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A STUDY OF RODENT ECTOPARASITES IN MOBILE, ALA.[1]

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This report on the 1934 survey of rodent ectoparasites in Mobile, Ala., is the second intracommunity analysis of data collected in an extensive and simultaneous survey of several communities in the United States. This large project was under the general direction of A. S. Rumreich, Senior Surgeon, United States Public Health Service, who, in the first paper of this series has described in some detail the background for the investigation and has also analyzed certain intercommunity comparative data from the standpoint of correlations between ectoparasite indices and the incidence of endemic typhus in human populations (1, 2). *The pressure of other duties has made it impossible for Dr. Rumreich to continue active work on the analysis of the data for other communities, and it has been carried out by those who worked with him. Since conditions in each locality differed, it has been impracticable to follow in every detail the pattern of the first (Jacksonville) paper, but the tables in this and subsequent studies are in substantially comparable form.*

More than 40 years of research on the epidemiology of bubonic plague provide a classical background of theory and methodology for the study of epidemic diseases which exist in a rodent reservoir and are transmitted to man by rodent ectoparasites (*3, 4*). Some of the conclusions reached by the plague workers are of very general epi-

[1] From the Division of Public Health Methods. Collection of the data locally was under the direction of F. M. Faget, Medical Director, United States Public Health Service, and identification of the ectoparasites was directed by M. O. Nolan, Associate Zoologist, United States Public Health Service.

demiologic importance. We may note especially the establishment of the axiom that infectibility of a community with plague is proportional to the abundance of the vector species and the conclusion that, although no less than 15 species of insects are capable of transmitting plague under experimental conditions, epidemics are predominantly attributable to a single species, the tropical rat flea *Xenopsylla cheopis* Rothschild (*3*).

Comparatively recently it was recognized that typhus fever exists in the United States in a rodent reservoir and in a form transmissible by rodent ectoparasites (*5*, *6*, *7*). In certain respects the epidemiologic parallel between endemic typhus fever and bubonic plague is striking. Both diseases show marked seasonal variations in incidence and marked affinity for certain types of premises. As with plague, endemic typhus fever has been shown to be transmitted experimentally among rodents by a variety of arthropods (*8*, *9*, *10*, *11*, *12*, *13*, *14*, *15*, *16*) but field studies have focused attention primarily on *X. cheopis* as a natural vector. Data from surveys of rodent ectoparasites in communities of the United States may have public health value in connection with the control of both diseases. An adequate accumulation of comparable survey data collected under divergent conditions may aid both in identifying the vector species of consequence under natural conditions and in devising accurate criteria for the evaluation of epidemic liability under specified conditions.

THE PORT OF MOBILE

Mobile is situated at the mouth of the Mobile River and at the head of Mobile Bay in southwestern Alabama at latitude 30° 41′ N. and longitude 80° 02′ W. It is the county seat of Mobile County and is the only seaport in Alabama. The greater city occupies an area of about 20 square miles on a flat sandy plain and lies at an altitude of approximately 100 feet above sea level. The estimated population in 1933 was 70,500 composed of 45,400 white persons and 25,100 persons of other races.

During the period of field operations the port of Mobile was touched by about 25 steamship lines operating to ports throughout the world. It was also a port for coastwise shipping largely from New Orleans and Pensacola and exchanged barge-borne commerce through the inland waterways of the Warrior River system with regions as far north as Birmingham. The city was an important terminal for 5 railroad trunk lines. The principal imports were sodium nitrate, fruit (particularly bananas) and coconuts, molasses, manganese, and manganese ore; the principal exports were raw cotton, logs, lumber, and iron and steel products. In the inland and coastwise shipping there was considerable traffic in grain, coal, coke, petroleum products, cottonseed oil, fish, oysters, and sand and gravel.

CHRONOLOGY AND TECHNIQUES OF FIELD OPERATIONS

The trapping of rats was begun in Mobile on January 22, 1934, and ended on December 27, 1934, after 266 actual days of trapping. Operations were interrupted only twice for periods of more than 3 days—once for 12 days from March 23 to April 3 and once for 5 days from July 1 to July 5. Trapping was distributed sufficiently evenly throughout the year to permit statistical analysis of the data on the basis of 48 weeks rather than on a monthly basis, as was necessary in the first paper of this series (*1*). The summary tables in the text, however, have been compiled on a monthly basis to facilitate comparison with the data of the Jacksonville study.

The techniques practiced in these surveys for live-trapping of rats and removal and identification of the ectoparasites already have been described in the Jacksonville paper. In Mobile there was also in progress until July 1, 1934, a rodent-eradication program conducted by the same workers who were live-trapping rodents for the ectoparasite study. Previous workers have noted the possibility of rodent destruction raising ectoparasite counts by causing the ectoparasites to become concentrated on the surviving hosts. Thus there is apparently a possibility that the somewhat high indices obtained in Mobile for the early months of 1934 may be related to the destruction of 18,835 rodents in the city during the first 6 months of the year. A more detailed analysis of this question, however, does not support the assumption that such influence was significant in this case.[2]

The data from the rodent-eradication program probably give a more reliable indication of the relative abundance of the important species of rodents than do the data of the ectoparasite survey because the live traps are very selective in their action, particularly in a tendency not to capture the smaller forms such as mice. Table 1 compares the numbers of rodents of each species taken by the two means. *Rattus norvegicus* definitely appears to have been the predominant domestic rodent in Mobile, but the data from live-trapping greatly overestimate this predominance.

COMPOSITION OF MATERIAL

Of the 6,159 rats examined for ectoparasites in the field station, 36 had to be eliminated from consideration because of loss of the vials of ectoparasites. Although these 36 rats were all infested with ecto-

[2] This particular point and others concerning the validity of indices as indicators of population changes is discussed in detail in a forthcoming paper (*17*) dealing with the problems encountered in interpreting the data from ectoparasite surveys.

TABLE 1.—*Relative abundance of species of domestic rodents*

Species	Rodent eradication program		Taken alive in traps	
	Number	*Percent*	*Number*	*Percent*
R. norvegicus	11,565	62.49	5,966	94.88
R. r. rattus	123	.66	13	.21
R. r. alexandrinus	1,128	6.10	178	2.83
Mus musculus	5,691	30.75	131	2.08
Total	18,507	100.00	6,288	100.00

parasites, their elimination had an insignificant effect on the infestation rates and no compensatory adjustment has been made in the tables which are based on the remaining 6,123 rats.

Hosts of other than the genus *Rattus* were taken in too small numbers to warrant special analysis. These consisted of 131 mice, 45 squirrels, 68 wood rats (*Neotoma*), 4 rabbits, 2 muskrats, 1 field mouse (*Microtus*), 15 opossums, and 9 birds. All but four of the 157 fleas found on squirrels belonged to the species *Orchopeas wickhami* which was found on no other hosts and the wood rats were almost exclusive hosts for the flea *Rhopalopsyllus gwyni* and the mite *Atricholaelaps glasgowi*. Otherwise these miscellaneous animals were lightly infested with ectoparasites and they are of no apparent importance for the purposes of this study.

All of the fleas from the 6,123 live *Rattus* were identified at the National Institute of Health but only a sample consisting of every tenth rat was examined for mites and lice. The data on these orders are thus based on a sample of 612 rats. Table 2 shows the composition of the ectoparasite collection by species and also an estimate of the relative abundance in nature of the various species as judged from the mean numbers found per rat examined.

X. cheopis is seen to have been the predominant species of rodent ectoparasite, but the louse *Polyplax spinulosa* and the flea *Echidnophaga gallinacea*, both of which have been shown experimentally to be potential typhus vectors (*13*, *14*, *15*, *18*), exhibited considerable abundance, as did the mites *Laelaps hawaiiensis* and *Echinolaelaps echidninus*, and the lice of the genus *Hoplopleura*. The vector potentialities of these latter forms have not been thoroughly investigated, but in the absence of conclusive evidence to the contrary every important species of rodent ectoparasite should be investigated for possible epidemiologic importance.

CONSIDERATIONS ON STATISTICAL CONSTANTS OF THE SPECIES-POPULATIONS OF ECTOPARASITES

The work of the Indian Plague Commission led to the conclusion that the intensity of plague epizootics among rats depends upon

TABLE 2.—*Species composition of the ectoparasite collection from 6,123 live* Rattus

Ectoparasite species	Number	Percent of order	Estimated relative [1] abundance in nature
Fleas:			
Xenopsylla cheopis	28,855	64.0	27.9
Nosopsyllus fasciatus	3,846	8.5	3.7
Leptopsylla segnis	4,081	9.0	4.0
Echidnophaga gallinacea	7,292	16.2	7.0
Ctenocephalides felis	992	2.2	1.0
Rhopalopsyllus gwyni	25	.1	0
Pulex irritans	6	0	0
Total Siphonaptera	45,097	100.0	43.6
Mites:			
Laelaps hawaiiensis	1,727	66.6	16.7
Echinolaelaps echidninus	733	28.3	7.1
Eulaelaps stabularis	43	1.7	.4
Liponyssus bacoti	31	1.2	.3
Atricholaelaps glasgowi	10	.4	.1
Others	48	1.9	.5
Total Acarina	[2] 2,592	100.0	25.1
Lice:			
Polyplax spinulosa	1,996	61.6	19.3
Hoplopleura spp.	1,238	38.2	12.0
Others	5	.2	0
Total Anoplura	[2] 3,239	100.0	31.3

[1] Percentage of total ectoparasites when based on the mean number per examined rat.
[2] Numbers of Acarina and Anoplura are based on 612 live rats.

the size of the *X. cheopis* population and that the extent of human epidemics is dependent upon the intensity of the epizootics. This postulated relationship between epidemic intensity and vector prevalence has received strong empirical support from studies made of arthropod-borne diseases by many workers but there still remain many inadequately answered questions as to the best manner of estimating vector populations.

With respect to bubonic plague and endemic typhus fever it is clear that the total number of rodent ectoparasites in a locality will vary with the numbers of ectoparasites found per rodent and with the number of rodents in the locality. The size of the rodent population is frequently ignored for practical purposes and the ectoparasite counts from a sample collection of rats are taken as indicative of the total ectoparasite population.

The most used "flea index" has been the mean number per rat of individuals of the species in question. Eskey (*19*) noted that this average might be affected strongly by a few rats harboring very large numbers of fleas and suggested that the percentage of rats infested might provide a better index of flea abundance. Several other workers have eliminated rats with very high counts from their calculations in an attempt to avoid drastic increases in the mean resulting from high counts. Rumreich and Wynn (*1*) have recently proposed an "index" giving reduced emphasis to high counts by limiting all such counts to a particular value $\mathcal{A}$ determined by fitting a curve to the frequency distribution.

All of the indices proposed to date possess theoretical limitations largely related to the fact that ectoparasites apparently are never distributed at random among the available hosts, but tend to occur in groups or to comprise "contagious" frequency distributions (*17*, *20*). Samples from such distributions yield larger numbers, both of noninfested rats and of rats with very high counts than would be expected by chance from a random distribution and the adequacy of usual indices as measures of population changes is accordingly diminished. Until some one type of ectoparasite index has been definitely shown, through a repeatedly demonstrated close correlation with typhus incidence, to be entirely adequate for practical purposes, it appears advantageous to consider several different indices in analyzing survey data. Following the precedent established for the Jacksonville study three types of indices have been used in analyzing the Mobile data: The mean, the infestation rate, and the "index" (*1*).

In Mobile the values obtained for $\mathcal{A}$, used in computing the "index," were 40 in the case of *X. cheopis* and 31 in the case of *L. hawaiiensis*. Thus, in computing the "index" for *X. cheopis* any rat having over 40 *cheopis* is counted as having exactly 40. These are not, however, unique values because they depend upon the type and complexity of the curve chosen to fit the data and the criteria adopted for judging the goodness of fit.

VARIATIONS IN PARASITIZATION BY HOST SPECIES

In the Jacksonville study (*1*) the flea *E. gallinacea* was found to be significantly more associated with *R. norvegicus* than with *R. rattus*, while other species of ectoparasites did not exhibit significant association with either host species. Since 92.8 percent of the rats in Jacksonville were *R. norvegicus* all of the host species were lumped together for calculation of the biometric constants.

In Mobile 94.9 percent of the rats were *R. norvegicus* so, as in the earlier study, the genus *Rattus* has been considered in its entirety for the purposes of this analysis. However, the results of many earlier studies (*3*, *4*) have indicated heavier parasitization of *R. norvegicus* than of other rats and this factor may have epidemiologic importance in any region where the various *Rattus* species do not occur in extremely disproportionate numbers.

By using the chi-square test and a fourfold table (*21*) to test significance, parasitization of *R. norvegicus* has been compared with that of *R. rattus* for each species of ectoparasite. Table 3 shows the only statistically significant results obtained. *E. gallinacea* was

TABLE 3.—*Significant parasitization differences between host species*

Hosts	Ectoparasites		P [1]
	E. gallinacea	*L. segnis*	
Infested *norvegicus*	[2] 614	787	0.006
Noninfested *norvegicus*	5,318	5,145	
Infested *rattus*	8	[2] 69	10^{-7}
Noninfested *rattus*	181	120	

[1] The symbol P expresses the probability of obtaining by chance, when the true difference is zero, a sample difference as great as or greater than that obtained. By convention any value of 0.05 or less is considered statistically significant.
[2] Numbers larger than would be expected due to chance.

again found to be significantly associated with *R. norvegicus*, and *L. segnis* was significantly associated with *R. rattus*.

SEASONAL VARIATIONS OF PARASITIZATION

Endemic typhus fever in the United States has long been known to be primarily a summer and autumn disease (*2*, *5*, *6*). Any rodent-ectoparasite species which is responsible for transmitting this disease from rats to man would accordingly be expected to show seasonal variations in prevalence somewhat similar to the seasonal variations in typhus case incidence.

Tables 4, 4A, 4B, and 4C make it evident that each of the common species of ectoparasites except *E. gallinacea* does exhibit some definite seasonal variation in abundance. This is more clearly brought out if we divide the year into a "hot-weather" period and a "cold-weather" period and compare parasitization levels for the two periods. In Mobile the 24 consecutive weeks beginning on May 13 and ending October 27 were characterized by mean maximum daily temperatures in excess of 80° F. (only 1 week fell below this level, which, incidentally, has been considered by plague investigators (*4*, *22*) to represent a critical upper limit for the effective spread of plague by *X. cheopis*) while the other 24 weeks of the study (January 21 to May 12 and October 28 to December 22) had only 1 week with a mean maximum daily temperature as high as 80° F.

Table 5 compares parasitization levels for the two periods. Only *E. gallinacea* failed to vary significantly between the hot- and cold-weather periods while, as in the Jacksonville analysis, only *X. cheopis* and *L. hawaiiensis* exhibited warm-weather maxima such as one would expect to find for any species which commonly transmits endemic typhus to man. Unfortunately we have no data on the incidence of typhus infection among the rats so we cannot neglect the possibility that other ectoparasite species may be of primary importance in spreading this infection from rat to rat.

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TABLE 4.—*Monthly and annual means, indices, and infestations, Siphonaptera and* X. cheopis, *by principal host species*

Month	Rodent host		Total Siphonaptera [1]			*Xenopsylla cheopis*			
	Species	Number	Number	Mean	Infestation percent	Number	Mean	Index	Infestation percent
1934									
January	*R. norvegicus*	273	2,875	10.53	91.6	1,298	4.75	4.32	72.5
	R. rattus	15	87	5.80	73.3	22	1.47	1.47	40.0
	Total	288	2,962	10.28	90.6	1.320	4.58	4.17	70.8
February	*R. norvegicus*	944	7,180	7.61	74.3	2,600	2.75	2.65	53.7
	R. rattus	56	387	6.91	85.7	85	1.52	1.38	33.9
	Total	1,000	7,567	7.57	74.9	2,685	2.68	2.58	52.6
March	*R. norvegicus*	860	6,836	7.95	69.1	2,302	2.68	2.50	50.7
	R. rattus	15	42	2.80	66.7	7	.47	.47	26.7
	Total	875	6,878	7.86	69.0	2,309	2.64	2.47	50.3
April	*R. norvegicus*	419	2,618	6.25	61.3	1,830	4.37	3.36	44.4
	R. rattus	3	2	.67	33.3	1	.33	.33	33.3
	Total	422	2,620	6.21	61.1	1,831	4.34	3.34	44.3
May	*R. norvegicus*	389	4,680	12.03	81.2	2,481	6.38	5.73	68.4
	R. rattus	20	33	1.65	60.0	19	.95	.95	35.0
	Total [2]	411	4,716	11.47	80.3	2,501	6.08	5.47	66.7
June	*R. norvegicus*	550	5,486	9.97	80.2	4,278	7.78	7.45	75.6
	R. rattus	30	136	4.53	83.3	118	3.93	3.93	83.3
	Total	580	5,622	9.69	80.3	4,396	7.58	7.27	76.0
July	*R. norvegicus*	267	2,563	9.60	79.8	2,534	9.49	8.79	79.0
	R. rattus	4	7	1.75	75.0	7	1.75	1.75	75.0
	Total	271	2,570	9.48	79.7	2,541	9.38	8.69	79.0
August	*R. norvegicus*	462	3,343	7.24	82.9	3,264	7.06	6.59	81.0
	R. rattus	11	30	2.73	72.7	29	2.64	2.64	72.7
		473	3,373	7.13	82.7	3,293	6.96	6.50	80.8
September	*R. norvegicus*	493	2,280	4.62	79.5	2,176	4.41	4.27	77.5
	R. rattus	11	46	4.18	63.6	45	4.09	4.09	63.6
	Total	504	2,326	4.62	79.2	2,221	4.41	4.27	77.2
October	*R. norvegicus*	481	3,193	6.64	81.3	3,007	6.25	6.10	79.6
	R. rattus	11	19	1.73	54.5	17	1.55	1.55	54.5
	Total	492	3,212	6.53	80.7	3,024	6.15	6.00	79.1
November	*R. norvegicus*	445	2,068	4.65	69.4	1,797	4.04	3.98	66.1
	R. rattus	8	16	2.00	62.5	12	1.50	1.50	50.0
	Total	453	2,084	4.60	69.3	1,809	3.99	3.94	65.8
December	*R. norvegicus*	349	1,157	3.32	63.0	925	2.65	2.65	55.9
	R. rattus	5	10	2.00	60.0	0	0	0	0
	Total	354	1,167	3.30	63.0	925	2.61	2.61	55.1
Year	*R. norvegicus*	5,932	44,279	7.53	76.1	28,492	5.22	4.87	67.0
	R. rattus	189	815	3.06	65.9	362	1.68	1.67	47.3
	Total [2]	6,123	45,097	7.40	75.9	28,855	5.12	4.78	66.5

[1] Includes 25 *Rhopalopsyllus gwyni* and 6 *Pulex irritans*.
[2] Includes 2 *Rattus* of unknown species.

TABLE 4A.—*Monthly and annual means and infestations,* N. fasciatus, L. segnis, E. gallinacea, *and* C. felis, *by principal host species*

Month	Species of rodent host	*Nosopsyllus fasciatus*			*Leptopsylla segnis*			*Echidnophaga gallinacea*			*Ctenocephalides felis*		
		Number	Mean	Infestation per cent	Number	Mean	Infestation per cent	Number	Mean	Infestation per cent	Number	Mean	Infestation per cent
1934													
January	*R. norvegicus*	1	(1)	0.4	767	2.81	62.6	711	2.60	20.9	98	0.36	13.9
	R. rattus	0	0	0	65	4.33	73.3	0	0	0	0	0	0
	Total	1	(1)	.3	832	2.89	63.2	711	2.47	19.8	98	.34	13.2
February	*R. norvegicus*	1,396	1.48	36.1	1,564	1.66	26.4	1,389	1.47	13.0	226	.24	12.2
	R. rattus	24	.43	28.6	247	4.41	64.3	26	.46	5.4	4	.07	3.6
	Total	1,420	1.42	35.7	1,811	1.81	28.5	1,415	1.42	12.6	230	.23	11.7
March	*R. norvegicus*	1,689	1.96	41.5	870	1.01	16.7	1,687	1.96	14.4	272	.32	12.0
	R. rattus	10	.67	33.3	21	1.40	46.7	0	0	0	1	.07	6.7
	Total	1,699	1.94	41.4	891	1.02	17.3	1,687	1.93	14.2	273	.31	11.9
April	*R. norvegicus*	227	.54	21.7	61	.15	8.8	420	1.00	9.5	77	.18	8.8
	R. rattus	0	0	0	1	.33	33.3	0	0	0	0	0	0
	Total	227	.54	21.6	62	.15	9.0	420	1.00	9.5	77	.18	8.8
May	*R. norvegicus*	164	.42	17.7	178	.46	18.0	1,783	4.58	20.3	74	.19	10.0
	R. rattus	3	.15	15.0	5	.25	15.0	5	.25	10.0	1	.05	5.0
	Total [2]	169	.41	18.0	183	.45	17.8	1,788	4.35	19.7	75	.18	9.7
June	*R. norvegicus*	58	.11	6.7	117	.21	9.3	900	1.64	12.5	131	.24	10.9
	R. rattus	2	.07	6.7	13	.43	20.0	2	.07	6.7	1	.03	3.3
	Total	60	.10	6.7	130	.22	9.8	902	1.56	12.2	132	.23	10.5
July	*R. norvegicus*	2	.01	.7	1	(1)	.4	18	.07	3.4	8	.03	3.0
	R. rattus	0	0	0	0	0	0	0	0	0	0	0	0
	Total	2	.01	.7	1	(1)	.4	18	.07	3.3	8	.03	3.0
August	*R. norvegicus*	0	0	0	3	.01	.4	59	.13	4.8	17	.04	3.5
	R. rattus	0	0	0	0	0	0	0	0	0	1	.09	9.1
	Total	0	0	0	3	.01	.4	59	.12	4.7	18	.04	3.6
September	*R. norvegicus*	23	.05	3.7	12	.02	1.4	58	.12	5.1	11	.02	1.4
	R. rattus	0	0	0	0	0	0	1	.09	9.1	0	0	0
	Total	23	.05	3.6	12	.02	1.4	59	.12	5.2	11	.02	1.4
October	*R. norvegicus*	57	.12	8.1	28	.06	3.5	85	.18	4.4	16	.03	2.7
	R. rattus	1	.09	9.1	1	.09	9.1	0	0	0	0	0	0
	Total	58	.12	8.1	29	.06	3.7	85	.17	4.3	16	.03	2.6
November	*R. norvegicus*	97	.22	10.8	88	.20	4.7	55	.12	3.8	31	.07	2.5
	R. rattus	1	.12	12.5	3	.38	12.5	0	0	0	0	0	0
	Total	98	.22	10.8	91	.20	4.9	55	.12	3.8	31	.07	2.4
December	*R. norvegicus*	88	.25	14.6	27	.08	4.9	93	.27	8.0	23	.07	3.4
	R. rattus	1	.20	20.0	9	1.80	60.0	0	0	0	0	0	0
	Total	89	.25	14.7	36	.10	5.6	93	.26	7.9	23	.06	3.4
Year	*R. norvegicus*	3,802	.43	13.5	3,716	.56	13.1	7,258	1.18	10.0	984	.15	7.0
	R. rattus	42	.14	10.4	365	1.12	27.8	34	.07	2.6	8	.03	2.3
	Total [2]	3,846	.42	13.5	4,081	.58	13.5	7,292	1.13	9.8	992	.14	6.8

[1] Less than 0.005.
[2] Includes 2 *Rattus* of unknown species.

TABLE 4B.—*Monthly and annual means, indices, and infestations, Acarina, by combined host species* R. norvegicus—R. rattus

Month	Number of live rats	Number of animals in 10-percent sample	Total Acarina			*Laelaps hawaiiensis*			
			Number	Mean	Infestation percent	Number	Mean	Index	Infestation percent
1934									
January	288	28	47	1.68	35.7	5	0.18	0.18	14.3
February	1,000	100	196	1.96	43.0	32	.32	.32	10.0
March	875	88	205	2.33	36.4	41	.47	.47	13.6
April	422	42	261	6.21	66.7	140	3.33	3.33	42.9
May	411	41	254	6.20	56.1	171	4.17	4.17	39.0
June	580	58	390	6.72	50.0	216	3.72	3.40	27.6
July	271	27	53	1.96	29.6	47	1.74	1.74	18.5
August	473	47	227	4.83	55.3	199	4.23	3.45	46.8
September	504	51	303	5.94	64.7	256	5.02	4.80	56.9
October	492	49	386	7.88	57.1	378	7.71	5.49	55.1
November	453	45	235	5.22	55.6	218	4.84	3.71	51.1
December	354	36	35	.97	33.3	24	.67	.67	22.2
Year	6,123	612	2,592	4.33	48.6	1,727	3.03	2.64	33.2

Month	*Echinolaelaps echidninus*			*Liponyssus bacoti*			Other species[1]
	Number	Mean	Infestation percent	Number	Mean	Infestation percent	Number
1934							
January	32	1.14	21.4	9	0.32	10.7	1
February	115	1.15	30.0	5	.05	2.0	44
March	128	1.45	22.7	3	.03	2.3	33
April	111	2.64	52.4	0	0	0	10
May	78	1.90	29.3	1	.02	2.4	4
June	171	2.95	36.2	3	.05	5.2	0
July	5	.19	11.1	0	0	0	1
August	21	.45	21.3	3	.06	4.3	4
September	45	.88	21.6	0	0	0	2
October	7	.14	8.2	0	0	0	1
November	11	.24	8.9	6	.13	2.2	0
December	9	.25	8.3	1	.03	2.8	1
Year	733	1.12	22.6	31	.06	2.7	101

[1] *Includes* 43 *Eulaelaps stabularis*, 10 *Atricholaelaps glasgowi*, 6 Uropodidae, 4 *Myobia ensifera*, 4 Macrocheles, 1 *E. glasgowi*, and 33 unidentified.

TABLE 4C.—*Monthly and annual means and infestations, Anoplura, by combined host species* R. norvegicus—R. rattus

Month	Number of live rats	Number of animals in 10-percent sample	Total Anoplura[1]			*Polyplax spinulosa*			*Hoplopleura*		
			Number	Mean	Infestation percent	Number	Mean	Infestation percent	Number	Mean	Infestation percent
1934											
January	288	28	61	2.18	50.0	55	1.96	39.3	6	0.21	10.7
February	1,000	100	1,193	11.93	65.0	627	6.27	51.0	566	5.66	43.0
March	875	88	792	9.00	71.6	539	6.12	59.1	253	2.88	36.4
April	422	42	181	4.31	59.5	164	3.90	57.1	17	.40	14.3
May	411	41	117	2.85	58.5	66	1.61	46.3	51	1.24	22.0
June	580	58	111	1.91	27.6	85	1.47	24.1	21	.36	6.9
July	271	27	17	.63	22.2	6	.22	14.8	11	.41	11.1
August	473	47	109	2.32	31.9	71	1.51	23.4	38	.81	14.9
September	504	51	84	1.65	33.3	50	.98	27.5	34	.67	11.8
October	492	49	163	3.33	40.8	63	1.29	32.7	100	2.04	14.3
November	453	45	372	8.27	31.1	240	5.33	31.1	132	2.93	8.9
December	354	36	39	1.08	36.1	30	.83	22.2	9	.25	16.7
Year	6,123	612	3,239	4.12	44.0	1,996	2.62	35.7	1,238	1.49	17.6

[1] Includes 5 unidentified Anoplura in June.

TABLE 5.—*Seasonal differences in means, indices, and infestations, principal ectoparasite species, on hosts of the genus* Rattus

Ectoparasite species	Biometric constant	Season of highest average values	Critical ratio (t)[1]	Probability of chance occurrence (P)[2]
X. cheopis	Mean	warm	6.83	0.000
	Index	do	7.78	.000
	Infestation	do	9.04	.000
N. fasciatus	Mean	cold	4.28	.000
	Infestation	do	5.98	.000
L. segnis	Mean	do	2.88	.004
	Infestation	do	2.73	.064
E. gallinacea	Mean	warm	.19	.865
	Infestation	cold	1.80	.072
C. felis	Mean	do	3.76	.000
	Infestation	do	3.60	.000
L. hawaiiensis	Mean	warm	2.80	.005
	Index	do	3.11	.003
	Infestation	do	2.13	.033
P. spinulosa	Mean	cold	2.65	.008
	Infestation	do	3.66	.000

[1] The ratio of the differences between seasonal means to the standard error of this difference.
[2] See footnote to table 3.

RELATION OF ECTOPARASITE COUNTS TO METEOROLOGIC FACTORS

The early students of plague and typhus epidemiology noted sudden alterations in epidemic intensity coinciding with meteorologic phenomena and attempted to determine definite limits of temperature, rainfall, and atmospheric moisture which were favorable for epidemic propagation (*23, 24, 25, 26, 27, 28*). With the establishment of the flea-transmission theory of plague it came to be generally accepted that weather influences the course of epidemics through effects exerted on the flea population (*29, 30, 31, 32, 33*). Specifically, such effects might be exerted in a number of ways, viz, through effects on flea propagation and consequently on the size of the flea population (*29, 30, 32, 34*), through effects on the predilection of the fleas to bite (*3, 4*), through lethal effects on fleas separated from their hosts (*33, 35, 36, 37, 38*), and perhaps on the multiplication and survival of the pathogenic organisms in the fleas (*3, 4*). There are also definite indications that meteorologic conditions may influence the numbers of fleas actually on the hosts quite apart from any actual change in the total flea population (*4, 38, 39*).

That the ectoparasite counts actually respond to some widespread conditions, presumably meteorologic, is indicated by a considerable tendency for indices from different portions of the city and from different types of premises to fluctuate simultaneously (*17*). Tentative identification of particular influential meteorologic conditions may be made if the indices exhibit significant correlation with appropriate meteorologic data although the occurrence of such correlation is by itself insufficient to establish causation. The principal monthly meteorologic data for Mobile are shown in table 6. Table 7 shows the coefficients of correlation between the weekly biometric

TABLE 6.—*Meteorologic conditions in Mobile before and during the period of field operations*

Month	Contemporary measurement			Previous measurement		
	Mean temperature (degrees Fahrenheit)	Total precipitation (inches)	Mean relative humidity	Mean temperature (degrees Fahrenheit) 66-year average	Total precipitation (inches) 67-year average	Mean relative humidity 50-year average
1934						
January	55.2	4.31	75.5	52.0	4.86	80.0
February	51.3	4.90	73.0	54.4	5.16	78.0
March	57.8	5.93	79.0	60.2	6.40	78.0
April	66.9	6.43	78.5	66.8	4.90	76.5
May	74.0	5.63	78.5	74.0	4.42	76.5
June	81.1	4.14	78.0	80.2	5.33	77.0
July	82.2	6.06	80.0	81.8	6.94	80.0
August	81.6	7.59	83.0	81.4	6.61	81.5
September	77.2	.95	79.0	78.3	5.00	79.5
October	71.4	7.39	79.0	68.7	3.69	77.0
November	62.0	5.31	76.0	59.1	3.63	77.5
December	51.6	2.93	80.0	52.8	4.87	80.0
Year	67.7	61.57	78.3	67.5	61.81	78.5

TABLE 7.—*Values of coefficients of correlation between biometric constants and meteorologic factors* [1]

Ectoparasite species	Biometric constant	Meteorologic measurement [2]		
		Temperature	Rainfall	Humidity
X. cheopis	Mean	0.717±0.071**	0.053±0.145	−0.067±0.145
	Index	.739±.066**	.060±.145	−.039±.146
	Infestation	.668±.081**	.047±.146	.011±.146
N. fasciatus	Mean	−.548±.102**	.064±.145	−.074±.145
	Infestation	−.641±.086**	.118±.144	−.123±.144
L. segnis	Mean	−.550±.102**	.024±.146	−.387±.124**
	Infestation	−.480±.112**	.074±.145	−.280±.134
E. gallinacea	Mean	−.091±.145	.184±.141	−.220±.139
	Infestation	−.243±.137	.024±.146	−.115±.144
C. felis	Mean	−.338±.129*	.012±.146	−.016±.146
	Infestation	−.286±.134	.018±.146	−.017±.146
L. hawaiiensis	Mean	.385±.126**	−.109±.146	.182±.143
	Index	.456±.117**	−.077±.147	.204±.141
	Infestation	.400±.124**	−.080±.147	.232±.140
P. spinulosa	Mean	−.435±.120**	.017±.147	−.327±.132*
	Infestation	−.413±.122**	−.043±.147	.020±.147

[1] The correlation coefficients and their standard errors are shown. One asterisk,* indicates that the correlation coefficient is; by Fisher's z-test, statistically significant—$P<0.05$. A double asterisk,** indicates a highly significant value—$P<0.01$.
[2] 47 weekly values were used in all computations for this table.

constants for the ectoparasite species and weekly meteorologic data. The meteorologic data are from Weather Bureau records and, for temperature, they represent the means of the 14 daily maximum and minimum readings while the relative humidity data are the means of 14 readings made at 7 a. m. and 7 p. m. daily. The coefficients of correlation suggest that, except for *E. gallinacea* and *C. felis*, temperature exerted the greatest influence on the Mobile ectoparasite populations. It is noteworthy that, as in Jacksonville (*1*), only *X. cheopis* and *L. hawaiiensis* exhibited significant positives correlations with temperature.

Because the ectoparasite populations cannot respond instantaneously to altered environmental conditions it is reasonable to expect, if the changes in ectoparasite counts represent actual changes in ectoparasite abundance, that the biometric constants should give highest correlations with the meteorologic conditions prevailing some weeks previously. This has been investigated for the Mobile data and, in the case of *X. cheopis*, a time lag of 4 weeks does yield the maximum values for correlation with temperature. In no case, however, was this increase in the coefficient of correlation statistically significant.

LOCATIONAL FACTORS IN PARASITIZATION

The rats captured in Mobile were classified, as described in the Jacksonville study, according to section of the city (zone) in which they were trapped, type of premises on which they were trapped, and according to whether the trap was located inside of, or outside of, a building. The zone boundaries used in Mobile are shown on the map (fig. 1).

Tables 8 and 9 show how the biometric constants varied with respect to these criteria and tests for statistical significance of these differences are shown in table 10.

With respect to the classification of the city by zones, *X. cheopis* was significantly associated with the commercial zone while *E. gallinacea* was significantly associated with the residential zone. These results are in general agreement with those obtained in Jacksonville. However, *L. hawaiiensis*, which was significantly associated with the commercial zone in Jacksonville, failed to exhibit this association in Mobile.

In Jacksonville none of the ectoparasite species exhibited significant differences associated with the types of premises on which the rats were trapped. In Mobile *X. cheopis* was significantly associated with food-handling business establishments as opposed to residences, while *N. fasciatus*, *E. gallinacea*, and *C. felis* were most abundant in association with residences.

With respect to location of the trap, *X. cheopis* and *L. segnis* were significantly more abundant in Mobile on rats which were caught indoors. *L. hawaiiensis* also showed this tendency, but it was statistically significant only in the case of the mean.

DISCUSSION

The series of rodent-ectoparasite surveys of which the Mobile study is a part was inaugurated for the purpose of evaluating a portion of the complex of conditions which govern infectibility of a community with bubonic plague or endemic typhus fever. Definite identifica-

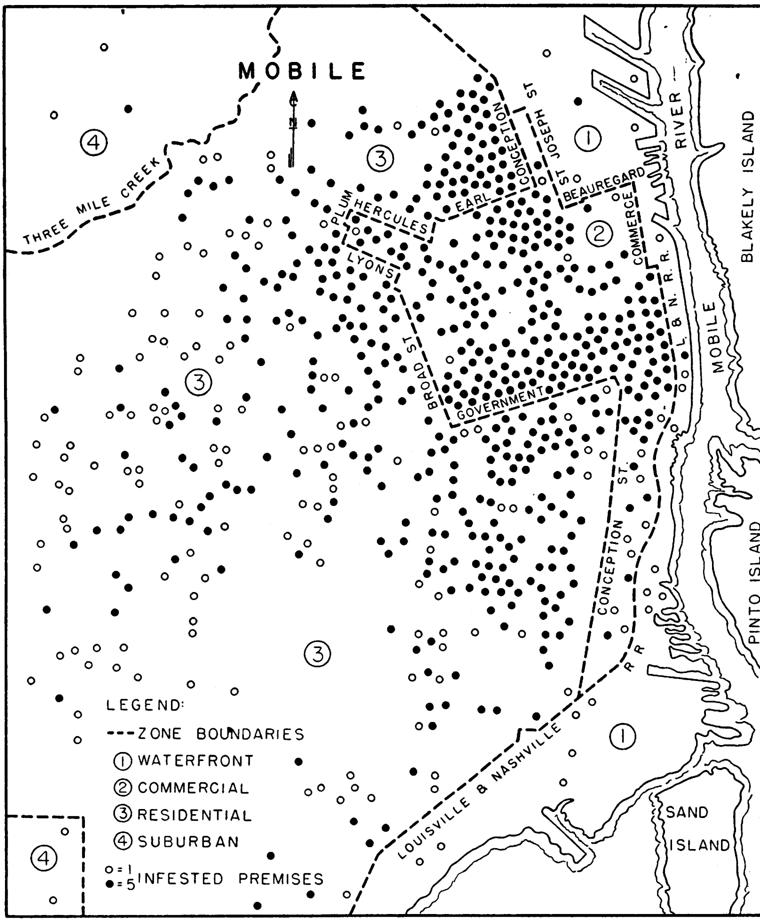

FIGURE 1.—Map of Mobile showing zone boundaries and locations of infested premises.

tion of the natural vectors of endemic typhus and knowledge of their ecological relationships should greatly facilitate estimation of community infectibility. Comparison of the results of numerous surveys conducted under varying conditions may also indicate to what extent conclusions reached from the data of one ectoparasite survey may be applicable to other places and times.

The principal rationale for the ectoparasite survey method is the very logical and fairly adequately verified assumption that, when arthropod-borne infection is present in a community, the probability of spread to man, and consequently the human incidence, tends to be proportional to the vector population of the community. Aside from complications introduced by such conditions as nonuniform exposure and susceptibility, a very close parallel between case incidence and vector prevalence should be anticipated.

TABLE 8.—*Annual means, indices, and infestations,* X. cheopis, L. hawaiiensis *and* N. fasciatus *by zone, trap location, and types of premises* [1]

	Number of live rats examined [1]	*Xenopsylla cheopis*				*Laelaps hawaiiensis*				*Nosopsyllus fasciatus*		
		Number	Mean	Index	Infestation percent	Number in 10-percent sample	Mean	Index	Infestation percent	Number	Mean	Infestation percent
Zone:												
Water-front	61	126	2.17	2.17	39.3	27	5.40	5.40	40.0	43	0.22	9.0
Commercial	2,692	15,743	6.42	5.96	72.0	773	4.44	3.29	37.8	1,282	.39	13.2
Residential	3,368	12,950	4.37	4.11	62.0	927	3.95	2.99	31.8	2,516	.44	14.5
Location of trap:												
Indoors	3,618	20,600	5.86	5.43	68.9	1,230	3.63	3.17	39.5	1,666	.41	13.3
Outdoors	2,500	8,208	4.04	3.89	63.2	497	3.13	2.65	32.3	2,175	.46	15.3
Type of premises:												
Food establishment	2,646	15,777	6.13	5.65	68.8	1,012	3.64	3.39	38.5	873	.29	11.0
Other business	413	2,163	4.38	4.26	68.2	53	1.39	1.39	36.6	258	.38	12.9
Residence	3,062	10,879	3.97	3.83	61.6	662	3.75	2.92	35.2	2,710	.51	16.7

[1] Omitted from tables 8 and 9 are: 2 rats from completely unknown locations having 36 *X. cheopis*, 5 *N. faciatus*, and 1 *C. felis*; and 3 rats from unknown trap locations having 11 *X. cheopis*.

TABLE 9.—*Annual means and infestations,* L. segnis, E. gallinacea, C. felis, *and* P. spinulosa *by zone, trap location, and type of premises* [1]

	Leptopsylla segnis			*Echidnophaga gallinacea*			*Ctenocephalides felis*			*Polyplax spinulosa*		
	Number	Mean	Infestation percent	Number	Mean	Infestation percent	Number	Mean	Infestation percent	Number in 10-percent sample	Mean	Infestation percent
Zone:												
Water front	103	0.86	13.8	2	0.06	6.2	2	0.02	1.0	22	3.50	60.0
Commercial	1,573	.56	11.9	1,751	.57	7.4	330	.11	5.6	738	2.95	30.2
Residential	2,405	.40	10.4	5,539	1.32	10.0	659	.14	7.0	1,236	2.03	36.9
Location of trap:												
Indoors	2,740	.66	11.9	4,152	1.07	8.0	529	.13	5.6	1,097	3.94	33.8
Outdoors	1,341	.32	9.7	3,140	1.29	11.0	462	.13	7.1	899	2.54	40.1
Premises:												
Food establishment	1,590	.56	11.2	2,705	1.07	8.0	193	.06	4.4	833	2.93	33.6
Other business	403	.55	11.1	70	.23	6.2	62	.10	6.8	76	2.83	34.1
Residence	2,088	.36	9.8	4,517	1.16	10.3	736	.17	7.4	1,087	2.27	36.1

The natural vectors of endemic typhus to man are not definitely known. Experimental transmission of the disease to man has apparently never been accomplished with any species of rodent ectoparasite although a number of species are known to be infectible by feeding on rodents and capable of transmitting the infection to rodents. Ecological results from field surveys can do much to indicate the probable vectors but, in the absence of knowledge that the incidence in rodents parallels the incidence in man, all numerically adequate species of rodent ectoparasites must be regarded as of possible epidemiologic importance.

It has been shown that in Mobile the prevalence, seasonal variations in abundance, and local distribution of *X. cheopis* are quite com-

TABLE 10.—*Comparative scores*[1] *for zones, trap locations, and types of premises by numbers of weeks in which biometric constants from rats in one category exceeded those in the contrasting category* [2]

Ectoparasite species	Biometric constant	Zones [3]						Trap locations		Uses					
		Commercial: water front		Residential: water front		Commercial: residential		Indoors: outdoors		Food establishments: other businesses		Food establishments: residences		Other businesses: residences	
		Score	P	Score	P	Score	P	Score	P	Score	P	Score	P	Score	P
X. cheopis	Mean	13:4	0.049	12:5	0.143	34:13	0.003	38:8	0.000	29:14	0.031	41:6	0.000	20:23	0.757
	Index	13:4	.049	12:5	.143	35:12	.001	37:9	.000	29:15	.049	40:7	.000	21:22	1.000
	Infestation	13:4	.049	12:5	.143	31:16	.040	31:15	.026	21:22	1.000	35:12	.001	29:14	.031
N. fasciatus	Mean	11:2	.022	13:2	.007	17:22	.522	17:22	.522	22:12	.121	11:25	.029	10:23	.035
	Infestation	12:1	.003	13:2	.007	21:18	.749	18:21	.749	18:16	.864	12:24	.065	13:20	.296
L. segnis	Mean	10:4	.180	12:4	.077	21:19	.874	31:9	.001	24:8	.007	23:16	.337	13:21	.229
	Infestation	10:4	.180	12:4	.077	17:23	.430	30:10	.002	19:12	.281	23:17	.430	14:20	.392
E. gallinacea	Mean	14:0	.000	16:0	.000	15:31	.026	22:24	.883	32:6	.000	14:32	.011	5:36	.000
	Infestation	13:1	.002	15:1	.001	17:29	.104	17:29	.104	30:8	.000	15:31	.026	9:32	.000
C. felis	Mean	14:1	.001	14:1	.001	16:24	.268	18:22	.636	21:11	.110	5:33	.000	7:28	.001
	Infestation	14:1	.001	14:1	.001	21:19	.874	14:26	.081	23:9	.020	8:31	.000	8:27	.002
L. hawaiiensis	Mean					24:16	.268	23:14	.044	15:5	.041	26:17	.222	8:11	.648
	Index					24:16	.268	27:15	.088	15:5	.041	25:18	.360	8:11	.648
	Infestation					27:12	.024	26:14	.081	10:9	1.000	22:19	.755	11:8	.648
P. spinulosa	Mean					20:20	1.000	26:18	.291	13:8	.383	20:23	.757	4:14	.031
	Infestation					17:21	.627	19:25	.451	12:9	.664	19:23	.644	6:12	.238

[1] The scores give the actual number of weeks in which a biometric constant for one category was larger than that of the contrasted category. For example, the mean number of *X. cheopis* per rat in the commercial zone exceeded the mean in the residential zone for 34 weeks out of 47, while the reverse was true for the other 13 weeks; the score was therefore 34: 13. Any discrepancy this great, or greater, should occur by chance only about 3 times in 1,000 trials if the zones had equal *X. cheopis* populations.

[2] The P-values (see footnote to table 3) in this table are exact values computed as described in (*40*).

[3] The catch of rats in the water-front zone was too small to yield usable data for all species of ectoparasites.

patible with a role as vector of this disease. *L. hawaiiensis*, although less abundant and not known to attack man or to be infectible with typhus, also exhibits seasonal and local disbributions which indicate that it should not be disregarded as a possible vector. All of the other ectoparasite species investigated, some of which are known to be potential vectors, appear on ecological and epidemiologic grounds unlikely to have been important vectors in Mobile. Similar conclusions were obtained from analysis of the Jacksonville survey (*1*) but there are indications that a somewhat different situation may prevail in Honolulu (*2*).

Three statistics, the mean, the infestation rate, and the "index" have been employed in this paper as estimates of ectoparasite abundance. Much more information on correlations with typhus incidence will be necessary before exclusive acceptance of any one type of estimate can be justified and all present methods have theoretical limitations. Presumably, when sufficient comparable data representing a variety of situations have been accumulated and analyzed it will be possible to identify measurable events transpiring in the ectoparasite populations with pending or threatening outbreaks of endemic typhus fever. Outbreaks of typhus among rodents would probably exhibit this relationship better than outbreaks of human cases and such data might profitably be collected in connection with future ectoparasite surveys.

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CHANGES IN REGULATIONS PERTAINING TO TETRAETHYL LEAD GASOLINE [1]

In 1926 there were published, as part of Public Health Bulletin No. 163, which contained the report of the committee on tetraethyl lead gasoline, four sets of regulations which had been formulated in accordance with the committee's recommendations (*1*). These were proposed for adoption by the several States in order to secure uniformity of control, and were the subject of consideration at the meeting of the State and Territorial health authorities with the Surgeon General on May 25, 1926. The regulations were in four series, as follows:

I. Proposed regulations for the manufacture of tetraethyl lead and the blending of the latter to make ethyl fluid.
II. Proposed regulations for mixing.
III. Proposed regulations for distribution of ethyl gasoline.
IV. Proposed regulations for automobile garages, repair shops, service stations, and filling stations.

It was stated in the above-mentioned bulletin that the regulations thus published were based on the conditions and knowledge then existent, and that changes might be advisable from time to time.

The results of years of experience have fully justified the recommendations of the committee with respect to the foregoing measures of control. However, that regulation in series III which had to do with warning signs on the pumps left much to be desired in uniformity, effectiveness, and practicability, as motor fuels and equipment employed in dispensing them underwent change. Moreover, it appeared wise, in view of the general availability of gasoline containing tetraethyl lead, to call the attention of consumers, in the simplest and most striking manner, to the fact that such gasoline contains tetraethyl lead and that it is designed for use only as a motor fuel. By such means it was intended that motor fuel containing tetraethyl lead would come to be differentiated in the public mind from gasoline and other petroleum products adapted to other uses, and so would not be misused. In accordance with this viewpoint, the approval of the Surgeon General was given in November 1928, February 1933, March 1935, and June 1946, to certain changes in the wording and

[1] From Industrial Hygiene Division, Bureau of State Services.

the manner of employment of warning signs on gasoline pumps and other containers. These changes have resulted in the replacement of series III referred to above with the following regulations:

1. Each filling station shall keep prominently displayed on each pump which delivers motor fuel containing tetraethyl lead a sign or signs, composed of enameled metal or of material of equivalent durability, inscribed in prominent heavy gothic capital letters, black on white background, with one or the other of the following statements arranged as shown:

(a)
CONTAINS LEAD
(Tetraethyl) and is
to be used as motor fuel
only; not for cleaning or
any other use. Avoid
spilling.

(b)
For use as a
motor fuel only
CONTAINS
LEAD
(Tetraethyl)

The printed matter on these signs, not counting the enclosing border, should measure approximately 7 inches wide by 8½ inches high in the case of (*a*) above, and 7 inches wide by 6 inches high in the case of (*b*). Such a sign shall be located on any side (front, back, or either lateral surface) of each pump, at such height (between 4 and 5 feet above ground level, when the design of the pump will permit), and in such position (free of intervening structures or equipment) as to be most easily observed. Island pumps will require a sign on front and back, or on both lateral surfaces, while pumps approached on but one side from either direction will require one sign on the front, or one on each lateral surface.

2. Containers of gasoline containing tetraethyl lead sold to customers shall bear one or the other of the following labels (as a sticker or decalcomania) in such a position as to be plainly legible when the container is opened:

(a)
CONTAINS LEAD
(Tetraethyl) and
is to be used as
motor fuel only.
Not for cleaning or
any other use.

(b)
For use as a
motor fuel only
CONTAINS
LEAD
(Tetraethyl)

REFERENCE

(*1*) Various authors: The use of tetratehyl lead gasoline in its relation to public health. Pub. Health Bull. No. 163. Government Printing Office, Washington 25, D. C., 1926.

June 28, 1946

DEATHS DURING WEEK ENDED SEPT. 14, 1946

[From the Weekly Mortality Index, issued by the National Office of Vital Statistics]

	Week ended Sept. 14, 1946	Corresponding week, 1945
Data for 92 large cities of the United States:		
Total deaths	8,510	8,170
Average for 3 prior years	7,951	
Total deaths, first 37 weeks of year	334,441	330,466
Deaths under 1 year of age	685	613
Average for 3 prior years	595	
Deaths under 1 year of age, first 37 weeks of year	23,506	22,243
Data from industrial insurance companies:		
Policies in force	67,284,591	67,288,107
Number of death claims	10,577	11,226
Death claims per 1,000 policies in force, annual rate	8.2	8.7
Death claims per 1,000 policies, first 37 weeks of year, annual rate	9.7	10.3

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

REPORTS FROM STATES FOR WEEK ENDED SEPTEMBER 21, 1946

Summary

A definite decline in the incidence of poliomyelitis was recorded for the country as a whole. A total of 1,427 cases was reported, as compared with 1,623 last week and a 5-year (1941–45) median of 818. Decreases were recorded in all major geographic divisions except the South Central and Mountain. Of 35 States reporting more than 5 cases, 12 showed an increase (456 to 548), while 23 reported a decline (1,102 to 846). Those reporting increases are as follows (last week's figures in parentheses): Rhode Island 14 (4), New York 90 (87), Illinois 210 (193), Kansas 68 (64), Kentucky 12 (3), Alabama 18 (10), Oklahoma 15 (11), Texas 33 (28), Montana 13 (6), Idaho 7 (3), Utah 24 (7), Washington 44 (40).

A total of 17,201 cases has been reported for the year to date, as compared with 8,882 and 13,570, respectively, for the same periods of 1945 and 1944, and a 5-year median of 8,630. As compared with the corresponding period last year, a higher incidence has been reported in all areas except the New England and Middle Atlantic. As compared with the 1944 figures, larger numbers of cases have been reported in the East North Central area (1944 figures in parentheses) 3,725 (2,279), West North Central, 5,242 (712), West South Central, 1,650 (390), Mountain, 1,316 (158), and Pacific, 1,935 (544), while fewer cases have been reported in the New England, 395 (515), Middle Atlantic, 1,166 (5,868), South Atlantic, 964 (2,195), and East South Central, 814 (910).

Of 295 cases of diphtheria reported for the week, Kentucky reported 27 (last week 7), Texas 25 (last week 35), California 24 (last week 18), New York 18 (last week 24), and Alabama 18 (last week 12). The total for the year to date is 11,123 (as compared with 10,217 last year and a 5-year median of 8,926), of which Texas has reported 1,202, California, 828, New York 718, Ohio 651, Pennsylvania 539, Maryland 464, North Carolina 413, Illinois 398, Virginia 331, Indiana 325, and Michigan 316, aggregating 6,185 or about 56 percent of the total.

Deaths recorded for the week in 93 large cities of the United States totaled 8,248, as compared with 8,607 last week, 8,205 and 8,027, respectively, for the corresponding weeks of 1945 and 1944, and a 3-year (1943–45) average of 8,206. The cumulative total is 345,835, as compared with 341,548 for the corresponding period last year.

Telegraphic morbidity reports from State health officers for the week ended Sept. 21, 1946, and comparison with corresponding week of 1945 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none was reported, cases may have occurred.

Division and State	Diphtheria: Week ended— Sept. 21, 1946	Diphtheria: Week ended— Sept. 22, 1945	Diphtheria: Median 1941–45	Influenza: Week ended— Sept. 21, 1946	Influenza: Week ended— Sept. 22, 1945	Influenza: Median 1941–45	Measles: Week ended— Sept. 21, 1946	Measles: Week ended— Sept. 22, 1945	Measles: Median 1941–45	Meningitis, meningococcus: Week ended— Sept. 21, 1946	Meningitis, meningococcus: Week ended— Sept. 22, 1945	Meningitis, meningococcus: Median 1941–45
NEW ENGLAND												
Maine	1	2	0	------	1	------	2	1	3	3	0	1
New Hampshire	0	0	0	------	------	------	------	------	------	0	0	0
Vermont	4	2	0	------	------	------	5	------	2	0	0	0
Massachusetts	9	4	4	------	------	------	44	41	31	5	2	3
Rhode Island	2	0	0	------	15	------	2	1	1	0	0	0
Connecticut	1	0	1	------	------	1	7	------	6	0	0	0
MIDDLE ATLANTIC												
New York	18	11	10	[1] 2	[1] 2	[1] 2	75	11	30	5	14	13
New Jersey	0	4	3	6	------	1	10	6	26	3	5	5
Pennsylvania	9	5	5	1	2	------	42	32	32	5	3	4
EAST NORTH CENTRAL												
Ohio	12	6	6	2	2	3	34	14	14	2	4	3
Indiana	5	9	9	14	2	4	4	2	3	4	4	1
Illinois	6	1	6	1	------	2	14	32	19	6	2	2
Michigan [2]	2	20	3	1	1	1	22	35	22	3	1	2
Wisconsin	6	2	0	4	12	12	23	20	25	1	0	0
WEST NORTH CENTRAL												
Minnesota	4	4	4	------	------	------	2	5	5	0	2	2
Iowa	0	0	4	------	------	------	5	4	4	2	0	0
Missouri	5	4	4	2	2	1	2	3	5	1	5	3
North Dakota	0	2	2	5	------	------	6	------	1	0	0	0
South Dakota	3	1	4	------	------	------	------	2	------	0	0	0
Nebraska	1	2	3	5	3	3	------	2	2	0	0	0
Kansas	5	7	3	------	------	1	1	3	3	1	1	1
SOUTH ATLANTIC												
Delaware	0	0	0	------	------	------	------	------	------	0	0	0
Maryland [2]	11	8	4	2	1	1	6	2	7	1	2	2
District of Columbia	0	0	0	------	------	------	4	------	1	0	1	1
Virginia	9	20	16	161	97	63	15	4	4	3	1	2
West Virginia	5	10	6	------	------	1	------	------	2	1	5	2
North Carolina	11	50	47	------	------	------	8	2	4	1	2	1
South Carolina	3	26	26	14	101	113	------	6	6	0	0	1
Georgia	15	31	31	------	11	7	9	1	5	0	3	0
Florida	7	6	6	1	------	2	2	1	2	3	1	1
EAST SOUTH CENTRAL												
Kentucky	27	9	11	------	1	1	43	9	4	3	0	0
Tennessee	10	39	15	2	6	12	3	3	3	2	3	1
Alabama	18	34	20	31	12	12	5	------	4	0	1	1
Mississippi [2]	6	25	15	------	------	------	------	------	------	0	1	1
WEST SOUTH CENTRAL												
Arkansas	4	6	6	12	------	9	2	5	2	1	1	0
Louisiana	6	9	9	------	34	1	------	4	4	1	1	1
Oklahoma	3	2	8	5	21	17	2	------	2	0	1	1
Texas	25	58	36	454	492	363	49	30	21	4	4	4
MOUNTAIN												
Montana	0	4	5	------	2	2	10	18	3	0	0	0
Idaho	0	1	0	2	1	------	7	17	4	0	0	0
Wyoming	2	0	0	------	------	3	------	2	2	0	0	0
Colorado	6	4	4	------	8	23	4	2	5	1	0	0
New Mexico	1	7	1	3	1	------	2	------	1	0	0	0
Arizona	1	5	1	25	4	28	3	3	3	0	1	1
Utah [2]	0	1	0	------	------	------	2	3	5	1	0	0
Nevada	0	0	0	------	------	------	------	1	------	0	0	0
PACIFIC												
Washington	6	8	5	------	------	1	8	49	14	1	1	1
Oregon	2	0	1	------	------	2	17	16	18	0	0	0
California	24	18	13	2	13	13	38	148	51	5	11	11
Total	295	467	385	757	847	746	539	540	540	69	83	83
38 weeks	11,123	10,217	8,926	194,853	75,069	84,920	641,654	104,125	541,518	4,735	6,578	6,578

[1] New York City only.

[2] Period ended earlier than Saturday.

Telegraphic morbidity reports from State health officers for the week ended Sept. 21, 1946, and comparison with corresponding week of 1945 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [3]		
	Week ended—		Median 1941–45	Week ended—		Median 1941–45	Week ended—		Median 1941–45	Week ended—		Median 1941–45
	Sept. 21, 1946	Sept. 22, 1945		Sept. 21, 1946	Sept. 22, 1945		Sept. 21, 1946	Sept. 22, 1945		Sept. 21, 1946	Sept. 22, 1945	
NEW ENGLAND												
Maine	0	9	2	23	12	10	0	0	0	0	0	0
New Hampshire	9	1	2	2	0	0	0	0	0	0	0	0
Vermont	2	5	4	1	2	2	0	0	0	0	0	0
Massachusetts	16	51	29	28	44	68	0	0	0	9	3	4
Rhode Island	14	1	1	2	5	4	0	0	0	0	0	0
Connecticut	1	11	11	8	7	9	0	0	0	0	1	1
MIDDLE ATLANTIC												
New York	90	110	110	75	82	82	0	0	0	7	4	8
New Jersey	9	55	27	15	15	19	0	0	0	3	2	2
Pennsylvania	14	48	48	48	76	72	0	0	0	5	5	9
EAST NORTH CENTRAL												
Ohio	46	37	34	60	95	79	0	0	0	3	4	8
Indiana	22	11	11	25	28	28	4	0	0	1	5	5
Illinois	210	93	50	34	62	62	0	0	0	3	5	5
Michigan [2]	69	12	20	43	40	49	0	0	0	2	3	4
Wisconsin	94	48	22	28	24	49	0	0	0	1	1	1
WEST NORTH CENTRAL												
Minnesota	128	23	23	13	26	26	0	0	0	0	1	1
Iowa	31	14	13	9	21	21	0	0	0	0	0	2
Missouri	72	9	9	3	22	22	0	0	0	1	1	6
North Dakota	30	0	1	1	6	4	0	0	0	1	0	0
South Dakota	9	1	1	1	0	9	0	0	0	1	0	0
Nebraska	33	14	10	22	16	7	0	0	0	11	2	0
Kansas	68	8	8	18	35	37	0	0	0	2	7	1
SOUTH ATLANTIC												
Delaware	4	2	2	2	2	1	0	0	0	0	0	0
Maryland [2]	2	13	13	5	22	14	0	0	0	1	5	4
District of Columbia	2	7	2	2	9	6	0	0	0	0	1	1
Virginia	6	19	4	32	32	32	0	0	0	4	7	7
West Virginia	2	3	3	27	42	42	0	0	0	1	1	6
North Carolina	3	14	8	17	48	48	0	0	0	2	2	4
South Carolina	0	6	2	0	22	6	0	0	0	0	4	5
Georgia	4	6	3	9	11	19	0	0	0	5	6	6
Florida	15	12	2	2	6	4	0	0	0	4	6	1
EAST SOUTH CENTRAL												
Kentucky	12	3	5	32	32	19	0	1	0	0	7	9
Tennessee	5	21	12	13	47	44	0	0	0	4	18	11
Alabama	18	4	3	9	18	18	0	0	0	0	3	4
Mississippi [2]	3	5	5	12	12	3	0	0	0	7	3	5
WEST SOUTH CENTRAL												
Arkansas	13	2	2	5	15	7	0	0	0	1	3	7
Louisiana	20	10	4	7	12	4	0	0	0	10	4	9
Oklahoma	15	15	3	8	8	6	0	0	0	1	5	5
Texas	33	39	5	22	56	20	1	0	0	10	17	17
MOUNTAIN												
Montana	13	7	2	2	6	5	0	0	0	0	5	0
Idaho	7	2	0	3	6	5	0	0	0	2	0	0
Wyoming	9	3	0	0	9	4	0	0	0	0	0	0
Colorado	49	11	4	5	7	10	1	0	0	0	5	5
New Mexico	14	1	1	4	7	3	0	0	0	2	8	4
Arizona	5	0	2	5	5	3	0	0	0	3	0	0
Utah [2]	24	22	2	4	3	4	0	0	0	0	0	0
Nevada	0	0	0	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	44	20	5	12	0	19	0	0	0	0	2	2
Oregon	14	2	12	8	14	14	0	1	0	2	0	0
California	124	54	10	59	108	79	0	0	0	5	11	4
Total	1,427	864	818	765	1,177	1,128	6	2	5	114	167	176
38 weeks	[4]17,201	8,882	8,630	89,992	139,374	102,603	292	279	625	3,114	3,671	4,184

[2] Period ended earlier than Saturday.
[3] Including paratyphoid fever reported separately, as follows: Massachusetts (salmonella infection) 8; New York 2; New Jersey 1; Ohio 1; North Carolina; 1 Georgia 2; Florida 1; New Mexico 1; Oregon 1.
[4] Corrections: Poliomyelitis, Georgia, week ended September 7, 7 cases (instead of 8); week ended September 14, Nebraska 37 cases (instead of 38), Arkansas 17 cases (instead of 19); Maryland, delayed report, 1 case.

Telegraphic morbidity reports from State health officers for the week ended Sept. 21, 1946, and comparison with corresponding week of 1945 and 5-year median—Con.

Division and State	Whooping cough			Week ended Sept. 21, 1946							
	Week ended—		Median 1941–45	Dysentery			Encephalitis, infectious	Rocky Mt. spotted fever	Tularemia	Typhus fever-endemic	Undulant fever
	Sept. 21, 1946	Sept. 22, 1945		Amebic	Bacillary	Unspecified					
NEW ENGLAND											
Maine	-	39	14	-	-	-	-	-	-	-	1
New Hampshire	-	-	2	-	-	-	-	-	-	-	-
Vermont	7	11	17	-	-	-	-	-	-	-	1
Massachusetts	121	138	123	1	-	-	-	-	-	-	-
Rhode Island	18	18	32	-	-	-	-	-	-	-	1
Connecticut	39	34	34	1	-	-	-	-	-	-	-
MIDDLE ATLANTIC											
New York	146	286	286	4	4	-	1	-	-	-	9
New Jersey	164	151	151	-	1	1	1	1	-	-	-
Pennsylvania	113	191	191	1	-	-	-	-	-	-	3
EAST NORTH CENTRAL											
Ohio	73	153	178	-	1	-	-	-	-	-	9
Indiana	22	20	18	1	-	-	5	-	-	-	5
Illinois	145	79	146	5	-	-	-	1	-	-	6
Michigan [2]	189	179	191	1	-	-	-	-	-	-	2
Wisconsin	245	47	199	-	-	-	-	-	-	-	9
WEST NORTH CENTRAL											
Minnesota	8	28	40	2	-	-	-	-	-	-	2
Iowa	11	3	16	1	-	-	1	-	1	-	2
Missouri	14	21	12	-	-	-	-	-	1	-	4
North Dakota	-	-	10	-	-	-	-	-	-	-	-
South Dakota	2	1	3	-	-	-	-	-	-	-	4
Nebraska	4	1	3	-	-	-	-	-	-	-	-
Kansas	20	20	20	-	-	-	-	-	-	-	2
SOUTH ATLANTIC											
Delaware	3	-	-	-	-	-	-	-	-	-	-
Maryland [2]	40	37	69	-	-	-	-	-	-	-	-
District of Columbia	7	7	13	-	-	-	-	-	-	-	-
Virginia	25	18	27	-	-	70	-	-	1	-	1
West Virginia	18	3	6	-	-	-	-	-	-	-	2
North Carolina	36	77	77	-	-	-	-	-	-	2	-
South Carolina	3	49	49	-	1	-	-	-	-	-	-
Georgia	10	15	16	1	2	-	-	-	-	14	6
Florida	10	4	13	1	1	2	-	-	-	15	4
EAST SOUTH CENTRAL											
Kentucky	35	81	58	-	-	-	-	-	-	1	1
Tennessee	12	20	32	-	-	1	-	-	2	1	-
Alabama	5	2	14	-	-	-	2	-	-	14	-
Mississippi [2]	-	-	-	-	-	-	-	-	-	2	1
WEST SOUTH CENTRAL											
Arkansas	5	6	10	1	-	-	-	-	1	6	-
Louisiana	8	28	1	2	1	-	-	-	-	6	-
Oklahoma	6	14	7	-	-	-	3	1	-	-	1
Texas	159	127	108	10	170	25	1	-	2	48	27
MOUNTAIN											
Montana	4	8	23	-	-	-	-	-	1	-	-
Idaho	8	11	2	-	-	-	-	-	-	-	2
Wyoming	6	2	6	-	-	-	-	-	-	-	1
Colorado	13	32	35	1	-	-	-	-	-	-	-
New Mexico	8	11	9	-	5	11	-	-	-	-	-
Arizona	6	17	15	-	-	28	-	-	-	1	-
Utah [2]	3	12	21	-	-	-	-	-	2	-	-
Nevada	1	-	-	-	-	-	1	-	-	-	-
PACIFIC											
Washington	21	16	17	-	-	-	-	-	-	-	-
Oregon	7	13	13	-	-	-	-	-	-	-	-
California	62	187	170	4	13	-	2	-	2	-	10
Total	1,862	2,217	2,634	37	199	138	17	3	13	110	116
Same week, 1945	2,217	-	-	30	842	397	31	6	12	152	87
Average, 1943–45	2,196	-	-	35	613	311	22	[5] 6	11	[5] 150	-
38 weeks: 1946	74,147	-	-	2,099	12,363	5,070	480	515	697	2,588	3,754
1945	95,586	-	-	1,383	19,610	8,342	455	420	576	3,508	3,521
Average, 1943–45	104,266	-	[5] 136,936	1,413	16,227	7,011	495	[5] 427	554	[5] 2,946	-

[2] Period ended earlier than Saturday.
[5] 5-year median, 1941–45.

Leprosy: Texas 1 case.

WEEKLY REPORTS FROM CITIES

City reports for week ended Sept. 14, 1946

This table lists the reports from 89 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	------	0	1	0	1	0	0	------
New Hampshire:												
Concord	0	0	------	0	------	0	0	1	0	0	0	------
Vermont:												
Barre	0	0	------	0	------	0	0	0	0	0	0	------
Massachusetts:												
Boston	3	0	------	1	2	0	4	14	11	0	0	24
Fall River	0	0	------	0	------	0	0	0	1	0	0	2
Springfield	0	0	------	0	1	0	1	0	2	0	0	8
Worcester	0	0	------	0	1	0	7	5	0	0	0	26
Rhode Island:												
Providence	0	0	------	0	3	1	0	1	0	0	0	45
Connecticut:												
Bridgeport	0	0	------	0	------	0	0	0	1	0	1	------
Hartford	0	0	------	0	------	0	1	1	1	0	0	2
New Haven	0	0	------	0	1	0	1	0	0	0	0	4
MIDDLE ATLANTIC												
New York:												
Buffalo	2	0	------	0	------	0	2	0	1	0	0	6
New York	19	0	4	0	25	1	42	54	20	0	4	49
Rochester	0	0	------	0	------	0	0	1	3	0	0	------
Syracuse	0	0	------	0	------	0	1	3	5	0	0	1
New Jersey:												
Camden	0	0	------	0	1	0	1	0	1	0	0	3
Newark	0	0	2	0	------	0	0	3	4	0	0	28
Trenton	0	0	------	0	------	0	0	0	0	0	0	1
Pennsylvania:												
Philadelphia	6	0	------	0	6	1	16	3	15	0	2	35
Pittsburgh	0	0	1	1	5	2	10	2	4	0	0	8
Reading	0	0	------	0	1	0	1	0	0	0	0	10
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	1	0	1	0	3	1	1	3	3	0	0	5
Cleveland	0	0	------	0	21	0	3	24	4	0	1	20
Columbus	2	0	1	1	------	1	0	2	8	0	0	6
Indiana:												
Fort Wayne	0	0	------	0	------	0	0	0	0	0	0	2
Indianapolis	0	1	------	0	------	1	1	7	2	0	0	6
South Bend	1	0	------	0	------	0	0	0	1	0	0	1
Terre Haute	0	0	------	0	------	0	0	1	1	0	0	------
Illinois:												
Chicago	0	0	1	0	10	3	15	53	15	0	0	89
Springfield	0	0	------	0	------	0	3	5	1	0	0	2
Michigan:												
Detroit	4	1	------	0	4	0	7	15	5	0	0	83
Flint	0	0	------	0	------	0	1	0	1	0	0	5
Grand Rapids	0	0	------	0	1	0	0	3	2	0	0	6
Wisconsin:												
Kenosha	0	0	------	0	------	0	0	7	2	0	0	2
Milwaukee	0	0	------	0	2	0	1	10	9	0	0	132
Racine	0	0	------	0	------	0	0	0	1	0	0	------
Superior	2	0	------	0	------	0	0	3	0	0	0	2
WEST NORTH CENTRAL												
Minnesota:												
Duluth	1	0	------	0	------	0	0	14	1	0	0	2
Minneapolis	0	0	------	0	------	0	6	30	3	0	0	1
St. Paul	0	0	------	0	------	0	5	10	2	0	0	7
Missouri:												
Kansas City	0	0	------	0	1	0	4	14	3	0	0	2
St. Joseph	0	0	------	0	------	0	0	1	0	0	0	------
St. Louis	1	0	1	0	------	0	10	36	3	0	0	15

City reports for week ended Sept. 14, 1946—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
North Dakota:												
Fargo	0	0	------	0	------	0	0	18	0	0	0	------
Nebraska:												
Omaha	1	0	------	0	------	0	0	22	0	0	0	------
Kansas:												
Topeka	0	0	------	0	1	0	1	2	1	0	0	4
Wichita	0	0	------	0	------	0	0	4	0	0	0	2
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	2	0	3	0	2	0	0	------
Maryland:												
Baltimore	5	0	1	1	6	0	7	1	4	0	0	35
Cumberland	0	0	------	0	1	0	0	0	0	0	0	------
Frederick	0	0	------	0	------	0	0	0	0	0	0	------
District of Columbia:												
Washington	0	0	------	0	5	0	3	0	2	0	0	2
Virginia:												
Lynchburg	0	0	------	0	------	0	0	0	0	0	0	------
Richmond	0	0	------	0	------	0	3	0	1	0	0	6
Roanoke	3	0	------	0	------	0	0	0	0	0	0	------
West Virginia:												
Charleston	0	0	------	0	------	0	0	0	0	0	0	------
Wheeling	0	0	------	0	------	0	0	0	1	0	0	3
North Carolina:												
Wilmington	0	0	------	0	------	0	1	0	0	0	0	------
Winston-Salem	0	0	------	0	------	0	0	0	6	0	0	3
South Carolina:												
Charleston	0	0	------	0	2	0	0	0	1	0	0	1
Georgia:												
Atlanta	5	0	------	0	------	0	0	2	2	0	0	------
Brunswick	0	0	------	0	------	0	0	0	0	0	0	------
Savannah	0	0	------	0	1	0	0	0	0	0	0	------
Florida:												
Tampa	4	0	------	0	------	0	2	0	0	0	1	------
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	------	0	------	0	3	1	2	0	0	3
Nashville	0	0	------	0	------	0	3	1	0	0	0	3
Alabama:												
Birmingham	2	0	2	0	2	0	2	6	0	0	0	------
Mobile	0	0	------	0	------	1	4	0	0	0	0	------
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	1	0	1	0	0	0	0	2
Louisiana:												
New Orleans	1	0	2	0	1	0	4	4	3	0	0	------
Shreveport	0	0	------	0	------	0	2	2	0	0	1	------
Texas:												
Dallas	3	0	------	0	1	0	1	2	4	0	0	14
Galveston	1	0	------	0	------	0	0	0	0	0	0	1
Houston	2	0	------	0	------	0	2	1	1	0	0	------
San Antonio	1	0	------	0	1	0	4	0	0	0	0	2
MOUNTAIN												
Montana:												
Billings	0	1	------	0	------	0	1	0	0	0	0	------
Great Falls	1	0	------	0	3	1	0	1	0	0	0	------
Helena	0	0	------	0	------	0	0	1	1	0	0	------
Missoula	0	0	------	0	------	0	1	1	0	0	0	------
Idaho:												
Boise	0	0	------	0	------	0	0	0	6	0	0	3
Colorado:												
Denver	0	0	3	0	------	0	1	27	5	0	1	3
Pueblo	1	0	------	0	------	0	0	4	0	0	0	------
Utah:												
Salt Lake City	0	0	------	0	1	0	0	3	0	0	0	------

City reports for week ended Sept. 14, 1946—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
PACIFIC												
Washington:												
Seattle	3	0	------	0	------	0	2	4	1	0	0	4
Spokane	0	0	------	0	------	1	1	16	0	0	0	2
Tacoma	0	0	------	0	------	0	0	0	1	0	0	------
California:												
Los Angeles	3	0	1	0	3	1	0	47	17	0	0	16
Sacramento	0	0	------	0	------	0	2	0	0	0	0	------
San Francisco	0	0	1	0	1	0	5	0	7	0	0	2
Total	78	3	21	4	120	15	204	496	205	0	11	751
Corresponding week, 1945	48	------	16	6	173	------	240	------	221	0	17	823
Average, 1941-45	54	------	30	[1] 8	[2] 142	------	[1] 225	------	262	0	31	877

[1] 3-year average, 1943-45.
[2] 5-year median, 1941-45.

Dysentery, amebic.—Cases: New York 1; Chicago 1; San Francisco 1.
Dysentery, bacillary.—Cases: New York 2; Columbus 1; Chicago 1; Baltimore 1; Charleston, S. C., 3; Los Angeles 1.
Dysentery, unspecified.—Cases: San Antonio 2.
Leprosy.—Cases: New York 1.
Tularemia.—Cases: St. Louis 1.
Typhus fever, endemic.—Cases: New York 2; Charleston, S. C., 1; Tampa 4; Birmingham 1; Little Rock 1; New Orleans 4; Dallas 1; Houston 3; San Antonio 1; Los Angeles 2.

Rates (annual basis) per 100,000 population, by geographic groups, for the 89 cities in the preceding table (estimated population, 1943, 34,351,200)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	7.8	0.0	0.0	2.6	21	2.6	39.2	57.5	44	0.0	2.6	290
Middle Atlantic	12.5	0.0	3.2	0.5	18	1.9	33.8	30.5	25	0.0	2.8	65
East North Central	6.1	1.2	1.8	0.6	25	3.6	19.5	80.9	33	0.0	0.6	220
West North Central	6.0	0.0	2.0	0.0	4	0.0	51.7	300.4	26	0.0	0.0	66
South Atlantic	28.2	0.0	1.7	1.7	28	0.0	31.5	5.0	31	0.0	1.7	83
East South Central	11.8	0.0	11.8	0.0	12	5.9	70.8	47.2	12	0.0	0.0	35
West South Central	23.0	0.0	5.7	0.0	11	0.0	40.2	25.8	23	0.0	2.9	55
Mountain	15.9	7.9	23.8	0.0	32	7.9	23.8	293.9	95	0.0	7.9	48
Pacific	9.5	0.0	3.2	0.0	6	3.2	15.8	106.0	41	0.0	0.0	38
Total	11.9	0.5	3.2	0.6	18	2.3	31.1	75.5	31	0.0	1.7	114

PLAGUE INFECTION IN PLACER COUNTY, CALIF.

Under date of Sept. 17, 1946, plague infection was reported proved, on Sept. 16, in a pool of 7 fleas from 12 chipmunks trapped at a beach at Lake Tahoe, Placer County, Calif., and received at the laboratory on Aug. 26.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended August 31, 1946.—During the week ended August 31, 1946, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox				23	44	7	11	17	13	115
Diphtheria		2	1	29	5	3	1		1	42
Dysentery:										
Amebic								3		3
Bacillary									4	4
Encephalitis, infectious							1			1
German measles					4			2	10	16
Influenza						3				3
Measles		12		23	41	16	35	46	8	181
Meningitis, meningococcus					2				2	4
Mumps				16	86	18	57	22	31	230
Poliomyelitis	11	2	4	216	39	5	9	15		301
Scarlet fever		1	3	15	35	5	2	9	5	75
Tuberculosis (all forms)		1	15	95	48	21	13	1	48	242
Typhoid and paratyphoid fever			1	19	5		6		11	42
Undulant fever				1	3					4
Venereal diseases:										
Gonorrhea	6	21	21	152	134	[1] 159	32	42	127	[1] 694
Syphilis	1	14	4	115	80	[1] 33	12	9	75	[1] 343
Whooping cough		10	3	41	47	3	3	16	1	124

[1] Includes delayed reports for weeks ended Aug. 17 and 24, 1946.

CUBA

Habana—Communicable diseases—4 weeks ended September 14, 1946.—During the 4 weeks ended September 14, 1946, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	14		Poliomyelitis	3	1
Malaria	10		Tuberculosis	10	3
Measles	2		Typhoid fever	12	1

Provinces—Notifiable diseases—4 weeks ended September 7, 1946.—During the 4 weeks ended September 7, 1946, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana [1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	3	11	15	12	1	9	51
Cerebrospinal meningitis					1		1
Diphtheria	4	18	1		2		25
Hookworm disease		35		6			41
Leprosy		4		1			5
Lethargic encephalitis				1			1
Malaria	4	12		3	2	9	30
Measles		7			3		10
Poliomyelitis	7	5	2	9	1	1	25
Rabies (human)						1	1
Tuberculosis (respiratory)	44	37	16	29	7	41	174
Typhoid fever	17	42	4	82	9	45	199
Undulant fever					1		1
Whooping cough					3	1	4

[1] Includes the city of Habana.

FINLAND

Notifiable diseases—July 1946.—During the month of July 1946, cases of certain notifiable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	13	Paratyphoid fever	302
Diphtheria	539	Poliomyelitis	20
Dysentery, unspecified	16	Scarlet fever	118
Gonorrhea	1,712	Syphilis	413
Malaria	29	Typhoid fever	56

JAPAN

Notifiable diseases—4 weeks ended August 24, 1946, and year to date.—During the 4 weeks ended August 24, 1946, and the year to date, cases of certain notifiable diseases were reported in Japan as follows:

Disease	4 weeks ended Aug. 24, 1946	Total cases reported for the year to date	Disease	4 weeks ended Aug. 24, 1946	Total cases reported for the year to date
Cholera	518	882	Paratyphoid fever	1,102	5,593
Diphtheria	2,015	31,971	Scarlet fever	109	1,282
Dysentery	22,995	39,743	Smallpox	36	17,642
Encephalitis, Japanese "B"	47	[1] 103	Typhoid fever	4,945	30,681
Malaria	5,665	[1] 15,410	Typhus fever	175	30,621
Meningitis, epidemic	100	1,111			

[1] For the period June 2, 1946, to date.

NEW ZEALAND

Notifiable diseases—4 weeks ended August 10, 1946.—During the 4 weeks ended August 10, 1946, certain notifiable diseases were reported in New Zealand as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cerebrospinal meningitis	10	1	Malaria	7	
Diphtheria	230	7	Poliomyelitis	5	
Dysentery:			Puerperal fever	8	
Amebic	2		Scarlet fever	124	
Bacillary	16	1	Trachoma	5	
Erysipelas	15	1	Tuberculosis (all forms)	153	53
Food poisoning	7		Typhoid fever	12	4
Influenza	1	1	Undulant fever	4	

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual incidence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during recent months. All reports of yellow fever are published currently.

A table showing the accumulated figures for these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

Cholera

China.—Cholera has been reported in China as follows: Anhwei Province—August 11–20, 1946, 56 cases, 12 deaths; Chekiang Province—July 21–31, 1946, 37 cases, 4 deaths; August 11–20, 1946, 40 cases, 2 deaths; Fukien Province—Foochow, August 1–10, 1946, 133 cases, 24 deaths; Honan Province—August 1–10, 1946, 336 cases, 66 deaths; Hopeh Province—July 21–31, 1946, 33 cases, 30 deaths, including 33 cases, 11 deaths in Tientsin; Kiangsi Province—August 1–10, 1946, 55 cases, 21 deaths; Kiangsu Province—August 11–20, 1946, 341 cases, 36 deaths, including 329 cases, 35 deaths in Shanghai; August 21–31, 1946, 195 cases, 23 deaths in Shanghai; Kwangsi Province—August 1–10, 1946, 83 cases, 31 deaths; Kwangtung Province—August 1–10, 1946, 198 cases, 60 deaths; August 21–31, 1946, 111 cases, 35 deaths in Swatow.

Korea.—Cholera has been reported epidemic in Korea, beginning in April or May, with a total of 11,351 cases and 7,399 deaths up to about September 1, 1946.

On Vessel—SS Lyons Creek.—Information dated September 18, 1946, stated that the *SS Lyons Creek* arrived at Ras Tanura, Arabia, from Singapore, Straits Settlements on August 29, 1946, with cases of suspected cholera on board among members of the crew. Later tests showed the disease to be cholera of the less virulent type.

Plague

Canada—Saskatchewan.—Under date of September 14, 1946, plague infection was reported in Saskatchewan, Canada, as follows: In a pool of 247 fleas from 33 ground squirrels collected at Alsask and in a pool of 246 fleas from 28 ground squirrels collected at Superb.

China.—Plague infection has been reported in China as follows: Fukien Province—July 21–31, 1946, 42 cases, 38 deaths; August 1–10, 1946, 76 cases, 42 deaths, including 17 cases, 6 deaths at Foochow; Kiangsi Province—July 21–31, 1946, 33 cases, 4 deaths in Nanchang; August 1–10, 1946, 50 cases, 16 deaths; Yunnan Province—August 21–31, 1946, 19 cases, 1 death.

Yellow Fever

Colombia—Santander Department.—For the period June 19 to July 17, 1946, 1 death from yellow fever was reported in Bolivar Municipality and 3 deaths from yellow fever were reported in San Vincente de Chucuri, Santander Department, Colombia.

Gold Coast—Tamale.—On September 9, 1946, 1 case of suspected yellow fever was reported in Tamale, Gold Coast, death occurring on September 14, 1946. All precautionary measures have been taken.