawaii (Board of Commissioners of Agriculture and Forestry), there were, during the 5-year period ending December 31, 1935, a total of 11,088 wild hogs reported killed on that island. Undoubtedly other hogs were killed that were not reported. The hogs in this survey were obtained from all sections of the island, but principally from the Kohala Forest Reserve (North Kohala district), and along tne slopes of the Mauna Kea, Mauna Loa, and Hualalai mountains. In these areas, hogs are usually present below the timber line, which varies from about 8,000 to 10,000 feet above sea level.

INCIDENCE OF TRICHINAE IN DOMESTICATED HOGS

Of 41 muscle samples from domesticated hogs examined for trichinae on the island of Hawaii, only one, obtained in the Hamakua district, was found positive. In 92, 130, and 30 hogs examined from Maui, Oahu, and Kauai, respectively, no trichinae were found.

The above data indicate a low incidence of trichina infection in domesticated hogs. This low incidence is in line with certain proper swine-feeding practices followed by many swine raisers. Hog raising in Hawaii is for the most part a very intensive form of agriculture. In most cases, hogs are kept in concrete or wooden pens, and are fed to a great extent on garbage which is secured from army posts, hotels, and households; the garbage is cooked before being fed to the swine, and this procedure, if properly conducted, should kill any trichina larvae that may be present in meat scraps. It is of interest to point out, in this connection, that the feeding of uncooked garbage to hogs in the continental United States is claimed to be an important factor in the spread of trichinosis to swine. Hall (*3*) reported that of 2,146 samples of pork from grain-fed hogs and of 1,973 garbage-fed hogs, 1.5 percent and 4.8 percent, respectively, were found infected with

trichinae. Schwartz (*4*) also reports approximately the same percentage infection in hogs.

TRICHINOSIS IN MAN IN THE TERRITORY OF HAWAII

A summary of cases of trichinosis in man which have been reported in the Territory of Hawaii up to July 1937 is presented below. Except as otherwise indicated, these cases were reported to the Territorial Board of Health by physicians:

Case number	Date known or reported	Island on which reported	Basis of diagnosis	Attributed source of infection	Physician reporting
1	May 1930	Maui	Clinical	Pork	Dr. F. A. St. Sure.
2	(?) 1930	do	do	(?)	Do.
3	January 1936	Hawaii	do	Pork	Dr. F. Irwin.
4	do	do	do	do	Do.
5	March 1936	do	do	Portuguese sausage	
6	Apr. 27, 1936	do	do	Portuguese sausage (wild hogs).	Dr. W. N. Bergin.
7	do	do	do	do	Do.
8	May 6, 1936	do	Trichina larvae in muscle.	do	Do.
9	Aug. 31, 1936	Maui	Clinical	Portuguese sausage	Dr. H. W. Chamberlin.
10	Nov. 21, 1936	Hawaii	Trichina larvae in muscle.	(?)	Dr. O. Orenstein.
11	June 1937	Maui	do	Pork	Dr. F. A. St. Sure.

Cases 1, 2, 3, 4, 5, and 11 were reported to the writer. Case 5 was diagnosed by the patient herself, who is a nurse; the patient noted clinical symptoms on Mar. 3, 1936, with an eosinophilia of 12 percent on March 17, and 45 percent on April 1.

SUMMARY AND DISCUSSION

The present survey has shown that trichinae are present in the rat, mongoose, and wild and domestic hog on the island of Hawaii, and in the mongoose and rat on the island of Maui. The data obtained are too incomplete in some instances to warrant the statement that trichinae are not present in other districts.

In addition to the findings in the present survey, 11 cases of human trichinosis have been reported, mostly by physicians, from the islands of Maui and Hawaii; the infection in some of these cases was attributed to the eating of pork or of a locally manufactured pork sausage.

So far as human trichinosis is concerned, man usually acquires it as a result of eating the fresh muscle of infected swine; therefore, in order to control human trichinosis, in addition to cooking pork properly, it is essential to prevent hogs from becoming infected so as to reduce the source of infection. Just what part rats and mongooses play in the spread of trichinosis to swine is not definitely known. Hall (*5*) is of the opinion that rats are not of much importance in the spread of trichinosis to domestic swine, but that swine usually become infected through eating infected pork scraps present in garbage. Although this is undoubtedly true for swine raised under domestication, wild hogs probably perpetuate the disease by cannibalism.

The presence of trichinae in hogs, both domestic and wild, constitutes a public health menace, and it is well to emphasize certain precautionary measures; namely, (*a*) Swine sanitation, involving among other things the thorough cooking of garbage to be fed to hogs so as to destroy any trichina larvae, and keeping hogs in ratproofed pens; (*b*) special slaughterhouse cooking, refrigerating, or processing of pork products of a kind customarily eaten without being cooked by the consumer; (*c*) thorough cooking of pork from domestic or wild swine before it is eaten.

It may well be emphasized, as Hall and Collins (*6*) have stated, that the fact that trichinosis is found in man "is not a reason for not eating pork, but it is a reason for cooking it well." According to reports by the United States Department of Agriculture, pork is rich in protein, fat, and vitamin B, and is easily digested; therefore, it is to be regarded as a desirable food.

ACKNOWLEDGMENTS

It is desired to acknowledge the helpful suggestions of Dr. F. E. Trotter, Territorial Commissioner of Public Health, in conducting this survey, and the valuable assistance received in the collection of material presented in this report from the following: Mr. Joseph S. Caceres and Dr. A. M. Ecklund, health officers for the islands of Hawaii and Kauai, respectively; Mr. S. W. Tay, director, bureau of sanitation; Mr. R. C. Lane and Mr. A. P. Christian, board of health division supervisors for the islands of Maui and Kauai, respectively; the various managers of the Hawaiian Sugar Planters' Association; Mr. Robert Hind of Puuwaawaa Ranch, Hawaii; and Dr. E. A. Fennel of the clinic and Dr. N. P. Larsen of the Queen's Hospital.

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DEATHS DURING WEEK ENDED FEBRUARY 19, 1938

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Feb. 19, 1938	Corresponding week, 1937
Data from 86 large cities of the United States:		
Total deaths	8,611	[1] 10,403
Average for 3 prior years	9,841	
Total deaths, first 7 weeks of year	63,127	75,579
Deaths under 1 year of age	522	[1] 656
Average for 3 prior years	591	
Deaths under 1 year of age, first 7 weeks of year	3,747	4,537
Data from industrial insurance companies:		
Policies in force	69,776,044	69,207,100
Number of death claims	13,926	16,541
Death claims per 1,000 policies in force, annual rate	10.4	12.5
Death claims per 1,000 policies, first 7 weeks of year, annual rate	10.2	11.6

[1] Data for 85 cities.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers.

In these and the following tables a zero (0) is to be interpreted to mean that no cases or deaths occurred, while leaders (------) indicate that cases or deaths may have occurred although none were reported.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Feb. 26, 1938, and Feb. 27, 1937

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Feb. 26, 1938	Week ended Feb. 27, 1937	Week ended Feb. 26, 1938	Week ended Feb. 27, 1937	Week ended Feb. 26, 1938	Week ended Feb. 27, 1937	Week ended Feb. 26, 1938	Week ended Feb. 27, 1937
New England States:								
Maine	1	0	5	212	44	6	1	0
New Hampshire	0	1	4	------	23	76	0	0
Vermont	1	0	------	------	172	------	0	0
Massachusetts	0	4	------	------	245	768	2	4
Rhode Island	0	1	------	------	3	201	1	2
Connecticut	3	2	5	169	20	474	0	2
Middle Atlantic States:								
New York	26	31	[1] 6	[1] 45	1,273	439	8	11
New Jersey	18	9	24	134	1,253	1,190	1	6
Pennsylvania	63	45	------	------	7,166	219	6	7
East North Central States:								
Ohio	36	38	------	447	2,591	99	7	13
Indiana	81	9	19	133	740	11	0	3
Illinois	29	37	23	162	6,495	36	2	7
Michigan [2]	15	16	2	4	3,448	52	2	2
Wisconsin	4	1	57	220	3,476	14	1	1
West North Central States:								
Minnesota	1	6	1	1	35	32	0	2
Iowa	2	2	14	8	66	2	2	0
Missouri	29	19	175	944	1,073	8	4	3
North Dakota	1	1	6	7	3	2	0	0
South Dakota	0	1	------	9	------	------	0	1
Nebraska	11	5	14	30	33	13	1	0
Kansas	4	9	8	------	322	6	0	0
South Atlantic States:								
Delaware	0	1	------	7	21	76	0	0
Maryland [2]	5	8	28	372	48	554	7	2
District of Columbia	10	10	------	28	4	75	0	1
Virginia	18	14	------	------	456	269	0	14
West Virginia	8	14	69	1,252	439	1	3	10
North Carolina	25	25	16	173	2,662	64	2	3
South Carolina [2]	4	------	604	1,346	559	54	2	2
Georgia [2]	8	8	------	1,262	419	------	0	3
Florida	7	9	------	35	564	5	1	0
East South Central States:								
Kentucky	9	13	43	493	698	243	9	17
Tennessee	12	11	152	844	1,520	10	9	10
Alabama [2]	18	37	316	1,546	1,172	26	12	8
Mississippi [2]	6	7	------	------	0	------	1	2

See footnotes at end of table.

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Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Feb. 26, 1938, and Feb. 27, 1937—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Feb. 26, 1938	Week ended Feb. 27, 1937	Week ended Feb. 26, 1938	Week ended Feb. 27, 1937	Week ended Feb. 26, 1938	Week ended Feb. 27, 1937	Week ended Feb. 26, 1938	Week ended Feb. 27, 1937
West South Central States:								
Arkansas	9	11	154	980	346	----	1	3
Louisiana	15	12	9	339	5	8	2	2
Oklahoma [4]	8	7	218	974	83	12	1	7
Texas	38	29	754	3,480	322	310	6	14
Mountain States:								
Montana	3	2	----	132	30	2	1	0
Idaho	0	2	7	67	4	34	1	1
Wyoming	2	0	----	56	3	2	0	0
Colorado	27	6	----	----	518	6	2	1
New Mexico	1	4	2	167	81	62	0	0
Arizona	8	5	101	269	16	239	0	2
Utah [3]	0	0	----	----	178	26	0	0
Pacific States:								
Washington	1	4	1	5	7	43	1	0
Oregon	2	1	84	196	15	7	0	1
California	34	21	110	1,915	252	110	2	13
Total	603	498	3,031	18,507	38,903	5,886	101	180
First 8 weeks of year	5,197	4,584	24,618	209,415	201,876	37,714	755	1,247

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers		Whooping cough
	Week ended Feb. 26, 1938	Week ended Feb. 27, 1937	Week ended Feb. 26, 1938	Week ended Feb. 27, 1937	Week ended Feb. 26, 1938	Week ended Feb. 27, 1937	Week ended Feb. 26, 1938	Week ended Feb. 27, 1937	Week ended Feb. 26, 1938
New England States:									
Maine	0	0	18	15	0	0	0	0	27
New Hampshire	0	0	18	23	0	0	2	0	4
Vermont	0	0	28	10	0	0	0	0	46
Massachusetts	0	0	299	255	0	0	1	1	84
Rhode Island	1	0	16	56	0	0	0	0	39
Connecticut	0	0	107	88	0	0	0	2	49
Middle Atlantic States:									
New York	1	0	740	953	0	4	5	2	410
New Jersey	0	0	136	174	0	0	0	1	166
Pennsylvania	2	0	610	561	0	0	5	3	295
East North Central States:									
Ohio	0	1	482	493	37	7	7	3	169
Indiana	1	1	270	216	47	8	2	0	25
Illinois	1	1	736	582	41	40	13	4	85
Michigan [3]	1	0	594	771	11	3	4	1	197
Wisconsin	0	0	214	349	7	4	1	1	136
West North Central States:									
Minnesota	0	0	171	169	16	2	0	1	27
Iowa	0	2	266	351	53	35	0	0	24
Missouri	0	0	218	292	52	46	4	0	125
North Dakota	0	0	18	47	15	22	0	1	0
South Dakota	0	0	11	73	4	5	0	1	70
Nebraska	0	0	94	106	8	0	1	0	14
Kansas	0	0	209	378	31	22	0	1	93
South Atlantic States:									
Delaware	0	0	16	4	0	0	0	1	5
Maryland [3]	0	0	62	51	0	0	0	1	48
District of Columbia	1	0	18	21	0	0	1	1	4
Virginia	0	0	35	35	0	0	4	1	89
West Virginia	1	0	44	55	0	0	5	3	88
North Carolina	2	1	52	33	0	0	5	8	383
South Carolina [3]	0	0	5	6	0	0	4	3	68
Georgia [3]	0	0	13	14	0	0	1	2	43
Florida	1	2	9	6	1	0	2	1	14

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Feb. 26, 1938, and Feb. 27, 1937—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers		Whooping cough
	Week ended Feb. 26, 1938	Week ended Feb. 27, 1937	Week ended Feb. 26, 1938	Week ended Feb. 27, 1937	Week ended Feb. 26, 1938	Week ended Feb. 27, 1937	Week ended Feb. 26, 1938	Week ended Feb. 27, 1937	Week ended Feb. 27, 1938
East South Central States:									
Kentucky	0	0	97	65	21	0	3	2	67
Tennessee	0	0	62	18	32	0	1	4	86
Alabama [2]	2	2	7	12	0	0	4	1	32
Mississippi [2]	2	0	9	12	6	0	2	2	----
West South Central States:									
Arkansas	2	0	9	11	6	5	1	0	26
Louisiana	0	1	13	14	0	0	25	6	12
Oklahoma [4]	0	2	20	41	20	6	0	0	41
Texas	2	1	124	77	20	2	12	20	177
Mountain States:									
Montana	0	0	26	47	21	29	0	0	24
Idaho	0	0	19	25	16	1	0	0	12
Wyoming	0	0	6	36	0	3	0	0	4
Colorado	0	0	73	45	14	1	0	0	15
New Mexico	2	0	24	35	0	0	7	0	31
Arizona	0	0	12	16	10	0	0	1	43
Utah [2]	0	0	49	23	1	0	0	0	23
Pacific States:									
Washington	1	0	57	63	51	5	1	2	138
Oregon	0	1	58	23	21	24	2	0	26
California	1	0	184	219	17	9	11	1	363
Total	24	15	6,358	6,969	579	283	136	82	3,947
First 8 weeks of year	174	174	48,076	50,571	4,650	2,364	986	885	31,816

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Typhus fever, week ended Feb. 26, 1938, 7 cases as follows: South Carolina, 1; Georgia, 4; Alabama, 2.
[4] Figures for 1937 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
January 1938										
Colorado	1	43	1	----	779	----	0	191	48	0
Idaho	2	6	17	----	24	----	1	141	142	7
Indiana	6	295	109	----	1,481	----	1	953	259	5
Louisiana	12	54	123	25	13	4	3	74	3	27
Massachusetts	3	17	----	1	566	----	0	1,163	0	7
Mississippi	5	28	7,217	943	642	173	2	39	43	8
Montana	2	3	51	----	21	----	1	178	39	3
Nevada	0	0	33	----	1	----	0	20	0	1
New Mexico	3	14	7	----	558	----	1	75	8	7
New York	29	129	----	4	1,758	----	6	2,516	0	18
Oklahoma	8	102	706	34	113	3	2	270	74	12
Oregon	2	15	212	----	44	----	4	233	82	6
Pennsylvania	26	216	----	4	22,363	1	2	2,222	0	34
Puerto Rico	0	44	99	4,340	63	----	0	----	0	35
Rhode Island	0	----	----	----	2	----	0	149	0	0
South Dakota	2	19	14	----	9	----	0	115	39	0
Texas	7	306	2,949	178	322	112	6	650	77	76
Vermont	0	1	8	----	1,219	----	0	69	0	0
Virginia	16	82	2,002	3	1,495	6	0	196	1	13

Summary of monthly reports from States—Continued

January 1938

	Cases
Anthrax:	
Texas	4
Chickenpox:	
Colorado	487
Idaho	220
Indiana	507
Louisiana	48
Massachusetts	2,196
Mississippi	804
Montana	300
Nevada	28
New Mexico	191
New York	3,361
Oklahoma	294
Oregon	375
Pennsylvania	5,719
Puerto Rico	13
Rhode Island	129
South Dakota	231
Texas	1,072
Vermont	371
Virginia	373
Conjunctivitis:	
Idaho	6
New Mexico	3
Oklahoma	1
Dengue:	
Mississippi	4
Texas	29
Diarrhea:	
New Mexico	7
Dysentery:	
Louisiana (amoebic)	1
Massachusetts (bacillary)	6
Mississippi (amoebic)	46
Mississippi (bacillary)	220
New York (amoebic)	6
New York (bacillary)	99
Oklahoma (amoebic)	1
Oklahoma (bacillary)	7
Oregon (amoebic)	1
Pennsylvania (amoebic)	1
Puerto Rico	31
Texas (amoebic)	4
Texas (bacillary)	44
Virginia (diarrhea included)	41
Encephalitis, epidemic or lethargic:	
Montana	1
New York	5
Oregon	2
Pennsylvania	2
Rhode Island	1
Texas	5
Virginia	1
Filariasis:	
Puerto Rico	2
Food poisoning:	
New Mexico	1
German measles:	
Idaho	4
Massachusetts	57
Montana	3
New Mexico	1
New York	104
Pennsylvania	168
German measles—Contd.	
Rhode Island	7
Vermont	10
Hookworm disease:	
Louisiana	11
Mississippi	371
Impetigo contagiosa:	
Montana	3
Oregon	116
Jaundice, infectious:	
Montana	18
Oregon	1
Lead poisoning:	
Massachusetts	1
Mumps:	
Colorado	32
Idaho	327
Indiana	27
Louisiana	4
Massachusetts	618
Mississippi	275
Montana	96
Nevada	163
New Mexico	121
Oklahoma	14
Oregon	55
Pennsylvania	3,640
Puerto Rico	2
Rhode Island	30
South Dakota	65
Texas	232
Vermont	629
Virginia	229
Ophthalmia neonatorum:	
Louisiana	1
Massachusetts	75
Mississippi	8
New York [1]	11
Oklahoma	1
Pennsylvania	3
Puerto Rico	8
Virginia	1
Paratyphoid fever:	
Massachusetts	1
New York	3
Texas	2
Virginia	1
Puerperal septicemia:	
Mississippi	29
Puerto Rico	3
Rabies in animals:	
Indiana	62
Louisiana	11
Massachusetts	11
Mississippi	14
New York [1]	2
Oregon	4
Rhode Island	2
Rabies in man: Virginia	1
Scabies:	
Montana	3
Oregon	74
Septic sore throat:	
Idaho	32
Louisiana	30
Massachusetts	26
Montana	9
New Mexico	1
New York	110
Septic sore throat—Contd.	
Oklahoma	23
Oregon	10
Rhode Island	18
South Dakota	1
Tetanus:	
Louisiana	2
New York	2
Puerto Rico	8
Virginia	2
Tetanus, infantile:	
Puerto Rico	2
Trachoma:	
Mississippi	3
Montana	58
Oklahoma	27
South Dakota	1
Trichinosis:	
Massachusetts	3
New York	25
Tularaemia:	
Indiana	6
Louisiana	7
Nevada	1
New Mexico	1
Pennsylvania	2
Texas	3
Virginia	14
Typhus fever:	
Louisiana	3
Texas	31
Undulant fever:	
Colorado	1
Idaho	2
Indiana	1
Louisiana	4
Massachusetts	2
Mississippi	6
Montana	2
New York	16
Oklahoma	94
Oregon	2
Pennsylvania	6
Texas	10
Virginia	5
Vincent's infection:	
New York [1]	68
Oklahoma	4
Oregon	13
Whooping cough:	
Colorado	35
Idaho	133
Indiana	121
Louisiana	15
Massachusetts	599
Mississippi	604
Montana	134
Nevada	26
New Mexico	147
New York	1,618
Oklahoma	121
Oregon	73
Pennsylvania	1,303
Puerto Rico	181
Rhode Island	187
South Dakota	98
Texas	765
Vermont	132
Virginia	476

[1] Exclusive of New York City.

WEEKLY REPORTS FROM CITIES

City reports for week ended Feb. 19, 1938

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	208	1,111	161	4,556	1,001	2,187	25	419	19	1,176	----
Current week [1]	142	185	66	12,470	740	1,719	39	316	15	1,089	----
Maine:											
Portland	0	----	0	7	3	1	0	0	0	23	37
New Hampshire:											
Concord	0	----	0	1	0	0	0	0	0	2	14
Manchester	0	----	0	0	6	0	0	0	0	0	28
Nashua	0	----	1	4	0	0	0	0	0	4	3
Vermont:											
Barre											
Burlington	0	----	0	7	0	1	0	0	0	6	7
Rutland	0	----	0	0	0	0	0	0	0	0	4
Massachusetts:											
Boston	1	----	1	144	17	98	0	6	0	14	206
Fall River	0	----	0	0	2	1	0	0	0	10	29
Springfield	0	----	0	0	3	7	0	0	0	7	38
Worcester	0	----	0	1	12	30	0	2	0	6	54
Rhode Island:											
Pawtucket	1	----	0	0	2	5	0	0	0	0	13
Providence	0	----	1	1	2	10	0	1	0	25	58
Connecticut:											
Bridgeport	0	1	0	0	2	28	0	1	0	1	36
Hartford	0	3	0	0	4	17	0	0	0	6	39
New Haven	0	5	1	0	3	2	0	0	0	2	47
New York:											
Buffalo	0	----	0	1	9	24	0	7	1	16	124
New York	31	24	8	527	133	368	0	75	3	271	1,474
Rochester	0	2	0	1	1	13	0	0	0	6	65
Syracuse	1	----	0	10	6	11	0	2	0	13	59
New Jersey:											
Camden	1	1	1	38	4	1	0	1	0	1	32
Newark	0	1	1	22	7	11	0	2	0	39	117
Trenton	0	1	1	8	2	1	0	4	0	3	38
Pennsylvania:											
Philadelphia	2	----	5	715	31	125	0	28	0	47	510
Pittsburgh	6	5	3	414	27	47	0	8	0	21	193
Reading	1	0	0	3	3	5	0	0	0	1	40
Scranton	1	----		68		4	0		0	4	
Ohio:											
Cincinnati	1	----	2	4	12	9	0	7	0	6	134
Cleveland	1	17	2	176	15	78	0	7	1	35	174
Columbus	0	----	0	229	5	7	0	1	0	0	83
Toledo	0	----	0	132	4	8	0	4	0	9	72
Indiana:											
Anderson	0	----	0	3	0	4	7	0	0	0	9
Fort Wayne	2	----	0	39	4	14	0	0	1	1	25
Indianapolis	10	----	1	99	16	17	0	4	0	1	98
Muncie	1	----		53	0	1	2	0	0	0	15
South Bend	1	----	0	8	0	1	1	0	0	0	16
Terre Haute	4	----	0	22	0	3	0	0	0	0	18
Illinois:											
Alton	0	----		0	3	10	0	0	0	0	11
Chicago	9	11	5	3,116	46	227	0	32	2	35	699
Moline	0	1	0	67	2	15	0	0	0	0	9
Springfield	1	----	0	128	3	3	2	0	0	2	14
Michigan:											
Detroit	9	----	3	2,029	14	154	0	16	0	53	263
Flint	2	----	0	1	2	31	0	0	0	11	20
Grand Rapids	0	----	1	1	2	12	0	0	0	1	27
Wisconsin:											
Kenosha	0	----	0	11	3	0	0	0	0	1	13
Madison	1	----	1	1	1	9	0	0	0	5	15
Milwaukee	0	----	0	2,636	11	15	0	2	0	12	110
Racine	1	----	0	18	1	9	0	2	0	4	18
Superior	0	----	0	1	0	1	0	0	0	1	7

[1] Figures for Barre, Vt., estimated; report not received.

City reports for week ended Feb. 19, 1938—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Minnesota:											
Duluth	0	------	0	0	2	2	0	0	0	2	23
Minneapolis	0	------	1	9	5	28	0	0	0	7	92
St. Paul	0	------	0	1	4	8	3	2	0	1	60
Iowa:											
Cedar Rapids	0	------	------	1	------	0	0	------	0	1	------
Davenport	0	------	------	12	------	0	0	------	0	0	------
Des Moines	0	------	------	1	0	35	0	------	0	0	31
Sioux City	0	------	------	1	------	7	0	------	0	0	------
Waterloo	0	------	------	19	------	17	0	------	0	1	------
Missouri:											
Kansas City	1	------	0	223	18	17	0	3	0	2	110
St. Joseph	0	------	2	12	4	2	0	1	0	0	30
St. Louis	7	1	0	56	13	60	4	3	2	4	237
North Dakota:											
Fargo	0	------	0	3	0	0	1	0	0	0	9
Grand Forks	0	------	------	1	------	1	1	------	0	0	------
Minot	0	------	0	0	0	0	3	0	0	0	4
South Dakota:											
Aberdeen	0	------	------	0	------	1	0	------	0	1	------
Sioux Falls	0	------	0	0	0	0	2	0	0	0	10
Nebraska:											
Lincoln	0	------	------	2	------	15	0	------	0	0	------
Omaha	0	------	0	0	8	3	0	1	0	0	53
Kansas:											
Lawrence	0	------	0	0	1	0	0	1	0	0	3
Topeka	0	------	1	8	7	2	1	0	0	19	30
Wichita	0	------	0	1	7	1	0	0	0	0	28
Delaware:											
Wilmington	0	------	0	11	6	4	0	0	0	0	27
Maryland:											
Baltimore	5	17	0	4	24	34	0	10	0	43	217
Cumberland	0	------	0	0	1	0	0	1	0	2	13
Frederick	0	------	0	0	0	1	0	0	2	0	3
District of Columbia:											
Washington	7	1	0	6	18	20	0	1	1	9	176
Virginia:											
Lynchburg	1	------	0	1	3	0	0	1	0	0	12
Norfolk	0	4	0	38	5	4	0	3	0	12	28
Richmond	0	------	0	31	2	1	0	2	0	0	41
Roanoke	2	------	0	2	2	3	0	0	0	4	16
West Virginia:											
Charleston	1	3	1	138	8	0	0	0	1	0	25
Huntington	1	------	------	6	------	0	0	------	0	0	------
Wheeling	0	------	0	25	0	10	0	0	0	4	17
North Carolina:											
Gastonia	0	------	0	0	------	0	0	------	0	2	------
Raleigh	1	------	0	18	7	0	0	0	0	23	19
Wilmington	0	------	0	28	5	0	0	0	0	3	15
Winston-Salem	0	------	0	3	0	1	0	1	0	40	10
South Carolina:											
Charleston	0	16	0	115	1	4	0	0	0	1	23
Florence	0	------	0	1	2	1	0	0	0	0	11
Greenville	0	------	0	2	2	1	0	0	0	13	17
Georgia:											
Atlanta	2	18	1	247	5	4	0	4	0	6	68
Brunswick	0	1	0	0	2	0	0	1	0	0	7
Savannah	1	------	0	23	1	1	0	1	0	0	19
Florida:											
Miami	0	2	1	137	4	2	0	1	0	8	36
Tampa	2	------	0	4	6	2	0	0	0	0	33
Kentucky:											
Ashland	0	------	0	0	2	0	0	1	0	1	17
Covington	0	------	0	0	3	2	1	1	0	0	23
Lexington	1	------	0	3	5	0	0	2	0	0	19
Louisville	2	1	1	328	10	67	0	2	0	6	74
Tennessee:											
Knoxville	2	5	0	18	1	2	0	0	1	0	27
Memphis	0	------	3	323	14	3	0	4	0	4	77
Nashville	0	------	0	91	8	1	0	2	0	18	56
Alabama:											
Birmingham	0	9	1	160	12	3	0	4	0	3	66
Mobile	0	------	1	9	4	0	0	1	0	0	23
Montgomery	0	------	------	14	------	1	0	------	0	3	------
Arkansas:											
Fort Smith	0	------	------	5	------	1	0	------	0	0	------
Little Rock	0	------	2	58	3	2	0	0	0	0	------

City reports for week ended Feb. 19, 1938—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths all causes
		Cases	Deaths								
Louisiana:											
Lake Charles	0	------	0	0	1	0	0	0	0	2	3
New Orleans	5	11	4	2	15	2	0	14	8	18	148
Shreveport	1	------	0	8	12	3	0	1	0	1	38
Oklahoma:											
Muskogee	0	------	--------	0	--------	0	0	-------	0	0	--------
Oklahoma City	2	------	1	0	8	5	1	6	0	0	64
Tulsa	2	------	--------	0	--------	1	2	-------	0	3	--------
Texas:											
Dallas	0	6	2	2	4	14	0	2	0	0	54
Fort Worth	0	------	3	1	6	9	1	3	0	1	34
Galveston	0	------	0	0	1	1	0	0	0	0	20
Houston	1	------	0	6	7	3	0	9	3	0	95
San Antonio	1	------	3	0	13	1	0	10	0	9	76
Montana:											
Billings	0	------	0	1	1	1	0	0	0	0	7
Great Falls	0	------	0	1	4	0	2	0	0	6	11
Helena	0	1	1	0	0	1	0	0	0	2	4
Missoula	0	------	0	0	3	0	0	0	0	0	16
Idaho:											
Boise	0	------	0	0	2	0	13	0	0	0	13
Colorado:											
Colorado Springs	4	------	0	0	1	3	0	0	0	0	10
Denver	9	------	3	334	9	16	0	5	0	1	97
Pueblo	0	------	0	0	4	2	2	0	0	1	8
New Mexico:											
Albuquerque	0	------	0	11	3	0	0	2	0	0	14
Utah:											
Salt Lake City	0	------	2	87	5	4	1	0	0	3	53
Washington:											
Seattle	0	------	0	0	6	5	0	5	0	47	83
Spokane	0	------	0	0	7	1	0	0	0	5	35
Tacoma	0	------	0	0	0	10	8	0	0	12	26
Oregon:											
Portland	4	5	0	4	10	37	6	1	0	1	79
Salem	0	5	--------	1	-------	0	0	-------	0	0	--------
California:											
Los Angeles	9	27	2	13	25	45	1	16	1	4	347
Sacramento	1	1	0	0	4	1	0	1	0	43	32
San Francisco	1	2	0	0	13	11	0	2	0	65	190

State and city	Meningococcus meningitis		Poliomyelitis cases	State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
Massachusetts:				Maryland:			
Springfield	1	1	0	Baltimore	1	0	0
New Hampshire:				Kentucky:			
Nashua	1	0	0	Louisville	1	0	0
New York:				Tennessee:			
Buffalo	1	1	0	Nashville	2	2	0
New York City	5	2	0	Alabama:			
New Jersey:				Birmingham	4	0	0
Newark	1	0	0	Arkansas:			
Pennsylvania:				Little Rock	0	1	0
Philadelphia	2	1	0	Louisiana:			
Pittsburgh	2	1	0	New Orleans	1	0	0
Reading	1	1	0	Shreveport	0	1	0
Ohio:				Colorado:			
Cleveland	1	0	0	Pueblo	1	0	0
Columbus	0	1	0	Washington:			
Michigan:				Seattle	0	1	0
Detroit	1	1	0	Spokane	1	0	0
Missouri:				California:			
St. Louis	1	0	0	Los Angeles	2	0	0
Kansas:				Sacramento	0	0	1
Wichita	1	0	0				

Encephalitis, epidemic or lethargic.—Cases: Providence, 1; New York, 3; Pittsburgh, 1; Detroit, 2.
Typhus fever.—Cases: New York, 1; Montgomery, 1; Lake Charles, 1.
Pellagra.—Cases: Philadelphia, 1; Atlanta, 2; Brunswick, 1; Savannah, 1; Tampa, 1; Birmingham, 1; Los Angeles, 1.
Rabies in man—Death: New Orleans, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended January 29, 1938.—During the 2 weeks ended January 29, 1938, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia[1]	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				1	5					6
Chickenpox	2	6	2	359	701	106	68	28	161	1,433
Diphtheria		9	7	131	10	8	7	9	3	184
Erysipelas		1		12	6	3	1	3	2	28
Influenza		12			161	3			20	196
Measles		5	36	354	574	133	34	186	345	1,667
Mumps		6			297	86	26	18	34	467
Paratyphoid fever					2				1	3
Pneumonia	5	2			56		1		16	80
Poliomyelitis		1		1				2	2	6
Scarlet fever		41	19	242	332	71	77	114	46	942
Smallpox								1	1	2
Trachoma							[2] 69			[2] 69
Tuberculosis	2	29	17	123	88	8	3	4	41	315
Typhoid fever		1	1	78	4	1	3	2	1	91
Undulant fever					3					3
Whooping cough		1	1	411	148	22	14	7	88	692

[1] For 2 weeks ended Feb. 2, 1938.
[2] Includes 68 cases among Indians.

CUBA

Habana—Communicable diseases—4 weeks ended February 12, 1938.—During the 4 weeks ended February 12, 1938, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	11	2	Tuberculosis	12	1
Malaria	[1] 11		Typhoid fever	[1] 55	3
Scarlet fever	1				

[1] Includes imported cases.

YUGOSLAVIA

Communicable diseases—4 weeks ended January 30, 1938.—During the 4 weeks ended January 30, 1938, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	25	3	Paratyphoid fever	15	----
Cerebrospinal meningitis	32	8	Poliomyelitis	1	----
Diphtheria and croup	749	72	Scarlet fever	315	5
Dysentery	21	----	Sepsis	11	3
Encephalitis	3	1	Tetanus	19	5
Erysipelas	206	1	Typhoid fever	551	49
Favus	4	----	Typhus fever	54	3
Measles	7	1			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for February 25, 1938, pages 313-327. A similar cumulative table will appear in future issues of the PUBLIC HEALTH REPORTS for the last Friday of each month.

Cholera

India—Chittagong.—During the week ended February 19, 1938, 1 case of cholera was reported in Chittagong, India.

India (French).—Cholera has been reported in French India as follows: Chandernagor, week ended January 15, 1938, 1 case; Karikal Territory, week ended January 8, 1938, 1 case, 1 death; Pondichery Territory, week ended January 8, 1938, 1 case, week ended January 15, 1938, 1 case.

Indochina (French).—During the week ended February 19, 1938, 72 cases of cholera were reported in Annam Province, and 2 cases in Tonkin Province, French Indochina.

Plague

Bolivia.—During the week ended January 8, 1938, plague was reported in Bolivia as follows: Sucre, 1 case of penumonic plague; Oropeza Province, 2 cases; Tarija, 1 case.

Hawaii Territory—Island of Hawaii—Hamakua District.—One rat found on February 14, 1938, in Hamakua Mill Sector, and one rat found on February 18, 1938, in Paauhau Sector, both in Hamakua District, Island of Hawaii, Hawaii Territory, have been proved positive for plague.

Tunisia—Tunis.—On February 15, 1938, 1 plague-infected rat was reported in Tunis, Tunisia.

Smallpox

China—Hong Kong.—During the week ended February 12, 1938, 156 cases of smallpox with 83 deaths were reported in Hong Kong, China.

Iraq—Baghdad.—During the week ended February 12, 1938, 1 case of smallpox was reported in Baghdad, Iraq.

Venezuela.—According to information dated Feb. 21, 1938, 4,000 cases of smallpox (alsatrim) were reported in Barquisimeto, a city of

50,000 population, in the State of Lara, Venezuela. The disease was stated to be present from Barquisimeto to Valencia and Maracay.

Yellow Fever

Brazil.—Yellow fever has been reported in Brazil as follows: Minas Geraes State—Juiz de Fora, January 29, 1938, 2 deaths; Rio Novo, January 27, 1 death; S. Domingo do Prata, January 19–22, 3 deaths. Rio de Janeiro State—Valença, January 27–29, 1938, 2 deaths.

Senegal—Dakar.—During the week ended February 19, 1938, 1 suspected case of yellow fever was reported in Dakar, Senegal.

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