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A STUDY OF THE RODENT-ECTOPARASITE POPULATION OF JACKSONVILLE, FLA.

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Epidemiologic and bacteriologic investigations in mutually complementary fashion established several decades ago the centuries-old cognition of the existence of a rodent reservoir of bubonic plague and demonstrated the role of certain ectoparasites of these rodents in the transmission of human plague infection (*1, 2, 3, 4*). Comparatively recently, similar studies indicated the existence of an analogous situation with respect to a mild form of typhus fever (*5, 6, 7, 8, 9, 10, 11*) whose existence as a clinical entity had first been recognized, without identification, in this country (*12, 13*).

Despite the extensive cumulative contribution to our knowledge and understanding of plague epidemiology, over a period of more than half a century by numerous students representing many nationalities, sanitarians have remained at a loss to explain convincingly some aspects of the genesis of epidemics of the disease. The occurrence of plague, in epidemic dimensions, in some of our seaports, and the apparent immunity of others, has posed a still inadequately answered question.

The theory gradually evolved that vulnerability of communities to bubonic plague is governed by climatic conditions, particularly temperature (*14, 15, 16*). As a corollary of this postulate the idea developed that infectibility is directly related to the prevalence of ectoparasite vectors, notably the so-called tropical rat flea, *Xenopsylla cheopis* (*17, 18, 19, 20, 21, 22*).

Reformulations of this theory provided an impetus for the inauguration by quarantine officers of a series of surveys of the fleas of rats in seaports and attracted the attention of the First Pan American Conference of National Directors of Health, which appointed a committee to formulate a program for the investigation of plague. This committee recommended that surveys of the ectoparasites of rats and other rodents be made for the purpose of clearly defining the factors of the spread of plague, to the end that the degree of infectibility of a locality to plague may be determined. The committee expressed the belief that such surveys, if made by a considerable number of countries over a period of at least one year, under identical circumstances, with records of results that are strictly comparable, will serve more definitely to fix upon the exact species and quantities of rodents and ectoparasites that make possible the propagation of plague (*23*, *24*).

During the 7-year period following the conference several field investigations were made of the external parasites of rodents, and particularly of the prevalence of *X. cheopis* and other fleas harbored by domestic rats in some of our seaports, both on the mainland and in outlying possessions (*25*, *26*, *27*, *28*, *29*). The valuable fundamental contributions of these independent studies indicated a need for coordinated and synchronized studies in multilocations on the same basic pattern. Since then additional investigations have been made (*30*, *31*, *32*, *33*).

Following the clinical recognition, laboratory identification, and early epidemiologic elucidation of the typhus fever occurring endemically in the United States, the role of vector has been variously assigned to a number of ectoparasites, including sucking lice, fleas, ticks, bedbugs, mosquitoes, chiggers, and the parasited mites, several of which have been proved to be capable of transmitting the disease under experimental conditions. Also, the complete make-up of the animal reservoir has not as yet been ascertained, despite the general acceptance of the commensal rats as the principal reservoir.

The first opportunity to undertake a comprehensive study designed to provide definitive answers to many of the questions that had remained unanswered, some for several decades, seemed to be presented when the organizers and administrators of the work-relief program of the Federal government undertook to furnish labor and other help for the conduct of suitable public health programs and requested the submission of detailed specifications for a project related to the control of endemic typhus fever in this country. On the strength of authoritative assurances that a study over a 12-month period would receive support, a plan for simultaneous studies in the principal continental seaports, several inland communities, and seaports in outlying American possessions was formulated, submitted, and approved.

Field studies were inaugurated simultaneously in 30 localities, giving coverage of all representative areas in which bubonic plague was known to have occurred, or in which typhus fever was endemic, as well as important and presumably disease-free communities whose vulnerability to plague or typhus might be a matter of public concern. Owing to changes of policies governing the provision and employment of personnel, field work was interrupted in various stages of completion in nearly all of the 30 localities. In most of these the studies were abandoned, but in several it was possible to effect arrangements for carrying the work through to the end of the year, according to plan. Material was obtained from communities representing the Atlantic, Gulf Coast, and Pacific seaboards, the inland typhus-endemic region, and our principal outlying territory.

Very soon after the completion of field work, the laboratory examination of collected material and the statistical processing of accumulated data were interrupted by the transfer of all professional and technical personnel to other duties.

A revived, and indeed heightened, interest in typhus fever as a traditional concomitant of war and of post-war disturbances has permitted a resumption of the processing of the material amassed nearly ten years ago. This paper is the first of what is intended to be a series of reports on the findings of the studies in the individual areas. These reports will provide a body of comparable data which will serve as the basis for a systematic treatment of epidemiologic features of plague and typhus in this country and in some of its outlying territory.

THE PORT OF JACKSONVILLE

Jacksonville is situated near the mouth of the St. Johns River in northeastern Florida, at 30° 19′ N. latitude and 81° 40′ W. longitude. Its altitude ranges from 10 to 25 feet above sea level. The incorporated city covers an area of 38.96 square miles. The estimated population in 1934 was 146,953, composed of 93,278 white persons and 53,675 persons of other races.

The port of Jacksonville is touched by steamship lines serving ports in the West Indies, South America, Europe, the Dutch East Indies, and Asia. The major part of the water-borne commerce is, however, coastwise shipping. The city is an important terminus of several railroad trunk lines. The principal import is fertilizer; the principal exports are logs, lumber, and naval stores. In coastwise traffic, vegetable products and fertilizer are the leading commodities. the same items comprise the limited internal shipments on the St. Johns River (*34*).

CHRONOLOGY AND TECHNIQUES OF FIELD OPERATIONS

Collection of material was begun in Jacksonville on January 8, 1934, and continued until December 22, 1934, with two major interruptions —one of 20 days, in March, the other of 37 days, in May and June— and three inconsequential minor interruptions of 3 to 5 days each. The number of trapping days totalled 243. The longer of the two major interruptions commenced on May 5, leaving only 2 trapping days in that month, viz, May 2 and 3; hence, this month was excluded from all calculations, and the small amount of material obtained on those two days was combined with that obtained during April.

The object of the field work was the procurement of representative samples of live animals from all parts of the surveyed area at all seasons of the year. Hence, no incentive was offered for large catches, which might have led to a concentration of effort on heavily infested premises. Instead, emphasis was placed on a systematic coverage, at frequent intervals, of the entire city. In fact, a definite quota was originally established for the weekly catch, in order to provide a sample large enough to insure statistically reliable findings but not so large as to overtax available laboratory facilities. A constant pro-

TABLE 1.—*Monthly and annual means, indices, and infestations, Siphonaptera and* X. cheopis, *by principal host species*

Month	Rodent host		Siphonaptera[1]				*Xenopsylla cheopis*			
	Species	Adjusted net number	Number	Mean	Index	Infestation percent	Number	Mean	Index	Infestation percent
1934										
January	*R. norvegicus*	613	3,983	6.50	6.23	74.71	1,657	2.70	2.60	59.38
	R. rattus	96	510	5.31	5.31	75.00	295	3.07	3.07	60.42
	Total	709	4.493	6.34	6.10	74.75	1,952	2.75	2.66	59.52
February	*R. norvegicus*	648	4,147	6.40	5.40	72.53	1,463	2.26	2.22	54.63
	R. rattus	27	267	9.89	6.52	81.48	224	8.30	4.30	74.07
	Total	675	4,414	6.54	5.44	72.89	1,687	2.50	2.30	55.41
March	*R. norvegicus*	338	2,018	5.97	5.97	81.95	776	2.30	2.30	57.69
	R. rattus	13	40	3.08	3.08	76.92	21	1.62	1.62	38.46
	Total	351	2,058	5.86	5.86	81.77	797	2.27	2.27	56.98
April	*R. norvegicus*	487	4,481	9.20	7.92	85.83	1,650	3.39	3.37	69.82
	R. rattus	25	188	7.52	7.52	68.00	134	5.36	5.00	52.00
	Total	512	4,669	9.12	7.90	84.96	1,784	3.48	3.45	68.94
June	*R. norvegicus*	255	2,663	10.44	9.90	91.76	1,884	7.39	7.19	87.84
	R. rattus	8	41	5.12	5.12	87.50	36	4.50	4.50	87.50
	Total	263	2,704	10.28	9.76	91.63	1,920	7.30	7.11	87.83
July	*R. norvegicus*	426	3,646	8.56	8.54	94.60	2,988	7.01	7.00	92.72
	R. rattus	58	640	11.03	11.03	89.66	628	10.83	10.62	87.93
	Total	484	4,286	8.86	8.83	94.01	3,616	7.47	7.43	92.15
August	*R. norvegicus*	417	2,711	6.50	6.50	87.53	2,279	5.46	5.45	85.85
	R. rattus	38	150	3.95	3.95	78.95	140	3.68	3.68	78.95
	Total	455	2,861	6.29	6.29	86.81	2,419	5.32	5.30	85.28
September	*R. norvegicus*	302	1,478	4.89	4.89	88.08	1,270	4.20	4.20	85.10
	R. rattus	11	23	2.09	2.09	72.73	20	1.82	1.82	72.73
	Total	313	1,501	4.80	4.80	87.54	1,290	4.12	4.12	84.66
October	*R. norvegicus*	309	1,375	4.45	4.45	86.73	1,077	3.48	3.48	79.61
	R. rattus	11	14	1.27	1.27	54.54	13	1.18	1.18	45.45
	Total	320	1,389	4.34	4.34	85.62	1,090	3.41	3.41	78.44
November	*R. norvegicus*	274	1,075	3.92	3.92	82.12	581	2.12	2.12	64.96
	R. rattus	28	43	1.54	1.54	60.71	16	.57	.57	32.14
	Total	302	1,118	3.70	3.70	80.13	597	1.98	1.98	61.92
December	*R. norvegicus*	259	789	3.05	3.05	77.99	418	1.61	1.61	61.00
	R. rattus	20	36	1.80	1.80	60.00	23	1.15	1.15	50.00
	Total	279	825	2.96	2.96	76.70	441	1.58	1.58	60.22
Year	*R. norvegicus*	4,328	28,366	6.35	6.07	83.98	16,043	3.81	3.78	72.60
	R. rattus	335	1,952	4.78	4.48	73.23	1,550	3.82	3.41	61.79
	Total	4,663	30,318	6.28	6.00	83.35	17,593	3.83	3.78	71.94

[1] Includes 405 *Ctenocephalides felis* and 11 *Rhopalopsyllus gwyni.*

gression to new premises was required, individual field production records being so designed as to provide a check on such progression. The interruptions previously referred to and the associated turn-over of personnel precluded the maintenance of production schedules, hence the month-to-month variation in the yield, as shown in the first column of numerals in table 1.

TABLE 1A.—*Monthly and annual means and infestations,* N. fasciatus, L. segnis, *and* E. gallinacea, *by principal host species*

Month	Species of rodent host	*Nosopsyllus fasciatus*			*Leptopsylla segnis*			*Echidnophaga gallinacea*		
		Number	Mean	Infestation percent	Number	Mean	Infestation percent	Number	Mean	Infestation percent
1934										
January	*R. norvegicus*	130	0.21	9.14	1,407	2.30	44.04	756	1.23	12.72
	R. rattus	5	.05	2.08	202	2.10	53.12	8	.08	6.25
	Total	135	.19	8.18	1,609	2.27	45.28	764	1.08	11.85
February	*R. norvegicus*	103	.16	8.02	1,266	1.95	43.21	1,278	1.97	13.58
	R. rattus	1	.04	3.70	31	1.15	55.56	11	.41	3.70
	Total	104	.15	7.85	1,297	1.92	43.70	1,289	1.91	13.18
March	*R. norvegicus*	122	.36	14.79	884	2.62	55.03	205	.61	15.09
	R. rattus	0	0	0	19	1.46	53.85	0	0	0
	Total	122	.35	14.24	903	2.57	54.98	205	.58	14.53
April	*R. norvegicus*	146	.30	14.17	1,195	2.45	53.18	1,346	2.76	26.49
	R. rattus	4	.16	12.00	47	1.88	52.00	3	.12	8.00
	Total	150	.29	14.06	1,242	2.42	53.12	1,349	2.63	25.58
June	*R. norvegicus*	7	.03	2.74	113	.44	14.12	566	2.22	27.84
	R. rattus	0	0	0	2	.25	25.00	3	.38	25.00
	Total	7	.03	2.66	115	.44	14.45	569	2.16	27.76
July	*R. norvegicus*	3	.01	0.70	12	.03	2.35	614	1.44	28.40
	R. rattus	0	0	0	2	.03	3.45	10	.17	13.79
	Total	3	.01	.62	14	.03	2.48	624	1.29	26.65
August	*R. norvegicus*	0	0	0	6	.01	1.20	404	.97	25.66
	R. rattus	0	0	0	0	0	0	9	.24	15.79
	Total	0	0	0	6	.01	1.10	413	.91	24.84
September	*R. norvegicus*	2	.01	.66	23	.08	4.97	171	.57	17.55
	R. rattus	1	.09	9.09	0	0	0	2	.18	18.18
	Total	3	.01	.96	23	.07	4.79	173	.55	17.57
October	*R. norvegicus*	6	.02	1.94	82	.26	14.89	205	.66	16.50
	R. rattus	0	0	0	1	.09	9.09	0	0	0
	Total	6	.02	1.88	83	.26	14.69	205	.64	15.94
November	*R. norvegicus*	26	.09	8.03	221	.81	35.40	241	.88	21.53
	R. rattus	0	0	0	17	.61	25.00	10	.36	17.86
	Total	26	.09	7.28	238	.79	34.44	251	.83	21.19
December	*R. norvegicus*	34	.13	10.42	188	.72	32.82	146	.56	15.44
	R. rattus	2	.10	5.00	10	.50	25.00	1	.05	5.00
	Total	36	.13	10.04	198	.71	32.26	147	.53	14.70
Year	*R. norvegicus*	579	.12	6.42	5,397	1.06	27.38	5,932	1.26	20.07
	R. rattus	13	.04	2.90	331	.73	27.46	57	.18	10.32
	Total	592	.12	6.16	5,728	1.04	27.39	5,989	1.19	19.44

TABLE 1B.—*Monthly and annual means, indices, and infestations, Acarina, by combined host species* R. norvegicus—R. rattus

Month	Total number of rodents	Number of animals in 10-percent sample	Acarina			*Laelaps hawaiiensis*			
			Number	Mean	Infestation percent	Number	Mean	Index	Infestation percent
1934									
January	716	71	171	2.41	39.44	15	0.21	0.21	8.45
February	675	68	160	2.35	42.65	10	.15	.15	10.29
March	353	35	103	2.94	31.43	2	.06	.06	5.71
April	525	53	240	4.53	69.81	48	.91	.91	24.53
June	318	31	90	2.90	70.97	70	2.26	2.26	51.61
July	639	64	990	15.47	76.56	857	13.39	6.38	65.62
August	576	58	453	7.81	84.48	434	7.48	6.12	77.59
September	410	41	326	7.95	80.49	280	6.83	6.42	70.73
October	400	40	214	5.35	72.50	201	5.02	4.75	70.00
November	349	35	91	2.60	51.43	81	2.31	2.31	40.00
December	284	28	32	1.14	53.57	16	.57	.57	32.14
Year	5,245	524	2,870	5.04	61.21	2,014	3.56	2.74	41.52

Month	*Echinolaelaps echidninus*			*Liponyssus bacoti*			Other species
	Number	Mean	Infestation percent	Number	Mean	Infestation percent	Number
1934							
January	51	0.72	22.54	104	1.46	11.27	[1] 1
February	78	1.15	20.59	72	1.06	17.65	0
March	87	2.49	20.00	14	.40	8.57	0
April	63	1.19	26.42	129	2.43	30.19	0
June	16	.52	22.58	4	.13	9.68	0
July	101	1.58	23.44	32	.50	9.38	0
August	18	.31	18.96	1	.02	1.72	0
September	41	1.00	26.83	0	.00	.00	[2] 5
October	12	.30	15.00	0	.00	.00	[3] 1
November	5	.14	11.43	5	.14	5.71	0
December	16	.57	25.00	0	.00	.00	0
Year	488	.91	21.16	361	.56	8.56	7

[1] *Myobia ensifera.* [2] *Atricholaelaps glasgowi.* [3] Cheyletidae.

TABLE 1C.—*Monthly and annual means and infestations, Anoplura, by combined host species* R. norvegicus—R. rattus

Month	Total number of rodents	Number of animals in 10 percent sample	Anoplura			*Polyplax spinulosa*			*Hoplopleura hirsuta*		
			Number	Mean	Infestation percent	Number	Mean	Infestation percent	Number	Mean	Infestation percent
1934											
January	716	71	262	3.69	40.84	217	3.06	38.03	[1] 45	0.63	12.68
February	675	68	400	5.88	29.41	74	1.09	25.00	326	4.79	13.24
March	353	35	52	1.48	37.14	48	1.37	34.28	4	.11	5.71
April	525	53	146	2.75	37.74	108	2.04	32.08	38	.72	11.32
June	318	31	74	2.39	54.84	67	2.16	54.84	7	.22	9.68
July	639	64	178	2.78	54.69	152	2.38	48.44	26	.41	14.06
August	576	58	98	1.69	46.55	66	1.14	43.10	32	.55	8.62
September	410	41	105	2.56	53.66	79	1.93	48.78	26	.63	17.07
October	400	40	61	1.52	40.00	50	1.25	35.00	11	.28	10.00
November	349	35	66	1.88	65.71	53	1.51	51.43	13	.37	22.86
December	284	28	53	1.89	39.28	41	1.46	32.14	12	.43	10.71
Year	5,245	524	1,495	2.59	45.44	955	1.76	40.28	540	.83	12.36

[1] Includes 3 *Hoplopleura acanthopus.*

Field workers furnished by the official work-relief agency were instructed and supervised by cadres of trained and experienced personnel from the Foreign Quarantine Division.

For trapping rats, steel animal traps of size No. 0 Victor were used. These traps are unsuited for trapping very small animals, hence the small proportion of live mice in the material. The traps were set, unbaited, in runways. Usually trap lines were run twice a day. Animals found alive were removed from the traps and placed in muslin cloth bags, one to the bag. Each bag was then securely tied and an identification tag attached.

Ectoparasites were collected only from such animals as were still alive when they reached the field station. The animals, in unopened bags, were placed in a glass jar and chloroformed. Ectoparasites were then recovered from these animals and the bags with the aid of a suction apparatus. After classification and enumeration the parasites from each animal were placed in a *homeopathic* vial containing 80 percent alcohol and shipped to the National Institute of Health for final identification.

Identification of collected ectoparasites was made by experienced entomologists of the Zoology Laboratory, with the assistance of trained entomologic technicians.

COMPOSITION OF MATERIAL

During the field operations there were collected in Jacksonville and examined in the field station a total of 5,357 live rodents, consisting of 4,853 *Rattus norvegicus*, 340 *Rattus rattus alexandrinus*, 66 *Rattus rattus rattus*, 2 *Sigmodon hispidus*, 41 young of undetermined species of the genus *Rattus* found in 6 nests, and 55 *Mus musculus*. Ectoparasites were obtained in the field station from 4,331 *R. norvegicus*, 288 *R. r. alexandrinus*, 53 *R. r. rattus*, 1 *S. hispidus*, 2 nests containing a total of 12 young of undetermined species of *Rattus*, and 3 *M. musculus*. Owing to losses from breakage of specimen containers in transit, desiccation of imperfectly sealed containers, and unascertainable causes incidental to the aforementioned interruptions of work and turn-over of personnel, there were ultimately received at the National Institute of Health, and examined in the Zoology Laboratory, ectoparasite specimens from 3,882 *R. norvegicus* (4 of which were young animals found in a nest), 237 *R. r. alexandrinus*, 39 *R. r. rattus*, 1 *S. hispidus*, 12 young animals of undetermined species of *Rattus* found in 2 nests, and 3 *M. musculus*.

In addition, 7 leprous rats, all of them *R. norvegicus*, were not examined for ectoparasites but were sent alive to the Division of Infectious Diseases, National Institute of Health, for special study.

All of the fleas received in good condition by the National Institute of Health were examined and identified. The examination and identification of mites and lice, especially the former, required a disproportionately large amount of tedious and time-consuming work, as compared with the relatively easy and expeditious processing of fleas. As the available number of skilled technical personnel was limited, it was decided to restrict the examination of parasites other than fleas to material from 10 percent of the number of live animals. In order to insure a random sampling, specimen material was examined from each tenth rat, hence from 524 of the 5,245 rodents of the combined *R. norvegicus—R. rattus* species. Whenever the tenth animal chanced to be one which had been found by the field station to be infested but for which the specimen had been lost, the infested animal substituted was that which was numerically nearest the missing one. If selection lay between two numerically equidistant animals, preference was given to the one most closely corresponding, in species, maturity, and environment to the source of the missing specimen.

The ectoparasite material identified at the National Institute of Health consisted of 30,353 Siphonaptera, or fleas; 3,695 Acarina, or mites; and 2,441 Anoplura, or sucking lice. Of the Siphonaptera, 17,622 or 58.1 percent, were *Xenopsylla cheopis;* 5,990, or 19.7 percent, *Echidnophaga gallinacea;* 5,732, or 18.9 percent, *Leptopsylla segnis;* 593, or 2.0 percent, *Nosopsyllus fasciatus;* 405, or 1.3 percent, *Ctenocephalides felis*, and 11 *Rhopalopsyllus gwyni*. Of the Acarina in the 10-percent sample, 2,014, or 70.2 percent, were *Laelaps hawaiiensis;* 488, or 17.0 percent, *Echinolaelaps echidninus;* 361, or 12.6 percent, *Liponyssus bacoti;* 5 *Atricholaelaps glasgowi*, 1 *Myobia ensifera*, and 1 mite of the Cheyletidae. Of the Anoplura, likewise limited to the 10-percent sample, 955, or 63.9 percent, were *Polyplax spinulosa;* 537, or 35.9 percent, *Hoplopleura hirsuta*, and 3 *Hoplopleura acanthopus*.

In addition, material was examined in the laboratory from a number of rodents that were not included in the 10-percent sample described above, and consisted of 232 *L. hawaiiensis*, 590 *E. echidninus*, 2 *L. bacoti*, 1 of the Cheyletidae, 780 *P. spinulosa*, 154 *H. hirsuta*, and 12 *H. acanthopus*. Since the selection of specimens from these additional animals was not governed by the rigid sampling rule that applied to the 10-percent sample, the results of the identification of these additional, nonsample specimens have not been included in any tabulation nor in the computation of any statistical constants.

Not included in the tabulations of statistically analyzed material were 35 fleas recovered from rodents other than trapped *R. norvegicus* and *R. rattus*, distributed as follows: from 1 *S. hispidus*, 1 *L. segnis;* from 1 *M. musculus*, 2 *X. cheopis;* from 1 *M. musculus*, 1 *E. gallinacea;* from 1 *M. Musculus*, 1 *L. segnis;* from 1 nest of 7 *Rattus* of undetermined species, 22 *X. cheopis;* from 1 nest of 5 *Rattus* of undetermined species, 1 *X. cheopis;* and from 1 nest of 4 *R. norvegicus*, 4 *X. cheopis*, 1 *N. fasciatus*, and 2 *L. segnis*.

ADJUSTMENT FOR LOST SPECIMENS

Of the 5,245 rats of the species *R. norvegicus* and *R. rattus* (exclusive of young in nests) collected alive and examined in the Jacksonville field station, 4,668, or 89 percent, were found to harbor ectoparasites. Fleas were identified on 4,353 of these animals, or 83.4 percent of the total examined. From an additional 315 rats, either mites or lice, or both of these ectoparasites, were obtained, but not any fleas.

By the time of final identification of flea species at the National Institute of Health, 514 specimen containers which had been recorded in the field station as containing fleas were missing. Any calculations based upon the 5,245 live rats examined in the field station would obviously have yielded results showing disparity from those which

TABLE 2.—*Adjustment for lost specimens*

Month	A Number of live animals examined in field	B Number of specimens examined in laboratory	C Number of specimens missing	D Number of parasitized animals (B+C)	E Number of noninfested animals (A−D)	F Percent of specimens missing (C/D)	G Percent missing applied to noninfested animals (F×E)
1934							
January	716	530	5	535	181	0.9	1.6
February	675	492	0	492	183	0	0
March	353	287	2	289	64	.7	.4
April	525	435	11	446	79	2.5	2.0
June	318	241	50	291	27	17.2	4.6
July	639	455	146	601	38	24.3	9.2
August	576	395	105	500	76	21.0	16.0
September	410	274	85	359	51	23.7	12.1
October	400	274	68	342	58	19.9	11.5
November	349	242	38	280	69	13.6	9.4
December	284	214	4	218	66	1.8	1.2
Year	5,245	3,839	514	4,353	892		68.0

Month	H Number of noninfested animals excluded as adjustment (G)	I Total number of animals excluded (C+H)	J Adjusted net number of live animals (A−I)	K Adjusted net number of noninfested animals (E−H)	L Infestation percent, field, original (D/A)	M Infestation percent, laboratory, adjusted sample (B/J)
1934						
January	2	7	709	179	74.7	74.8
February	0	0	675	183	72.9	72.9
March	0	2	351	64	81.9	81.8
April	2	13	512	77	85.0	85.0
June	5	55	263	22	91.5	91.6
July	9	155	484	29	94.0	94.0
August	16	121	455	60	86.8	86.8
September	12	97	313	39	87.6	87.5
October	12	80	320	46	85.5	85.6
November	9	47	302	60	80.2	80.1
December	1	5	279	65	76.8	76.7
Year	68	582	4,663	824	83.4	83.3

would have been obtained had the entire original material of 4,668 specimens reached the final identification stage intact. A correction was therefore made by excluding from the total number of animals a monthly quota of non-flea-infested rats, proportionate to the number of missing specimens from flea-infested rats, and corresponding also, as nearly as possible, in species of rat. The total number of noninfested rats excluded in this manner was 68, the resultant sample utilized for calculation of statistical constants for Siphonaptera thus consisting of 4,663 rats corresponding very closely in monthly infestation rates to the original material.

The steps in making the adjustment are given in table 2. The close correspondence maintained in monthly and annual infestation rates between the intact original material and the adjusted working sample will be noted by comparing columns L and M. In addition, deviations due to the adjustment in the several environmental categories of zone and type of premises are less than 1 percent in all cases with the exception of the water-front zone. The last-mentioned shows a 6-percent increase, the change being due possibly to the relative smallness of the sample in that category.

DEFINITION AND DERIVATION OF STATISTICAL CONSTANTS EMPLOYED[1]

As used throughout this study with reference to ectoparasites, the mean is the arithmetic mean, or average number per live animal host of the ectoparasites in question. The infestation rate is the proportion of live animals parasitized, expressed in the form of a percentage. Each biometric constant representing ectoparasites is based upon the entire animal host population of the category under consideration, all noninfested as well as infested animals being included in the calculations.

Every statistical constant designated as an annual constant is the arithmetic mean of all available monthly values in its own category. This method of calculation provides an unbiased cross section of the annual experience by obviating the weighting effect of the larger of unequal monthly host samples—an important precaution in view of the seasonal variation in parasite prevalence.

Hitherto, the constant designated index has been identical with the arithmetic mean. In this sense the term "index" has been universally employed by American workers for the past two decades. Objections have been raised to the use of this value, on the ground that even a relatively few very high parasite counts can distort the index so that it may not fairly represent the parasite prevalence and distribution. Alternative methods of correcting such a situation have been (*a*) limitation of counts to some arbitrarily chosen maximum, all excess values being discarded, and (*b*) total exclusion of animals with counts

[1] The standard error is used throughout as the measure of sampling error of statistical constants.

felt to be excessively high. The latter method, most often used today, is objectionable in that it alters the infestation percentage, thus introducing a new distortion while seeking to eliminate another. Both of these methods are open to the criticism that they are dependent on personal caprice and hence are devoid of objectivity and mathematical regulation.

Since neither of the above-described methods of adjustment has provided a satisfactory solution of the dilemma created by so-called abnormal counts, the superiority has been stressed of the infestation percentage over the traditional index as a measure of parasite prevalence (*30*, *33*).

In our opinion there is a need for an index that will be free of the torsional effect of atypical parasite counts and that can be derived by a method that will preserve the integrity of infestation rates and also be comparatively immune from the criticism attending the invocation of arbitrary personal selection.

An index that will fulfill these requirements may be derived by mathematically fitting an appropriate curve to the frequency distribution of parasite counts in any host population, and thus determining their normal upper limit. By this method the utilizable or normal maximum count is predetermined by the inherent characteristics of the frequency distribution. Adjustment of host samples either to a standard population or to a percentile basis eliminates any effects due solely to wide differences between magnitudes of samples. The appropriate curve in each case is simply that of the mathematical function which produces the best fit.

When the frequencies calculated from the fitted curve are plotted on a grid, with the parasite counts as abscissae and the host numbers as ordinates, utilizing the rule governing decimals (*35*), the 0.5 ordinal value of the function determines the terminal value of abscissae. The latter value in turn determines the maximum parasite counts admissible for computation of the index, all counts in excess of that limit being held to the value of the maximum.

An example of the application of this method of determining maxima for the calculation of indices is illustrated in figure 1. On the arithmetic grid an exponential curve of the function $Y=ab^X$ has been fitted by the method of least squares to *X. cheopis* counts plotted as increasing values of X on the abscissal axis against numbers of rodent hosts plotted as decreasing values of Y on the ordinal axis. The curve begins at $X=10$, the point marking a change in the rate of decrease in Y values (0–5=84 percent; 5–10=76 percent; 10–15=47 percent; 15–20=45 percent; 20–25=44 percent; 25–30=40 percent, etc.) and extends to $X=49$, the highest X value in the first quintuple containing a majority of zero Y values. The logarithmic expression of the exponential curve $\log Y=mX+k$ where $m=\log b$ and $k=\log a$,

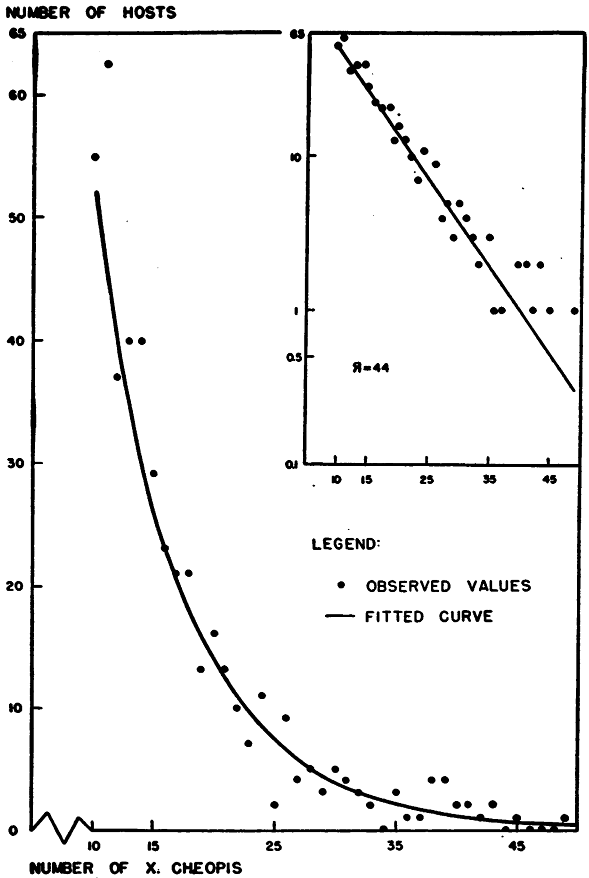

FIGURE 1.—Exponential curve of function $Y=ab^X$ fitted by least squares to frequency distribution of *X. cheopis* counts in determining upper limit for calculation of the index. Insert: Straight line fitted to same data on semi-logarithmic grid.

solved by the method of least squares, resulted in the function $\log Y = -0.05664X + 2.2829$. The point beyond which value $Y=0.5$ or less was reached at $X=44$, which may be designated as the limiting function я.[2] The curve then limits the *X. cheopis* count per host to 44. The goodness of fit measured by the index of correlation $\rho_{\log YX}$ *(36)* between the observed and the calculated series of frequencies is 0.946 ± 0.017.

Similarly a power curve of the function $Y=aX^b$ fitted to the frequency distribution of *L. hawaiiensis* counts yields a value of я=36. In computation of the index for *L. hawaiiensis*, specific parasite counts are then held to a maximum of 36 per host. The value of the index of correlation, $\rho_{\log Y\ \log X}$, as a measure of the goodness of fit is 0.943 ± 0.018.

[2] Selection of this Cyrillic symbol for the limiting function was prompted by the apparent exhaustion of the Greek and Latin alphabets as sources of statistical and scientific symbolic nomenclature.

The conclusion that the above fitted curves adequately represent the data is further substantiated through the use of the χ^2 test of goodness of fit.

BIOMETRIC CONSTANTS OF PRINCIPAL HOST SPECIES

Computations of the basic constants for the various species of fleas by species of the two principal animal hosts are shown in tables 1 and 1A. Since the two subspecies, *Rattus rattus alexandrinus* and *Rattus rattus rattus*, of the species *Rattus rattus* intergrade with each other and are almost identical except for differences in coloration, they have been combined under the species classification.

It will be noted that in the composite group Siphonaptera the values of the three annual biometric constants are substantially and consistently higher for *R. norvegicus* than for *R. rattus*. Tests for statistical significance of these differences give mean differences of the monthly values of the mean, the index, and the infestation rate, 2.1, 2.5, and 3.1 times their respective standard errors,[3] indicating a lack of significance for the mean, but a high probability of significance for the index, and a practical certainty of statistical significance in the case of the difference in infestation rates (*38*). However, when the composition of the raw material is noted, and the inconsistencies in the corresponding values for the individual species making up the Siphonaptera category are taken into consideration, it becomes evident that the apparently high degree of statistical significance must yield to the absence of biologic significance. Therefore only biometric constants computed for individual parasite species will be used for comparisons and analysis.

Considering individually the several constituent species comprising the category Siphonaptera, it is found that tests for statistical significance applied to the monthly biometric constants give the following values of *mean monthly difference*/$\sigma = t$ for the mean and infestation, respectively, of the compared species of *Rattus: X. cheopis*, 0.0 and 2.3; *N. fasciatus*, 2.3 and 2.0; *L. segnis*, 3.0 and 0.0; *E. gallinacea*, 5.1 and 5.2. For the *X. cheopis* index the corresponding value is 0.6. It is evident that consistently significant differences between the two host species *R. norvegicus* and *R. rattus* occur only in the case of *E. gallinacea.* Because of this lack of statistically significant differences between the two components of the host sample in biometric constants for all but the one ectoparasite species, *E. gallinacea*, and the overwhelming preponderance of one host species, *R. norvegicus* constituting 92.8 percent of the total sample, for purposes of further statistical treatment the two rodent species will be combined.

[3] The standard deviation used in these tests is the root-mean-square of the deviations of monthly differences from the mean of such differences (*37*).

SEASONAL VARIATION OF PARASITIZATION

The influence of climatic conditions on the breeding, hatching, development, and survival of *X. cheopis* and *N. fasciatus* have been studied intensively by workers in several countries, with varying techniques, inconstant results, and conflicting conclusions. It is not our intent at this time to attempt an evaluation of those studies.

It is evident from tables 1, 1A, 1B, and 1C that marked differences exist between the monthly values of each category of constants, and furthermore that the pattern of these differences varies as between the several species of ectoparasites.

TABLE 3.—*Meteorologic conditions in Jacksonville 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) 62-year average	Total precipitation (inches) 64-year average	Mean relative humidity 52-year average
1934						
January	58.0	1.08	78.5	56.0	2.70	80.0
February	54.2	3.48	75.0	57.9	2.98	77.5
March	61.4	2.18	78.0	63.0	3.16	76.0
April	69.5	2.92	72.5	68.6	2.69	73.5
May	74.0	6.33	81.0	74.8	4.09	75.5
June	80.7	13.23	81.0	79.9	5.86	78.5
July	82.5	5.07	78.5	81.8	6.53	80.0
August	82.2	5.98	81.0	81.5	5.86	82.5
September	79.2	1.99	84.5	78.5	7.07	83.5
October	73.0	5.24	81.0	70.9	4.40	81.0
November	64.3	.31	78.5	62.5	2.01	80.0
December	55.7	.70	76.0	56.6	2.90	80.5
Year	69.6	48.51	78.8	69.3	50.25	79.0

The meteorologic conditions obtaining in Jacksonville during the period of field operations are given in table 3. For purposes of future reference, the corresponding average measurements for several preceding decades are also given. The temperature given is the mean of the maximum and minimum daily dry bulb readings throughout each month. The figures on precipitation are self-explanatory. The relative humidity figures are the averages of daily 8 a. m. and 8 p. m. readings throughout the month.

The simplest grouping that can be made for the purpose of assessing the relationship of the degree of parasitization to meteorologic conditions is a division into two approximately equal periods of dissimilar conditions. The 11 months of field operations may thus be divided into two groups, viz, one of 5 consecutive months, June to October; the other of 6 months, November to April. The first, or warm weather season, is characterized by mean monthly temperatures in excess of 72° F. In this period the measurements of mean relative humidity are

78.5 percent of saturation or higher. It is also the period of the heaviest rainfall. In the second, or cold weather period, monthly mean temperatures are all below 70° F.; the relative humidity measurements are never higher than 78.5 percent; and the precipitation is at a low level throughout.

Tests of statistical significance of the differences between the mean monthly values for the warm and the cold weather periods of the biometric constants, shown in table 4, indicate that the higher warm weather values for *X. cheopis* and *L. hawaiiensis* are highly significant, as are the lower warm weather values for *N. fasciatus* and *L. segnis*, whereas there are no significant differences for *E. gallinacea* or *P. spinulosa*.

To determine the quantitative relationship between the several constants and meteorologic measurements, coefficients of correlation have been computed (*40*) and are shown in table 5. Consistently high

TABLE 4.—*Seasonal differences in means, indices, and infestations, principal ectoparasite species, by combined host species* R. norvegicus—R. rattus

Ectoparasite species	Biometric constant	Sign of $\bar{d}$, warm: cold seasons	Critical ratio [1]	Odds against chance occurrence
X. cheopis	Mean	+	3.89	270:1
	Index	+	4.01	320:1
	Infestation	+	8.58	>10,000:1
N. fasciatus	Mean	−	4.32	510:1
	Infestation	−	6.14	>10,000:1
L. segnis	Mean	−	4.25	400:1
	Infestation	−	7.34	>10,000:1
E. gallinacea	Mean	−	.32	<1:1
	Infestation	+	1.74	7:1
L. hawaiiensis	Mean	+	3.70	200:1
	Index	+	5.53	2,500:1
	Infestation	+	6.27	>10,000:1
P. spinulosa	Mean	+	.02	<1:1
	Infestation	+	2.10	15:1

[1] $\frac{\text{Difference between seasonal means}}{\text{Standard error of difference}}$. The standard error of the difference $=\sqrt{\frac{S(d_1^2)+S(d_2^2)}{N_1+N_2-2}\cdot\frac{N_1+N_2}{N_1N_2}}$, where $S(d^2)$ is the sum of the squares of monthly deviations measured from the seasonal mean, and N is the number of months (*39*).

TABLE 5.—*Values of coefficients of correlation between biometric constants and meteorologic factors*

Ectoparasite species	Biometric constant	Meteorologic measurement: Temperature	Rainfall	Humidity
X. cheopis	Mean	0.857±0.088	0.792±0.124	0.388±0.283
	Index	.870± .081	.780± .131	.399± .280
	Infestation	.970± .020	.644± .195	.594± .216
N. fasciatus	Mean	−.642± .196	−.418± .275	−.677± .181
	Infestation	−.740± .151	−.480± .257	−.764± .139
L. segnis	Mean	−.696± .172	−.370± .288	−.677± .181
	Infestation	−.817± .111	−.465± .261	−.739± .151
E. gallinacea	Mean	.084± .331	.457± .264	−.528± .240
	Infestation	.776± .133	.609± .210	.070± .332
L. hawaiiensis	Mean	.788± .126	.238± .314	.478± .257
	Index	.853± .091	.263± .310	.694± .173
	Infestation	.854± .090	.403± .279	.684± .177
P. spinulosa	Mean	.125± .328	.046± .333	.039± .333
	Infestation	.694± .173	.414± .276	.654± .191

positive correlation is evident for *X. cheopis* and *L. hawaiiensis* with respect to temperature. Somewhat lower values in the opposite direction, i. e., negative correlations, obtain for *N. fasciatus* and *L segnis.* A positive correlation between temperature and the infestation rates for *E. gallinacea* and P. *spinulosa* is not corroborated by the means nor by indices (0.439+0.269 and 0.402+0.279, respectively) computed by the *limiting function* method described above, and hence must be disregarded.

In comparison with the degrees of correlation between the biometric constants with mean temperature referred to above, the corresponding measurements expressing association between these constants and either rainfall or relative humidity are of a definitely lower order, with the exception of the slightly higher negative values for *N. fasciatus* and humidity.

ENVIRONMENTAL FACTORS IN PARASITIZATION

It has been conventional practice for many years to consider data gathered in rodent ectoparasite surveys by zones into which the city surveyed was divided. In recent years some workers have discarded such a classification and have stressed the role played by the location of the trapping point with reference to the interior and exterior of buildings. Both of the foregoing classifications are utilized in our analysis. Finally, in view of epidemiologic evidence incriminating food establishments as the principal foci of typhus infection, a grouping of premises has been made according to their use, or type of enterprise carried on therein.

The city has been divided into three zones, whose boundaries are shown on the map (fig. 2). Because of the small number of rodents obtained on the docks, the latter have been combined with the water front. The commercial zone includes all city blocks in the principal business area which are predominantly commercial in character on at least one side of the square. This zone thus inevitably includes a considerable number of residential premises located on the fringe of the business district. The residential zone consists of the remainder of the city and embraces isolated or neighborhood business premises.

Premises have been divided according to type into three groups: food establishments, other businesses, and residences. Food establishments include restaurants, groceries, feed warehouses, abattoirs, and docks shipping food commodities. In the case of premises with varied multiple listing, preference was given to (1) food, (2) other business, and (3) residential classification, in that order. Separate premises were denoted by individual addresses.

From table 6 it will be noted that the indices and infestation percentages of *X. cheopis* and *L. hawaiiensis* are somewhat higher in the commercial zone than in the residential zone and considerably

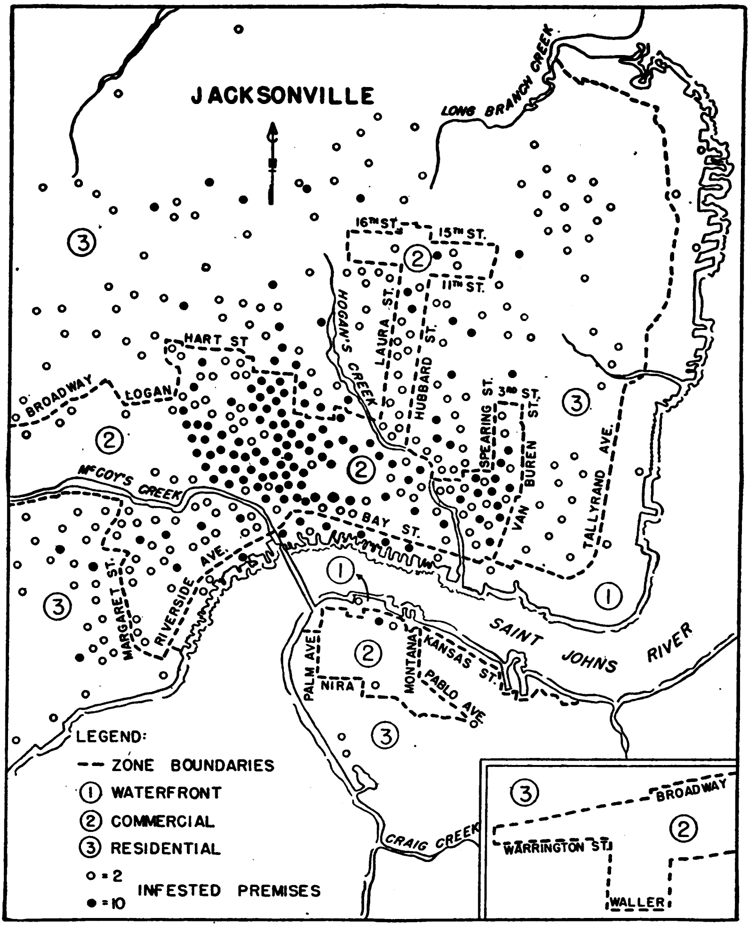

FIGURE 2.—Map of Jacksonville, showing zone boundaries and locations of infested premises.

TABLE 6.—*Annual means, indices, and infestations,* X. cheopis *and* L. hawaiiensis, *by zone, trap location, and type of premises*

	Adjusted net number of rodents examined	*Xenopsylla cheopis*				*Laelaps hawaiiensis*			
		Number	Mean	Index	Infestation percent	Number in 10-percent sample	Mean	Index	Infestation percent
Zone:									
Water-front	353	945	2.64	2.64	58.67	23	0.45	0.45	19.86
Commercial	3,258	13,447	4.13	4.06	74.60	1,720	3.96	2.98	45.18
Residential	1,052	3,201	3.14	3.14	66.79	271	2.17	1.98	31.09
Location of trap:									
Indoors	4,080	15,840	3.92	3.86	72.77	1,767	3.65	2.70	41.15
Outdoors	583	1,753	3.43	3.43	66.74	247	3.08	3.08	32.85
Type of premises:									
Food establishment	2,619	9,241	3.78	3.73	71.03	873	3.87	3.16	43.51
Other business	541	2,160	4.08	3.90	72.66	604	6.23	4.25	54.70
Residence	1,503	6,192	3.75	3.74	71.88	537	2.30	1.79	32.77

higher in the commercial over the water-front zone. "Student's" *t*-test applied to these differences discloses statistical significance only in the latter difference.[4] No significant differences by zone occur in the case of *N. fasciatus*, *L. segnis*, and *P. spinulosa*. *E. gallinacea* displays significantly higher values in the commercial and residential zones over the water-front zone[5], but no significant differences between residential and commercial zones.

TABLE 6A.—*Annual means and infestations*, N. fasciatus, L. segnis, E. gallinacea, *and* P. spinulosa, *by zone, trap location, and type of premises*

	Nosopsyllus fasciatus			*Leptopsylla segnis*			*Echidnophaga gallinacea*			*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	85	0.17	7.66	944	1.60	30.99	48	0.13	6.09	35	0.63	35.67
Commercial	355	.10	5.96	3,668	.98	27.15	4,245	1.17	20.42	659	1.74	40.27
Residential	152	.13	6.21	1,116	1.00	25.68	1,696	1.46	22.99	261	1.82	34.48
Location:												
Indoors	449	.10	5.53	5,007	1.00	26.60	4,240	.98	17.93	843	1.76	39.95
Outdoors	143	.24	10.00	721	1.32	31.18	1,749	3.03	27.43	112	1.52	35.30
Premises:												
Food establishment	308	.09	5.07	3,534	.90	23.74	2,577	.79	15.11	616	2.14	42.95
Other business	81	.13	6.87	696	1.10	31.13	493	.84	17.23	77	.80	24.22
Residence	203	.18	8.22	1,498	1.35	33.04	2,919	1.93	25.51	262	1.32	43.46

Considered by trap location, significant differences do not exist between indoors and outdoors for *X. cheopis*, *L. hawaiiensis*, *L. segnis*, or *P. spinulosa*, but occur in the case of *N. fasciatus*[6] and *E. gallinacea*,[7] both of the last-mentioned having higher values in outdoor samples.

The type of premises does not seem to be associated with any verifiable consistently significant differences in statistical constants representing ectoparasites. Hence the high risk of infection assigned to food establishments by epidemiologic evidence must seek explanation on some other basis than that of higher flea counts or infestation. Such an explanation is furnished by table 7, which shows that the average rat yield per infested food establishment is more than double that for other business or residential premises. This ratio holds good irrespective of zone.

INTERRELATIONSHIP OF BIOMETRIC CONSTANTS

It will have been noted that throughout the preceding consideration of the influences of various meteorologic and physical environmental factors on specific ectoparasites, a marked parallelism exists between the index and infestation values. This is indicated by the

[4] Values of P: *X cheopis*—index=0.001, infestation=0.002, *L. hawaiiensis*—index=0.008, infestation=0.016.
[5] P=0.002—<0.001.
[6] P=0.049, 0.026.
[7] P=0.006, 0.003.

TABLE 7.—*Live rat yield per premises by zone and type of premises*

	Type of premises			
	All	Food establishment	Other business	Residence
Number of premises yielding live rats:				
Entire city	1,827	613	274	940
Water-front zone	92	63	19	10
Commercial zone	1,190	407	210	573
Residential zone	545	143	45	357
Number of live rats obtained:				
Entire city	5,245	2,878	603	1,764
Water-front zone	400	335	43	22
Commercial zone	3,578	2,002	479	1,097
Residential zone	1,267	541	81	645
Average yield per infested premises:				
Entire city	2.9	4.7	2.2	1.9
Water-front zone	4.3	5.3	2.3	2.2
Commercial zone	3.0	4.9	2.3	1.9
Residential zone	2.3	3.8	1.8	1.8

values of the correlation coefficient *r* for index and infestation, as follows: *X. cheopis*, 0.904±0.061; *L. hawaiiensis*, 0.942±0.038. This condition holds good also for the mean and infestation in those instances where the mean does not deviate excessively from the median, as shown by the following values of *r* for mean and infestation: *N. fasciatus*, 0.956±0.029; *L. segnis*, 0.952±0.031.

Reference has been made to arguments for the superiority of the infestation rate over the mean as a measure of ectoparasite prevalence. However, in several instances in the Jacksonville material where the measurements of statistical significance were of border-line dimensions, one of these two constants—sometimes one, sometimes the other—was below the conventionally accepted level of significance, while the other was definitely above that level. Placing reliance in such cases upon only one of the values can lead to disputable conclusions. It is therefore our opinion that in the present state of our knowledge the use of both the mean and the infestation rate is preferable to the use of either one alone, and furthermore, that in asymmetrical frequency distributions containing atypical high ectoparasite counts, the mean should be adjusted toward the median by an appropriate precision mathematical procedure. It must be borne in mind that, after all, the ultimate purpose of these constants is the very practical one of measuring the infectibility of communities and evaluating the roles of several vectors of disease. Hence it would seem that a valid appraisal of the relative utility of the constants can only be made in the light of their correlation with the actual incidence of human plague or typhus. A forthcoming report will include a quantitative study of these relationships and an assay of their significance in the epidemiology of these diseases.

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DEATHS DURING WEEK ENDED JULY 7, 1945

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

	Week ended July 7, 1945	Corresponding week, 1944
Data for 90 large cities of the United States:		
Total deaths	8, 536	7, 777
Average for 3 prior years	7, 761	
Total deaths, first 27 weeks of year	249, 558	253, 098
Deaths under 1 year of age	566	514
Average for 3 prior years	565	
Deaths under 1 year of age, first 27 weeks of year	16, 346	16, 618
Data from industrial insurance companies:		
Policies in force	67, 372, 672	66, 653, 220
Number of death claims	10, 353	10, 036
Death claims per 1,000 policies in force, annual rate	8. 0	7. 9
Death claims per 1,000 policies, first 27 weeks of year, annual rate	10. 8	10. 4

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 JULY 14, 1945

Summary

A total of 254 cases of poliomyelitis was reported for the current week, as compared with 154 last week, 462 for the corresponding week last year, and a 5-year (1940–44) median of 180. Approximately 69 percent of the current total increase was accounted for by the increases in 7 States which reported more than 8 cases each and a total of 167 cases. These States are as follows (last week's figures in parentheses): New York 29 (21), New Jersey 23 (10), Ohio 10 (5), South Carolina 11 (6), Tennessee 27 (18), Texas 45 (21), California 22 (18).

The total cases reported since March 17, the date of lowest weekly incidence this year, is 1,281, as compared with 1,489 and 1,324 for the respective periods of 1944 and 1943. The total for the year to date is 1,678, as compared with 974 for the 5-year median, and 1,752 for the same period last year. For the first time this year the cumulative total is below that for the corresponding period last year.

Of the total of 128 cases of meningococcus meningitis reported, as compared with 109 last week and a 5-year median of 63, 18 occurred in New York, 12 in California, 9 in Texas, and 8 in Michigan. The cumulative figure is 5,655, as compared with 12,232 for the corresponding period last year and a 5-year median of 2,143.

Of the total of 35 cases of Rocky Mountain spotted fever reported for the week, 29 occurred in States east of the Mississippi River (16 in Virginia). The total to date is 204, as compared with 237 for the corresponding period last year.

A total of 8,174 deaths was recorded during the week in 93 large cities of the United States, as compared with 8,637 last week, 8,845 for the corresponding week last year, and a 3-year (1942–44) average of 8,340. The total to date is 260,122, as compared with 264,129 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended July 14, 1945, and comparison with corresponding week of 1944, 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			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1940–44	Week ended—		Median 1940–44	Week ended—		Median 1940–44	Week ended—		Median 1940–44
	July 14, 1945	July 15, 1944		July 14, 1945	July 15, 1944		July 14, 1945	July 15, 1944		July 14, 1945	July 15, 1944	
NEW ENGLAND												
Maine	0	0	0	------	1	------	1	14	87	1	1	1
New Hampshire	0	0	0	------	------	------	1	2	3	0	0	0
Vermont	0	0	0	------	------	------	18	11	37	0	0	0
Massachusetts	2	5	4	------	------	------	188	227	328	1	8	4
Rhode Island	0	0	0	25	7	------	0	7	38	0	1	1
Connecticut	1	1	1	1	2	1	41	52	66	2	2	2
MIDDLE ATLANTIC												
New York	8	7	9	[1] 1	(1)	[1] 3	84	485	681	18	25	9
New Jersey	4	3	5	2	------	1	34	167	500	3	9	3
Pennsylvania	6	9	9	------	------	------	181	111	211	3	15	6
EAST NORTH CENTRAL												
Ohio	4	5	5	3	2	2	33	38	64	7	7	1
Indiana	6	3	2	3	13	4	18	4	16	3	4	1
Illinois	5	6	12	1	------	2	304	60	228	4	15	1
Michigan [2]	13	7	3	1	------	1	195	146	370	8	9	1
Wisconsin	6	2	1	1	3	9	61	235	593	3	8	2
WEST NORTH CENTRAL												
Minnesota	2	1	1	------	------	------	5	52	52	4	2	0
Iowa	1	2	1	------	------	------	28	14	39	0	2	1
Missouri	4	2	1	3	------	------	24	14	31	2	10	7
North Dakota	1	4	3	------	1	------	1	2	8	0	0	0
South Dakota	1	0	0	------	------	------	5	33	8	1	0	0
Nebraska	3	1	1	2	3	------	7	14	13	1	3	0
Kansas	14	1	2	------	------	------	20	27	53	2	1	1
SOUTH ATLANTIC												
Delaware	0	0	0	------	------	------	0	0	1	0	1	0
Maryland [2]	4	1	1	1	------	1	8	31	40	2	7	2
District of Columbia	0	0	1	1	------	------	1	24	24	1	2	1
Virginia	2	0	2	38	44	42	6	57	57	3	10	2
West Virginia	3	0	2	32	------	1	0	19	23	4	3	1
North Carolina	9	4	4	------	1	------	17	69	61	0	4	1
South Carolina	4	1	3	49	68	105	12	33	10	2	4	1
Georgia	4	5	3	4	4	7	0	4	20	0	0	0
Florida	3	7	3	------	------	4	1	41	16	3	3	1
EAST SOUTH CENTRAL												
Kentucky	4	1	1	------	------	------	20	16	16	5	4	3
Tennessee	2	3	2	5	8	8	7	11	25	2	2	2
Alabama	3	5	5	6	5	5	2	6	30	7	5	2
Mississippi [2]	7	4	4	------	------	------	------	------	------	3	4	2
WEST SOUTH CENTRAL												
Arkansas	4	4	3	3	18	2	15	38	16	2	2	1
Louisiana	10	2	2	4	2	4	[3] 9	9	9	4	3	1
Oklahoma	0	1	3	7	5	7	8	15	10	1	0	0
Texas	44	24	13	391	203	203	135	237	118	9	4	3
MOUNTAIN												
Montana	2	1	0	1	------	------	4	4	22	0	1	0
Idaho	1	0	1	10	------	------	19	2	3	1	1	0
Wyoming	1	0	0	------	------	------	1	9	12	0	0	0
Colorado	6	4	4	21	4	4	7	27	32	0	3	0
New Mexico	0	0	0	------	------	------	3	4	4	0	0	0
Arizona	2	3	0	14	16	24	8	9	37	1	0	0
Utah [2]	2	0	0	------	1	------	110	21	21	0	0	0
Nevada	0	0	0	------	------	------	0	5	5	0	0	0
PACIFIC												
Washington	3	0	0	------	1	------	92	49	49	2	2	0
Oregon	4	0	2	1	2	4	26	36	36	1	1	0
California	18	22	12	6	7	19	373	641	324	12	17	2
Total	223	151	151	637	421	431	2,133	3,132	4,840	128	205	63
28 weeks	7,119	5,867	6,628	67,692	336,447	167,313	[3] 95,548	583,980	523,593	5,655	12,232	2,143

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Correction: Louisiana, week ended June 23, measles 10 (instead of 60).

Telegraphic morbidity reports from State health officers for the week ended July 7, 1945, and comparison with corresponding week of 1944, and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [4]		
	Week ended—		Median 1940–44	Week ended—		Median 1940–44	Week ended—		Median 1940–44	Week ended—		Median 1940–44
	July 14, 1945	July 15, 1944		July 14, 1945	July 15, 1944		July 14, 1945	July 15, 1944		July 14, 1945	July 15, 1944	
NEW ENGLAND												
Maine	1	1	1	11	10	3	0	0	0	0	0	1
New Hampshire	0	3	0	2	0	1	0	0	0	0	0	0
Vermont	1	0	0	4	3	3	0	0	0	0	0	0
Massachusetts	2	2	0	60	84	84	0	0	0	2	3	3
Rhode Island	0	0	0	6	2	2	0	0	0	0	0	1
Connecticut	4	2	2	4	12	12	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	29	93	3	122	116	113	0	0	0	7	7	7
New Jersey	23	1	0	23	36	36	0	0	0	1	2	2
Pennsylvania	4	31	3	63	73	73	0	0	0	8	5	9
EAST NORTH CENTRAL												
Ohio	10	16	3	57	64	57	0	1	0	8	3	6
Indiana	1	13	3	29	14	14	1	0	0	2	7	7
Illinois	4	16	6	82	49	71	2	0	0	3	2	5
Michigan [2]	1	10	4	117	46	46	1	2	1	11	4	5
Wisconsin	1	3	0	40	31	37	0	0	0	0	1	1
WEST NORTH CENTRAL												
Minnesota	0	1	1	29	17	20	0	0	0	0	1	1
Iowa	1	2	2	15	9	10	0	0	0	0	2	1
Missouri	1	1	1	16	6	11	1	0	0	0	4	6
North Dakota	0	1	0	8	5	3	0	0	0	0	0	1
South Dakota	0	0	0	1	7	5	0	0	2	0	0	0
Nebraska	0	0	0	18	3	3	0	0	0	0	0	0
Kansas	5	3	3	21	13	19	0	0	0	0	1	1
SOUTH ATLANTIC												
Delaware	1	0	0	4	1	3	0	0	0	0	0	0
Maryland [2]	3	0	0	19	30	14	0	0	0	2	3	4
District of Columbia	6	0	0	7	12	8	0	0	0	0	2	1
Virginia	7	39	1	19	5	8	0	0	0	3	6	7
West Virginia	3	3	0	9	15	15	0	0	0	4	2	5
North Carolina	2	62	1	7	17	16	0	0	0	[5] 3	7	7
South Carolina	11	5	3	4	2	2	0	0	0	9	6	8
Georgia	8	9	2	8	7	4	0	0	0	4	6	15
Florida	1	7	2	2	3	2	0	0	0	4	4	4
EAST SOUTH CENTRAL												
Kentucky	0	66	10	12	7	14	0	0	0	3	7	10
Tennessee	27	7	5	16	12	12	0	0	0	5	6	11
Alabama	6	8	5	11	2	8	0	0	0	5	8	7
Mississippi [2]	2	10	2	11	2	2	0	0	0	2	1	7
WEST SOUTH CENTRAL												
Arkansas	3	2	2	9	1	3	1	0	0	6	6	14
Louisiana	1	11	1	7	3	4	0	0	0	6	17	12
Oklahoma	8	1	1	7	1	3	0	1	0	1	3	8
Texas	45	13	7	32	25	14	0	0	0	22	14	27
MOUNTAIN												
Montana	0	0	0	5	7	7	0	0	0	2	0	0
Idaho	1	0	0	2	6	2	0	0	0	1	0	1
Wyoming	1	0	0	2	4	4	0	0	0	0	0	0
Colorado	1	2	0	11	21	16	0	0	0	1	0	1
New Mexico	0	0	1	2	12	3	0	0	0	0	3	1
Arizona	0	0	0	5	3	1	0	0	0	1	0	1
Utah [2]	0	0	0	6	7	5	0	0	0	2	0	0
Nevada	0	0	0	0	1	0	0	0	0	0	0	0
PACIFIC												
Washington	5	2	2	16	41	14	0	1	1	0	0	1
Oregon	2	4	1	9	14	6	0	0	0	2	1	0
California	22	12	12	131	114	58	0	0	0	3	4	4
Total	254	462	180	1,101	975	884	6	5	16	133	148	238
28 weeks	1,678	1,752	974	130,156	143,757	93,978	254	278	593	[5] 2,004	2,401	2,847

[2] Period ended earlier than Saturday.
[4] Including paratyphoid fever reported separately as follows: Massachusetts 2; New York 3; Michigan 7; South Carolina 1; Georgia 1; Florida 1; Arkansas 1; Louisiana 1; Texas 5; Montana 1.
[5] Correction: North Carolina, week ended June 23, typhoid fever 0 (instead of 1).

Telegraphic morbidity reports from State health officers for the week ended July 14, 1945, and comparison with corresponding week of 1944 and 5-year median—Con.

Division and State	Whooping cough: Week ended— July 14, 1945	Whooping cough: Week ended— July 15, 1944	Whooping cough: Median 1940–44	Week ended July 14, 1945: Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Rocky Mt. spotted fever	Tularemia	Typhus fever, endemic	Undulant fever
NEW ENGLAND											
Maine	50	30	21	0	0	0	0	0	0	0	0
New Hampshire	6	0	1	0	0	0	0	0	0	0	0
Vermont	27	51	16	0	0	0	0	0	0	0	3
Massachusetts	117	73	105	1	0	0	0	0	0	0	0
Rhode Island	19	5	6	0	0	0	1	0	0	0	0
Connecticut	28	49	49	0	0	0	0	0	0	0	3
MIDDLE ATLANTIC											
New York	327	136	265	3	5	0	1	2	0	1	
New Jersey	221	65	142	2	0	0	1	1	0	0	0
Pennsylvania	244	90	265	1	0	0	0	0	0	0	0
EAST NORTH CENTRAL											
Ohio	155	136	224	0	0	0	0	0	0	0	1
Indiana	46	21	30	0	0	0	0	0	0	0	0
Illinois	128	88	157	1	0	0	0	0	1	0	11
Michigan [3]	75	90	250	1	1	0	0	0	0	0	8
Wisconsin	49	88	168	0	0	0	0	0	0	0	3
WEST NORTH CENTRAL											
Minnesota	9	20	64	0	0	1	0	0	0	0	2
Iowa	4	7	44	0	0	0	0	0	0	0	3
Missouri	33	29	33	0	0	0	0	0	0	0	0
North Dakota	0	16	16	0	0	0	0	0	0	0	0
South Dakota	0	22	6	0	0	0	0	0	0	0	1
Nebraska	2	27	24	0	0	0	0	0	0	0	0
Kansas	36	48	63	0	0	0	0	0	0	0	3
SOUTH ATLANTIC											
Delaware	0	0	2	0	0	0	0	1	0	0	0
Maryland [3]	70	98	98	0	0	2	0	1	0	0	0
District of Columbia	12	5	13	0	0	0	0	0	0	0	0
Virginia	115	50	50	1	132	0	0	16	1	0	1
West Virginia	45	10	38	0	0	0	0	0	0	0	0
North Carolina	207	213	213	1	0	0	0	3	0	4	0
South Carolina	66	88	88	0	45	0	0	0	0	2	0
Georgia	15	15	20	1	5	0	0	4	0	31	2
Florida	1	31	13	0	0	2	0	0	0	12	0
EAST SOUTH CENTRAL											
Kentucky	59	17	64	0	2	0	0	1	1	0	0
Tennessee	45	37	48	0	0	6	0	0	0	0	0
Alabama	14	31	31	0	0	0	0	0	0	11	3
Mississippi [3]	------	------	--------	0	0	0	0	0	2	2	4
WEST SOUTH CENTRAL											
Arkansas	18	20	25	11	1	0	0	0	6	0	5
Louisiana	0	0	12	2	0	0	0	0	2	15	2
Oklahoma	21	12	19	0	0	0	0	0	0	0	0
Texas	258	253	210	18	551	10	0	0	1	46	19
MOUNTAIN											
Montana	14	5	10	0	1	0	0	0	0	0	0
Idaho	15	4	14	0	0	0	0	2	0	0	0
Wyoming	1	4	4	0	0	0	0	0	0	0	1
Colorado	44	23	35	0	0	0	0	1	0	0	2
New Mexico	5	2	15	0	0	0	0	0	0	0	0
Arizona	14	14	14	0	0	7	1	0	0	0	0
Utah [3]	35	60	79	0	0	0	0	2	1	0	5
Nevada	0	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	20	17	65	0	0	0	0	0	0	0	0
Oregon	22	9	27	0	0	0	0	1	0	0	1
California	231	94	195	0	1	0	5	0	2	0	4
Total	2,923	2,203	3,699	43	744	28	9	35	17	124	96
Same week, 1944	2,203	------	--------	25	1,001	358	11	32	15	141	63
Average, 1942–44	3,362	------	--------	32	652	402	14	[6] 18	20	[6] 58	-------
28 weeks: 1945	70,351	------	--------	926	12,985	3,543	193	204	440	1,822	2,606
1944	51,879	------	--------	851	10,633	3,603	308	237	330	1,643	1,926
Average, 1942–44	90,497	------	[6] 105,735	816	7,394	2,961	292	[6] 237	467	[6] 1,130	-------

[3] Period ended earlier than Saturday.
[6] 5-year median, 1940–44.

Anthrax: Louisiana 1 case. *Psittacosis:* Delaware 1 case.

WEEKLY REPORTS FROM CITIES

City reports for week ended July 7, 1945

This table lists the reports from 88 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	1	0	3	0	1	0	0	0
New Hampshire:												
Concord	0	0	------	0	0	0	1	0	0	0	0	0
Vermont:												
Barre	0	0	------	0	14	0	0	0	1	0	0	0
Massachusetts:												
Boston	0	0	------	0	64	0	11	0	20	0	0	20
Fall River	0	0	------	0	0	0	0	0	1	0	0	0
Springfield	0	0	------	0	0	0	0	0	5	0	0	4
Worcester	0	0	------	0	29	0	6	0	1	0	0	1
Rhode Island:												
Providence	1	0	------	0	0	0	4	0	0	0	0	6
Connecticut:												
Bridgeport	0	0	------	0	0	0	0	1	0	0	0	0
Hartford	1	0	------	0	5	0	1	0	0	0	0	0
New Haven	0	0	------	0	0	0	0	2	0	0	0	5
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	2	0	8	3	1	0	0	0
New York	9	0	4	0	54	6	0	6	66	0	2	101
Rochester	1	0	------	0	1	0	0	1	5	0	0	7
Syracuse	0	0	------	0	0	0	1	0	0	0	0	48
New Jersey:												
Camden	0	0	------	0	21	0	1	0	0	0	0	5
Newark	0	0	------	0	5	0	5	1	3	0	0	18
Trenton	0	0	------	0	1	0	1	0	0	0	0	0
Pennsylvania:												
Philadelphia	1	0	1	1	169	3	16	0	14	0	2	86
Pittsburgh	0	0	------	0	0	0	6	0	8	0	0	8
Reading	0	0	------	1	0	0	0	0	5	0	0	1
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	0	0	------	0	6	0	4	5	5	0	0	18
Cleveland	0	0	1	1	7	6	1	3	10	0	0	26
Columbus	0	0	1	1	0	0	0	0	3	0	0	3
Indiana:												
Fort Wayne	0	0	------	0	0	0	1	0	0	0	0	0
Indianapolis	1	0	------	0	7	0	4	0	2	0	0	5
South Bend	0	0	------	0	1	0	0	0	3	0	0	2
Terre Haute	0	0	------	0	0	0	2	0	0	0	0	4
Illinois:												
Chicago	2	0	------	1	164	7	16	1	33	0	1	33
Springfield	0	0	------	0	0	0	3	0	0	0	0	0
Michigan:												
Detroit	4	1	1	0	81	3	8	0	23	0	1	16
Flint	0	0	------	0	4	0	0	0	1	0	0	0
Grand Rapids	0	0	------	0	0	0	0	0	1	0	0	3
Wisconsin:												
Kenosha	0	0	------	0	3	1	0	0	1	0	0	4
Milwaukee	0	0	------	0	11	0	0	0	11	0	0	3
Racine	0	0	------	0	0	0	2	0	0	0	0	8
Superior	0	0	------	0	4	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	2	1	1	0	2	0	0	0
Minneapolis	1	0	------	0	0	0	1	0	7	0	0	0
St. Paul	2	0	------	1	2	0	0	0	3	0	1	0
Missouri:												
Kansas City	0	0	------	0	10	0	3	0	4	0	0	1
St. Joseph	0	0	------	0	0	0	0	0	0	0	0	0
St. Louis	0	0	4	0	4	1	7	0	3	0	0	19

City reports for week ended July 7, 1945—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
WEST NORTH CENTRAL—continued												
North Dakota:												
Fargo	0	0	------	0	0	0	1	0	0	0	0	1
Nebraska:												
Omaha	0	0	------	0	2	0	2	0	9	0	0	2
Kansas:												
Topeka	0	0	------	0	0	0	0	0	4	0	0	0
Wichita	0	0	------	0	3	1	3	0	1	0	0	3
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	1	0	2	1	0	0	0	0
Maryland:												
Baltimore	3	0	1	1	6	0	10	2	9	0	0	46
Cumberland	0	0	------	0	0	0	0	0	1	0	0	0
Frederick	0	0	------	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	0	0	------	0	1	3	11	0	10	0	0	12
Virginia:												
Lynchburg	0	0	------	0	0	0	0	0	1	0	0	0
Richmond	0	0	------	0	0	0	0	1	3	0	2	4
Roanoke	0	0	------	0	1	0	0	0	0	0	0	0
West Virginia:												
Charleston	0	0	------	0	0	0	0	0	0	0	0	0
Wheeling	0	0	------	0	1	0	0	0	0	0	1	0
North Carolina:												
Raleigh	0	0	------	0	2	0	1	0	0	0	0	8
Wilmington	0	0	------	0	0	0	0	0	1	0	0	14
Winston-Salem	0	0	------	0	0	0	0	0	5	0	0	13
South Carolina:												
Charleston	0	0	------	0	0	1	0	0	1	0	1	0
Georgia:												
Atlanta	1	0	------	0	0	0	3	3	2	0	0	3
Brunswick	0	0	------	0	0	0	0	0	0	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	------	0	3	0	3	0	2	0	0	2
Nashville	0	0	------	1	1	0	2	0	1	0	0	0
Alabama:												
Birmingham	0	0	------	0	0	0	3	3	0	0	1	1
Mobile	0	0	------	1	0	0	1	0	2	0	0	3
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	0	0	1	1	1	0	0	0
Louisiana:												
New Orleans	2	0	2	0	13	2	2	2	1	0	1	0
Shreveport	1	0	------	0	0	0	2	2	1	0	0	0
Texas:												
Dallas	2	0	------	0	1	0	2	4	3	0	0	5
Galveston	0	0	------	0	0	0	0	1	1	0	0	0
Houston	2	0	------	0	0	1	1	2	1	0	0	1
San Antonio	2	0	------	0	0	0	3	0	0	0	0	0
MOUNTAIN												
Montana:												
Billings	0	0	------	0	0	0	0	0	0	0	0	0
Great Falls	0	0	------	0	1	0	0	0	0	0	0	0
Helena	0	0	------	0	0	0	0	0	0	0	0	0
Missoula	0	0	------	0	0	0	0	0	0	0	0	0
Idaho:												
Boise	0	0	------	0	0	0	0	0	0	0	0	0
Colorado:												
Denver	1	0	2	0	3	0	4	0	6	0	0	11
Pueblo	0	0	------	0	0	0	0	0	0	0	0	4
Utah:												
Salt Lake City	0	0	------	0	21	0	1	0	1	0	0	11

City reports for week ended July 7, 1945—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	1	0	------	0	35	0	5	0	4	0	0	4
Spokane	3	0	------	0	6	0	1	1	1	0	0	0
Tacoma	0	0	------	0	24	0	0	0	1	0	0	0
California:												
Los Angeles	1	0	7	0	54	3	0	1	17	0	1	31
Sacramento	1	0	------	0	2	0	1	0	9	0	0	0
San Francisco	0	0	1	0	77	2	5	0	11	0	0	10
Total	43	1	25	9	930	41	187	47	353	0	14	644
Corresponding week, 1944	41	------	10	6	920	------	212	------	367	0	22	490
Average, 1940–44	46	------	25	[1] 9	[2] 1,938	------	[1] 249	------	419	0	25	1,054

[1] 3-year average, 1942–44.
[2] 5-year median, 1940–44.

Dysentery, amebic.—Cases: Newark, 1; Detroit, 1; Nashville, 1.
Dysentery, bacillary.—Cases: New York, 1; Detroit, 1, St. Louis, 2; Charleston, S. C., 18; Nashville, 1; Los Angeles, 4.
Dysentery, unspecified.—Cases: Cincinnati, 34.
Rocky Mountain spotted fever.—Cases: Trenton, 1.
Tularemia.—Cases: New Orleans, 1.
Endemic typhus fever.—Cases: Atlanta, 1; Birmingham, 3; Mobile, 1; New Orleans, 1; Shreveport, 2; Dallas, 1; Houston, 1; San Antonio, 1; Winston-Salem, 1.

Rates (annual basis) per 100,000 population, by geographic groups, for the 88 cities in the preceding table (estimated population), 1943, 34,156,200

	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	5.2	0.0	0.0	0.0	295	0.0	68.0	7.8	76	0.0	0.0	94
Middle Atlantic	5.1	0.0	2.3	0.9	117	4.2	17.6	5.1	47	0.0	1.9	127
East North Central	4.3	0.6	1.8	1.8	175	10.3	24.9	5.5	57	0.0	1.2	76
West North Central	6.0	0.0	8.0	2.0	46	6.0	35.8	0.0	66	0.0	2.0	52
South Atlantic	7.1	0.0	1.8	1.8	21	7.1	47.7	12.4	58	0.0	7.1	177
East South Central	0.0	0.0	0.0	11.8	24	0.0	53.1	17.7	30	0.0	5.9	35
West South Central	25.8	0.0	5.7	0.0	40	8.6	31.6	34.4	23	0.0	2.9	17
Mountain	7.9	0.0	15.9	0.0	199	0.0	39.7	0.0	56	0.0	0.0	207
Pacific	9.5	0.0	12.7	0.0	313	7.9	19.0	3.2	68	0.0	1.6	71
Total	6.6	0.2	3.8	1.3	142	6.3	28.6	7.2	54	0.0	2.1	99

PLAGUE INFECTION IN SAN BENITO COUNTY, CALIF.

Plague infection has been reported proved, on July 5, in a pool of 200 fleas from 57 ground squirrels, *C. beecheyi*, the same from which fleas were also proved plague-infected on June 22, shot 7 miles east and 3 miles south of Tres Pinos, San Benito County, Calif.; also, on July 5, in a pool of 204 fleas from 59 ground squirrels, *C. beecheyi*, shot on a ranch 5 miles east of Tres Pinos.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended June 23, 1945.—During the week ended June 23, 1945, 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		71	1	152	382	79	38	107	92	922
Diphtheria		2	2	15	3	2				24
Dysentery: bacillary				5						5
German measles		29		6	134	3	2	45	19	229
Influenza		8			36				7	51
Measles		11	2	92	137	17	28	123	219	629
Meningitis, meningococcus					3		2	1		6
Mumps		3		87	91	45	31	94	26	377
Poliomyelitis		1						1		2
Scarlet fever		1	8	49	50	9	4	25	24	170
Tuberculosis (all forms)		4	2	101	13	21	17	10	57	225
Typhoid and paratyphoid fever				17	1					18
Undulant fever				3						3
Venereal diseases:										
Gonorrhea		19	5	137	141	37	36	25	71	471
Syphilis		20		114	71	3	9	6	30	253
Whooping cough		4		58	28		1	19	9	119

JAMAICA

Notifiable diseases—4 weeks ended June 30, 1945.—During the 4 weeks ended June 30, 1945, cases of certain notifiable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox	15	37	Leprosy		2
Diphtheria	1	6	Tuberculosis (pulmonary)	16	58
Dysentery (unspecified)	8	5	Typhoid fever	7	101
Erysipelas	4		Typhus fever	2	2

NEW ZEALAND

Notifiable diseases—4 weeks ended June 16, 1945.—During the 4 weeks ended June 16, 1945, certain notifiable diseases were reported in New Zealand as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cerebrospinal meningitis	8		Poliomyelitis	2	
Dengue	1		Puerperal fever	8	
Diphtheria	160	5	Scarlet fever	561	2
Dysentery:			Tetanus	2	
Amebic	6		Trachoma	2	
Bacillary	20		Tuberculosis (all forms)	185	37
Erysipelas	32	1	Typhoid fever	2	
Malaria	14		Undulant fever	1	

PERU

Notifiable diseases—Year 1944.—During the year 1944, cases of certain notifiable diseases were reported in Peru as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	40	Recurrent fever	132
Diphtheria	1,021	Scarlet fever	500
Dysentery, unspecified	7,047	Smallpox	296
Encephalitis	18	Syphilis	5,738
Gonorrhea	8,129	Tuberculosis	18,054
Influenza	28,537	Typhoid fever	3,067
Leprosy	138	Typhus fever	1,466
Malaria	95,349	Undulant fever	866
Measles	5,895	Veruga peruana	853
Plague	83	Whooping cough	25,678
Poliomyelitis	45		

NOTE.—For reports for the years 1939–43 see page 1074 of the PUBLIC HEALTH REPORTS of Aug. 11, 1944.

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 the current year. 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—Szechwan Province.—For the period June 5–25, 1945, cholera was reported in Szechwan Province, China, as follows: Chungking municipality, 8,000 cases, 114 deaths; Nekiang, 200 cases, 122 deaths; Pishan, 40 cases, 5 deaths.

Plague

Argentina.—During the month of May 1945, 1 death from plague was reported in Campo Verde, Santiago del Estero Province, Argentina. For the same period plague infection was reported in 2 rats found in Port Quequen, Buenos Aires Province.

Egypt.—For the week ended June 9, 1945, 16 cases of plague with 2 deaths were reported in all of Egypt. For the week ended June 30, 1945, 12 cases of plague with 4 deaths were reported in Port Said, Egypt.

Typhus Fever

Algeria.—For the period June 1–10, 1945, 51 cases of typhus fever, including 15 cases in Algiers and 27 cases in Tenez, were reported in Algeria.

Bolivia.—For the month of May 1945, 61 cases of typhus fever with 17 deaths were reported in Bolivia. Departments reporting the highest incidence are as follows: La Paz, 23 cases, 11 deaths; Oruro, 15 cases, 3 deaths; Potosi, 14 cases, 1 death.

Chile.—For the period April 22 to May 19, 1945, 59 cases of typhus fever with 4 deaths were reported in Chile. Provinces reporting the highest incidence are as follows: Osorno, 17 cases; Concepcion, 12 cases.

Egypt.—For the week ended June 9, 1945, 476 cases of typhus fever with 58 deaths were reported in Egypt.

Union of South Africa.—For the month of March 1945, 106 cases of typhus fever with 10 deaths were reported in 9 inland districts of the Union of South Africa.

Yellow Fever

Brazil.—Deaths from yellow fever have been reported in Brazil as follows: Goiaz State—Rio Verde, May 1, 1; Minas Geraes State—Campina Verde, May 21–23, 2, Frutal, May 8, 1, Ituiutaba, April 23, 1, Paracatu, April 27, 1, Pirajuba, May 3, 1, Santa Vitoria, April 22, 1, Sao Francisco de Sales, April 16, 1.

Venezuela.—In the municipality of La Grita, Jauregui district, Tachira State, Venezuela, 3 fatal cases of yellow fever (confirmed by viscerotomy) were reported near the following villages: El Carmen, June 19, 1, Morotuto, June 20, 1, Omuquena, June 17, 1. A report dated July 13, 1945, states that 1 confirmed case of yellow fever was reported in the municipality of La Libertad, Perija district, Zulia State, Venezuela.

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