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BACILLUS PSITTACOSIS Nocard, 1893

Failure to find it in the 1929–30 Epidemic in the United States[1]

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The recent invasion of psittacosis into the United States and other countries has aroused new interest in "*B. psittacosis,*" that member of the *Salmonella* group of bacteria which was found by Nocard (1) in the marrow of parrot wings in 1892, and shown by him to be lethal for birds and other laboratory animals when injected.

This organism has been isolated from sick or dead parrots by several investigators. It has not been found with regularity, however, and the only record of its having been isolated from a human case of psittacosis seems to be the report of Gilbert and Fournier (2), who found it both in the blood of their patient at autopsy and in the parrot with which the patient was associated.

Sicard (3) found Nocard's *B. psittacosis* in the blood and bone marrow of a parrot that was associated with five cases of psittacosis in one family. Strains that seemed to be identical with Nocard's bacillus were found by Eckersdorff (4) in the blood of a dead parrot; by Bachem, Selter, and Finkler (5) in the blood and viscera of two newly imported gray parrots which they had kept in the same room, and which became sick soon after arrival; by Perry (6) from several gray touracous, and (7) from other birds in an epidemic in the London Zoo; and by Lignieres (8) from the bone marrow of a parrot which had been infected with material from a human case during the recent epidemic in the Argentine. Bedson, Western, and Simpson (9), during their recent studies, found one strain in a parrot not known to have caused a human case; and we have received one strain from Arnold (10) who isolated it from a parrot in Illinois during this present outbreak. Krumweide, McGrath, and Oldenbusch (11) have found one strain in the course of their investigations

[1] From the National Institute of Health, Washington, D. C.

in a parrot in which the pathological findings were distinctly different from those of their other birds, and which was not associated with a human case. Elkeles (12) isolated a strain from a parrot which sickened soon after its importation, and cites the reported cultivation of a strain by Santillan from a parrot in Argentina.

B. psittacosis has been reported by both Perry (7) and Bainbridge (13) to be identical with *S. aertrycke*. Medical literature abounds with reports proving the pathogenicity of *S. aertrycke* for many animals. It is the most common cause of food poisoning in man; many epizootics have been reported among guinea pigs, rabbits, rats, and mice; it has been isolated from sheep, calves, and canaries.

Agglutinins for *B. psittacosis* have been reported not infrequently in the blood of patients ill or convalescing from the disease. Usually these have been demonstrable only in very low dilutions, and do not seem ever to have been found in titers higher than those Rosher (14) found in the blood of normal people.

During the recent investigations carried on at the National Institute of Health (Hygienic Laboratory), a careful search was made for Nocard's organism, both in parrots and in human cases, and also for agglutinins for this bacterium in the blood of convalescents. There can be no doubt that much of the material cultured represented true psittacosis, since 7 of the 12 parrot carcasses and all 3 of the samples of droppings received from a distance are known to have been associated with human infection. That psittacosis was successfully established experimentally in parrots and parrakeets in the laboratory is indicated not only by the illness and death of the experimental birds, but also by the occurrence of 11 characteristic cases among the laboratory personnel during the time of these experiments (15).

The bacteriological studies were made from the above-mentioned 12 parrot carcasses and 3 samples of droppings from parrots ill of psittacosis, from 4 parrots and 8 parrakeets in which infection was produced experimentally; from blood, sputum, urine, or feces from 4 human cases of psittacosis; and from the organs of one fatal human case, as well as from 12 normal parrots obtained for experimental work.

The localities from which the parrot carcasses and droppings were received, information concerning their association with human cases of psittacosis, and the materials taken from the birds for bacteriological examination are listed in Table 1.

TABLE 1.—*The nature and source of materials shipped to the National Institute of Health (Hygienic Laboratory) and studied bacteriologically*

Identification and source	Material received	Date received	Associated with human cases	Material examined bacteriologically
		1930		
A. Baltimore, Md.	Parrot carcass	Jan. 16	1 human case	Heart, liver, lung, kidney, bone marrow, small intestines, and caecum.
B. Zanesville, Ohio	do	Jan. 18	do	Heart, liver, lung, bone marrow, small intestines, and caccum.
C. Miami, Fla.	Combined droppings of 2 parrots.	Jan. 17	2 fatal human cases	Droppings.
D. Crisfield, Md.	Parrot carcass	Jan. 21	1 human case	Heart, liver, lung, kidney, bone marrow, and intestines.
E. Baltimore, Md.	Parrot droppings	do	Several human cases, actual number unknown.	Droppings.
F., G., H. Toledo, Ohio.	Parrot carcass	Jan. 27	At least 20 human cases and possibly a number more.	Heart, liver, bone marrow, and intestines.
I. Bangor, Me.	do	Jan. 28	Unproved	Heart, liver, lung, kidney, bone marrow, intestines, and peritoneal fluid.
J. Trenton, N. J.	do	Feb. 17	2 human cases	Liver, lung, muscle, bone marrow, and intestines.
K., L., M., N. Rosebank, N. Y. Quarantine station.	do	Feb. 26	None	Heart, liver, lung, muscle, bone marrow, and intestines.

The experimentally infected birds which were studied bacteriologically, their treatment, the number of days between infection and death, and the materials cultured are listed in Table 2.

TABLE 2.—*The nature and source of materials studied bacteriologically from experimentally infected birds*

No.	Bird	Treatment	Number of days between infection and death	Material examined bacteriologically	Remarks
1	Parrot No. 4	Exposed to droppings of C.	11 days	Blood and droppings during illness; blood, liver, lung, kidney, bone marrow, muscle and intestines at autopsy.	This bird was killed with ether while acutely ill.
2	Parrakeet No. 1.	Injected intramuscularly with emulsion of organs from carcass B.	4 days	Heart, liver, lung, bone marrow, and intestines.	
3	Parrakeet No. 2.	do	6 days	Heart, liver, lung, kidney, bone marrow and intestines.	
4	Parrakeet No. 6.	Injected subcutaneously with emulsion of organs from parrakeets No. 1 and No. 2.	7 days	Heart, liver, lung, muscle and emulsion of organs.	Chloroformed when practically moribund.
5	Parrakeet No. 10.	Injected intramuscularly with emulsion of organs from parrakeet No. 6.	13 days	Heart, liver, lung, muscle, and intestines.	
6	Parrot No. 5	Put into a cage with carcass B.	28 days	do	
7	Parrot No. 3	Put into a cage with carcass A. After 15 days fed sputum from human case No. 1.	31 days after first exposure to infection; 15 after being fed sputum.	do	
8	Parrakeet J.	Injected intramuscularly with emulsion of droppings of E and also with human convalescent serum.	8 days	Heart and liver	

TABLE 2.—*The nature and source of materials studied bacteriologically from experimentally infected birds*—Continued

No.	Bird	Treatment	Number of days between infection and death	Material examined bacteriologically	Remarks
9	Parrakeet B	Injected intramuscularly with a Berkefeld N filtrate of droppings of E.	10 days	Heart, liver, lung, muscle and intestines.	
10	Parrakeet H	Injected intramuscularly with emulsion of droppings of E and also human convalescent serum.	11 days	do	
11	Parrakeet D	Injected intramuscularly with a Berkefeld N filtrate of droppings of E and also human convalescent serum.	14 days	do	
12	Parrot No. 14	Fed droppings of parrot No. 4.	(?)	do	

The 12 normal parrots obtained for experimental work were examined within a few days after their arrival at the laboratory and before any work with them had been begun. Several of these were studied again when they were autopsied after being experimentally infected, viz, Nos. 3, 4, 5, and 14 (see Table 2). Both mouth swabs and the droppings of all 12 birds were cultured.

The human cases of psittacosis from which material was obtained for study were as follows:

No. 1.—A fatal case. Samples of blood, sputum, feces, and urine were examined throughout the course of the infection, and liver, lung, and spleen were examined after death.

No. 2.—Blood culture.

No. 3.—Blood culture.

No. 4.—Samples of urine and feces throughout the course of illness.

Cases Nos. 2, 3, and 4 recovered.

Blood and urine were plated directly on glucose blood agar and Endo agar, and small quantities were added directly to veal infusion glucose broth. Bits of the various organs were smeared on Endo medium and blood agar plates, and small pieces were placed in the broth. Fecal material was emulsified in broth or salt solution, and then the emulsion was streaked upon Endo and blood agar. With feces, preliminary cultures in brilliant green broth were made, since many of the bacteria ordinarily abundant in these materials are definitely inhibited by brilliant green. These were subsequently plated out upon the Endo medium. Sputum was streaked upon blood agar and Endo. The mouth swabs from normal parrots were streaked directly upon Endo agar.

After incubation of the plate cultures, small colorless colonies were picked and inoculated on Russell's double sugar medium and

on plain agar, or blood agar. Further study of these was made as seemed indicated.

Four hundred and twenty-six colonies were picked. Approximately 100 of these were Gram-negative rods suggesting the colon-paratyphoid-typhoid-dysentery group of bacteria. These were replated on Endo medium to determine their purity and single colony cultures were used for further study.

A number of cultures proved to be members of the *coli* and *aerogenes* groups. Fifty strains failed to ferment lactose. Many of these fermented no sugars at all and apparently fell into the genus *Alcaligenes*. Others, giving a typical "paratyphoid reaction" on Russell's double sugar medium, liquefied gelatin readily, and were identified as belonging to the genus *Proteus*. Occasionally a strain of *Pseudomonas* (*B. pyocyaneus*) was found. Seven cultures seemed at first to belong to the *Salmonella* group; they produced a typical paratyphoid reaction in Russell's medium and in litmus milk, and failed to liquefy gelatin. But four of these produced indol abundantly and the other three were shown slowly to ferment lactose after a week of incubation. These last three bore some cultural resemblance to *Salmonella suipestifer*, since they did not blacken lead acetate medium, and fermented xylose and arabinose very slowly and trehalose not at all. But the slow lactose fermentation, a peculiar odor like that of decaying fish (probably due to production of tri-methyl amine), and failure to agglutinate with any of the *Salmonella* antisera with which they were tested, showed that these three strains were not members of the *Salmonella group*. The agglutination tests were made with antisera for "*B. psittacosis*", *S. aertrycke*, *S. paratyphi* (Para A), *S. schottmülleri* (Para B), *S. enteritidis*, *S. columbensis*, *S. suipestifer*, and *Eberthella typhi* (*B. typhosus*) in dilutions of 1–40 to 1–3,200. Antigens homologous for the sera used were well agglutinated, but there was no trace of agglutination with any of the strains isolated from the parrots. Throughout this bacteriological study we found no strain of any member of the *Salmonella* group of bacteria.

Three cultures of *B. psittacosis* have been sent to us: One, which we received through the kindness of the New York State Laboratories at Albany, came originally from the Pasteur Institute in Paris; another came from Dr. Lloyd Arnold, of Chicago, Ill., and was isolated by him from a parrot during the recent epidemic; and the third was received from Dr. Lignieres, of Argentina, South America, and was isolated from a parrot which had been injected with material from a human case. These three strains are closely related to each other and to *S. aertrycke* serologically, though they differ in some of their biochemical reactions. The strain received from New York failed repeatedly to ferment maltose or starch, split trehalose and xylose very slowly, and produced a much less marked degree of alkalinity

in litmus milk than the other two strains, which seemed to be identical in their action upon 24 carbohydrates studied.

Fifty-seven samples of blood collected from 45 different patients at varying intervals from the second to eighty-fourth day following the onset of symptoms were tested, in dilution from 1:20 to 1:640, against two strains of *B. psittacosis* (one secured from New York State Laboratories and one from Argentina), and one strain each of *S. aertrycke*, *S. enteritidis*, *E. typhi* (*B. typhosus*), *S. paratyphi* (*B. paratyphosus* A), and *S. schottmülleri* (*B. paratyphosus* B.) (see Table 3).

Partial agglutination in the lower dilutions was secured with some of the sera for one or more of the antigens. The presence of agglutinins in such low concentration with this group of organisms is not to be considered of diagnostic importance. "*Proteus* X_{19}" was tested against seven of these sera with wholly negative results.

TABLE 3.—*Results of agglutination tests using patients' sera and various antigens*

[0=no agglutination in any dilution; 4+ =complete agglutination; 2+ and 3+ =degrees of agglutination

Sample number	Number of days from onset of illness to taking of blood	"B. psittacosis," New York	"B. psittacosis," Argentina	S. aertrycke	S. enteritidis	E. typhi (B. typhosus)	S. paratyphi (Para A)	S. schottmülleri (Para B)	Proteus X_{19}
1	(?)	0	0	0	0	0	0	0	0
2	2	0	2+ in 1-20	0	0	0	0	0	
3	6	0	0	0	0	0	0	0	0
4	84	0	0	0	0	0	2+ in 1-20	0	
5	35	0	0	0	0	0	0	0	0
6	11	0	0	0	0	0	3+ in 1-20 2+ in 1-40	0	
7	72	0	0	0	0	2+ in 1-20	0	0	
8	(?)	0	0	0	0	0	3+ in 1-20 to 1-40 2+ in 1-80	0	
9	21	2+ in 1-20 1+ in 1-40	2+ in 1-20	2+ in 1-20	0	2+ in 1-20	3+ in 1-20 2+ in 1-40 to 160	0	
10	(?)	0	0	0	0	0	0	0	
11	22	0	0	0	0	0	4+ in 1-20	0	
12	(?)	0	0	0	0	0	0	0	
13	(?)	0	0	0	0	0	0	0	
14	(?)	0	0	2+ in 1-20	0	0	0	0	
15	81	2+ in 1-20	0	0	0	0	0	0	
16	6	0	0	0	0	0	0	0	
17	13	0	0	0	0	0	4+ in 1-20 3+ in 1-40 2+ in 1-80	0	
18	(?)	0	0	0	0	2+ in 1-40-80-160	0	0	
19	11	0	0	0	0	0	3+ in 1-20	0	0
20	64	0	0	0	0	0	0	0	
21	(?)	0	0	0	0	0	3+ in 1-20	0	
22	74	2+ in 1-20	2+ in 1-20	0	0	0	0	0	
23	(?)	0	0	0	0	0	3+ in 1-20 2+ in 1-40	0	0
24	(?)	0	0	0	0	0	0	0	
25	53	2+ in 1-20	0	0	0	0	0	0	
26	8	2+ in 1-20	0	0	0	0	0	0	
27	11	0	0	0	0	0	0	0	
28	(1)	2+ in 1-20 2+ in 1-40	2+ in 1-20 2+ in 1-40	0	2+ in 1-20	4+ in 1-20 3+ in 1-40	0	0	

[1] Not psittacosis.

TABLE 3.—*Results of agglutination tests using patients' sera and various antigens*—Continued

Sample number	Number of days from onset of illness to taking of blood	"B. psittacosis," New York	"B. psittacosis," Argentina	S. aertrycke	S. enteritidis	E. typhi (B. typhosus)	S. paratyphi (Para A)	S. schottmülleri (Para B)	Proteus X_{19}
29	20	0	0	0	0	0	0	0	
30	(?)	0	0	0	0	0	0	0	
31	(?)	0	0	0	0	0	0	0	
32	(?)	0	0	0	0	0	3+ in 1-20 2+ in 1-40	0	0
33	(?)	0	0	0	0	0	0	0	
34	(?)	0	0	0	0	9	0	0	
35	(?)	0	0	0	0	0	2+ in 1-20 to 1-40	0	
36	24	0	0	0	0	0	0	0	
37	72	2+ in 1-20	0	0	0	0	0	0	
38	(?)	0	0	0	0	0	3+ in 1-20	0	
39	(?)	0	0	0	0	0	0	0	
40	12	0	0	0	0	0	3+ in 1-20 3+ in 1-40 3+ in 1-80	0	0
41	9	0	0	0	0	0	4+ in 1-20 2+ in 1-40	3+ in 1-20 2+ in 1-40	0
42	66	0	0	0	0	0	0	0	
43	50	0	0	0	0	0	0	0	
44	62	0	0	0	0	2+ in 1-20 to 1-80	2+ in 1-20	0	
45	49	0	0	0	0	0	0	0	
46	3	0	0	0	0	0	0	0	
47	71	0	0	0	0	0	0	0	
48	76	0	0	0	0	0	0	0	
49	66	0	0	0	0	0	0	0	
50	84	0	0	0	2+ in 1-20	0	0	0	
51	(?)	0	0	0	0	0	2+ in 1-20 to 1-40	0	
52	33	0	0	0	0	0	3+ in 1-20 2+ in 1-40	0	
53	33	0	0	0	0	0	2+ in 1-20 to 1-40	0	
54	45	0	0	0	0	0	0	0	
55	(?)	0	0	0	0	0	0	0	
56	31	0	0	0	0	0	2+ in 1-20 to 1-40	0	
57	34	0	0	0	0	0	0	0	

SUMMARY

During the recent outbreak of psittacosis in the United States an intensive search for the "*Bacillus psittacosis*" of Nocard was made in the carcasses and droppings of parrots that were shipped to the National Institute of Health, in experimentally infected and in normal parrots and parrakeets, and in material obtained from human cases. No strain of "*B. psittacosis*" or of any other member of the *Salmonella* group of bacteria was found.

In 57 convalescent sera studied, agglutinins for "*B. psittacosis*" and other *Salmonella* bacteria were not demonstrable in dilutions that could be considered significant.

We have found no evidence of the association of any member of the *Salmonella* group of microorganisms with psittacosis either in birds or in man.

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A COLLEGE COURSE IN CHILD HYGIENE

By E. Blanche Sterling, *Acting Assistant Surgeon, United States Public Health Service*

The care and training of children is largely in the hands of women. The mother prepares for the child's coming; she watches over his infancy and guides his feet through the runabout preschool years. When he reaches school age, she sends him to a school where most of the teachers are women; and the parent-teacher associations are overwhelmingly feminine in their make-up.

This association of women with children is a very close, and, in early childhood, a natural one; therefore, any sound instruction in child hygiene that can be given to the women of the country will undoubtedly forward the cause of child health.

Not only do women care for their own children, but many of them are interested in the welfare of all children. This is shown by the programs of the various women's organizations, a very large number of which have child welfare committees. Many of such organizations are concerned only with child welfare.

Volunteer organizations of groups of earnest women ready and willing to work should be able to accomplish a great deal. The fact that they do not always accomplish as much as they should is due largely to the fact that the women have little knowledge of community hygiene and its relation to child hygiene. Without such knowledge there is likely to be duplication of effort, failure to utilize the means at hand, futile struggles with an incomplete program, and the haphazard results of isolated effort. The training of these intelligent women in

the principles of public health in relation to the health of the child would turn this stream of misdirected effort into channels of wide usefulness and accomplishment.

It would seem that one of the best fields for this training is to be found in the high-grade women's colleges of the country. These institutions turn out a body of women with trained minds who would naturally become leaders among the women of their several communities. With their senior and graduate students taking such a course as that outlined below, the growth of the child hygiene movement would receive a tremendous impetus. By an act of the Seventy-first Congress the Public Health Service has been empowered to help in educational institutions in "the dissemination of information relating to public health." It is felt that such work would be a most constructive contribution to child hygiene. Following is a proposed outline of a college course in child hygiene:

I

Eugenics

(1) Various social classes in the population.
(2) The birth rate in the various classes.
(3) The well-bred human being.

II

Prenatal hygiene

(1) Personal hygiene of pregnancy.
(2) Community hygiene of pregnancy:
    (*a*) Official and nonofficial agencies.
    (*b*) Prenatal clinics.
    (*c*) Hospitalization.
    (*d*) Public health nursing.
(3) Social aspects of prenatal hygiene:
    (*a*) Poverty.
    (*b*) Employment.
    (*c*) Legitimacy.
(4) Legal aspects of childbearing:
    (*a*) Mothers' pensions.
    (*b*) Legal age of marriage.
    (*c*) Relation of industry to childbearing.

III

Infant hygiene

(1) Physical care of the infant.
(2) Infant's environment and its effects.
(3) Community infant hygiene:
    (*a*) Infant welfare clinics.
    (*b*) Public health nursing.
(4) Public health and sanitation in relation to infant hygiene.

IV

Preschool hygiene

(1) Care of the runabout child.
(2) Physical defects in the runabout child.
(3) Preparation for school, including immunization.
(4) Child guidance.

V

School hygiene

(1) The relation of the department of health and the department of education to school health supervision.
(2) The function of the teacher, the nurse, and the physician in school health work.
(3) Construction and sanitation of school buildings and surroundings.
(4) Medical inspection of pupils.
(5) Physical defects and methods of securing corrections.
(6) School nursing.
(7) Control of communicable diseases.
(8) Nutrition of the school child.
(9) Physical training.
(10) Health education.
(11) Hygiene of instruction.
(12) Mental hygiene.
(13) Special classes for the handicapped child.

CHIEF ETIOLOGICAL FACTORS OF PLAGUE IN ECUADOR AND THE ANTI-PLAGUE CAMPAIGN

By C. R. Eskey, *Surgeon, United States Public Health Service*

(The first part of this paper, dealing with the general etiological factors of plague in Ecuador, was published in Public Health Reports for September 5, 1930.[1])

II. ANTIPLAGUE MEASURES

MEASURES PREVIOUSLY IN USE

Trapping and poisoning to reduce the rat population of Guayaquil were instituted by Surg. B. J. Lloyd, of the United States Public Health Service, who was made acting director of health when plague first appeared; and these measures have continued to be used with varying degrees of intensity ever since. During 1925, 1926, and 1927, over 250,000 rodents were caught each year. About 60 per cent of the rodents caught have always been mice, so that the yearly rat catch during the years named above was about 100,000. In 1928 the number of trappers was reduced and the rodent catch fell that year to 214,000, and in 1929 to 153,000. The number of rats caught per 100 traps a day has not varied much in the past five years and has usually averaged from 13 to 11 each month. Cage traps formed about two-thirds of the trappers' equipment of 75 traps.

[1] The complete article will be issued later as a single reprint.

On September 1, 1929, the trapping division consisted of a chief inspector, two field inspectors, and 14 trappers. There were 754 cage traps and 336 snap traps in use.

Poison is believed to have been used more intensely at the beginning of the epidemic than in recent years. During the past few years barium carbonate and flour were employed in a desultory manner. Only one man was engaged in preparing and placing poison.

A cursory macroscopical and microscopical examination was made of most of the trapped rats by a part-time local physician. No particular attention has been given to an area in which a plague infected rat was reported.

Discovery of plague cases has always depended upon the reports of physicians or an investigation of the cause of death. It is believed that many cases have occurred which were never reported. All cases of plague have been assigned to infections contracted in the place of residence and apparently no cases have been traced to places of occupation.

An inspector and five or six men visit, within a day or so, every house where plague is reported. They open up most inclosed spaces which may harbor rats in the infected house and treat the interior with hot lye solution. Clothing is boiled. Houses have few furnishings in them, so that practically everything can be treated with lye solution. Usually 100 traps are placed in the infected house and vicinity. The frequency with which secondary, tertian, and even quartan cases have been reported at the same address during the past five years indicates that the treatment of infected premises has been rather futile.

An infectious disease hospital to which plague cases are removed for treatment has been in operation since the first years of the epidemic in Guayaquil.

CONSTRUCTION OF BUILDINGS

There are three general classes of buildings in Guayaquil: Concrete modern buildings more or less rat proof, which number about 100; wooden buildings that compose the bulk of the structures in the main central part of the city; and cheap bamboo houses or shacks. These latter buildings have side walls of split bamboo which do not permit rat harborage, single floors, and usually ceilings that are not inclosed, so that they do not offer much rat harborage within them. They all have raised floors under which rats may live except in the rainy season. The bamboo houses or shacks are usually isolated structures, so that party walls are not common. Some are two stories high, but many are only one. They form the chief buildings in the outskirts of the city, but are also found in the central section, except the better class business area.

It is doubtful whether the buildings of any other place in the world offer more extensive and better rat harborage than the wooden buildings in Guayaquil. They are built in solid blocks without openings except doors and windows, and the inclosed space of party walls harbor many rats. There is an open space or patio within each that extends from the ground or first floor and is open at the top, so that rats are not hindered in their passage to any part of the building. These buildings are all occupied in apartment-like manner. The first floor is frequently some type of store or warehouse. The wealthier people occupy a whole floor, but those buildings in which the poor people live are overcrowded to an unbelievable extent. Individual houses of the better class can be counted on the fingers.

For a number of years there has been a law prohibiting double floors and walls in new structures and requiring their removal in the old buildings. This law has been pretty generally enforced, so that this type of rat harborage is rarely seen; but construction practically as bad is used at the present time. It consists in boxing in all the rough-hewn joists and beams. For appearance the boxing is often made larger than necessary, forming the kind of harborage so frequently encountered on ships. The second floor of all the wooden buildings extends over the sidewalk and is supported by uprights at its outer side. The uprights are boxed in the same manner as are those in the interior, but usually the boxing is excessively large and ornate. There are nearly always openings at the bottom of the outside uprights through which rats can pass, and at the top they may enter the boxing of the horizontal beams.

The first floor of all buildings, except a few of concrete and some remodeled business places, is raised from a few inches to 2 feet or more above the ground, and the sides are inclosed, with occasional windows for ventilation. The open places are sometimes screened, but more often they are only closed with strips of wood to keep large animals out. Ceilings are usually inclosed, and the roofs are commonly of tile. Rats may pass through the curved tiles to the ceiling space underneath.

An inspection was made on the first of September of the stores handling grains and other foods, the bakeries, and rice mills. Stored articles were found piled in helter-skelter fashion everywhere, and evidence of rat infestation was seen in every storeroom visited. There were innumerable openings to the places where foods were stored and sold through which rats could and did pass from all parts of the building. Only one fairly ratproof warehouse was found in the city, and it had grilled windows through which rats entered, as evidence by holes gnawed in sacks of flour. Two rice mills located on the river bank which is notoriously rat-infested, had no protection against the depredations of the rats, as the rice was piled on a wooden floor

with a roof and no side walls. The two large markets would be fairly ratproof if the stands in them were not raised about 6 inches above the floor and the innumerable openings in their gates and side walls were closed so that rats of the whole neighborhood could not enter them. Plague has been particularly prevalent in the vicinity of the two markets.

From the above description of the extensive rat harborage and evidence of rat infestation, some idea can be gained of the apparent hopelessness of attempting to ratproof the buildings, in fact ratproofing would practically require rebuilding. More stringent laws for new buildings and the ratproofing of food warehouses and the large markets would help the situation. The possibility of reducing the rat population by any known measures seemed hopeless.

GARBAGE DISPOSAL

Guayaquil has a garbage collection system that is very simple but also very unsatisfactory. Toward evening the householder merely dumps his garbage in the street in front of his house. In the small section of the city where there is pavement, the garbage is collected direct by an automobile garbage truck during the evening and night. Many people on the main streets hold their garbage until the trucks arrive, but not all. Most of the streets are not passable for motors, especially in the rainy season; and here all the garbage is dumped in the street to be collected some time during the night by a man with a wheelbarrow. He picks up the garbage with a shovel and broom in the dark and, consequently, is unable to see whether he gets all of it. These garbage piles are feeding places for stray dogs, cats, and rats. The garbage is dumped in a low area on the outskirts of the city and is not treated. Plague has appeared in houses not far from the garbage dump a number of times.

DETERMINATION OF THE DISTRIBUTION OF PLAGUE

Spot maps made for human cases of plague that have been reported in the past five years and during 1929 showed that the disease might occur in any block in the city, but that the central section suffered most. The section of the city in which plague occurs most is that composed of old wooden buildings in which the poorer people live and where congestion is excessive. The three sections of the city in which plague has been most prevalent during the past five years are as follows: The greatest number of cases were in the vicinity of the large central market which is located in the mathematical center of Guayaquil; the second badly infected area lies between the river market and the small section of the city occupied by most of the wholesale grain stores; and the third area is adjoining the customs

warehouse in which flour and other foods are stored for several days after being removed from ships.

It has already been shown that plague has its lowest incidence from May to October and that there are frequently months during this part of the year when no cases are reported. It is during this period that the disease is carried over to the active season by a small number of infected rats; and the places in which human cases are reported can be considered the endemic area. A spot map was prepared to show the location of all human cases from May to October. It was found that all cases with the exception of three or four during the past five years were located in the central part of Guayaquil in the same region in which the greatest number of cases were found to occur.

ANTIPLAGUE MEASURES OF THE PRESENT CAMPAIGN

At the time when the present campaign to reduce the incidence of plague in Guayaquil and Ecuador was underway, the financial stringency of the country was such, because of the reduced cacao exports, that it was impracticable to have any legislation passed to improve the rat proofing of buildings. Therefore, results had to be obtained without changing the structural condition of a single building and with very little funds to work with. The Government agreed to provide 30,000 sucres ($6,000) to be used during the last four months of 1929 and not reduce the appropriation for 1930 for public-health work by 90,000 sucres ($18,000) as had been planned, and that this money would be available for fighting plague. These funds were to be used not only in Guayaquil but for activities throughout Ecuador where plague was found.

With the small sum of money allotted it has been possible to more than double the trapping activities and to keep up a constant broadcasting of poison. In September the number of field inspectors was increased to 4 and trappers to 28. The number of traps in active use has been increased from time to time until on March 1 practically 6,000 were in use, and each trapper had all the traps possible for him to attend efficiently. These traps consisted of 900 cage and 5,100 snap traps on March 1, 1930.

POISON

The use of poison to destroy rats has been in practice for years, but this measure was seldom employed with the intensity adopted in the past few months in Guayaquil. It is not believed that the value of poison in antiplague work has been as generally recognized as it should be. Surg. J. D. Long, of the United States Public Health Service, under whose direction this campaign was conducted, had successfully used poison in eradicating plague at Oakland, Calif., and in Manila. The conditions in Manila are somewhat similar to those in Guayaquil.

The form in which the poison is used in Guayaquil is unique, and that city is probably the only place in which paper poison packages have been employed to fight plague. The paper packages of poison were devised some years ago by Mr. Cajas, the inspector in charge of plague activities in Guayaquil.

The preparation of poison packages is very simple, and they are made by 12 to 18 boys from 10 to 14 years old. The mixing of the ingredients, all of which are dry powders, is done by two men. The papers containing the poison are three inch squares, made by cutting up an ordinary thin, tough grade of wrapping paper. The boys dip one end of the paper square into the powdered poison ingredients and lift out about a heaping teaspoonful, which is shifted to the center of the paper square, and the edges are then brought into contact and twisted to retain the poison, thus producing a package that is ball like at its bottom and has a pointed twisted top. The poison packages are stored in barrels in the laboratory, and as they are placed in the barrels a few at a time they are sprayed with oil of anise by means of an ordinary atomizer.

The ingredients of the poison packages have varied during the different times of placing the poison throughout the city, as follows:

First poisoning.—Flour and barium carbonate 40 per cent.

Second poisoning.—Corn meal and arsenic 18 per cent.

Third poisoning.—Flour and arsenic 18 per cent and corn meal and arsenic 18 per cent.

Fourth poisoning.—Corn meal and barium carbonate 35 per cent.

Fifth poisoning.—Corn meal, dried powdered cheese, and corn meal, dried powdered codfish, both with barium carbonate 35 per cent.

Sixth poisoning.—Same as fifth.

Seventh and eighth poisonings.—Corn meal, dried powdered codfish and arsenic 18 per cent and corn meal, dried powdered cheese and arsenic 18 per cent.

The most effective of all the above forms of poison is believed to be the mixture of dried codfish, corn meal and arsenic, especially when poison is to be used in places where grains are stored. Dried powdered cheese is also an attractive bait. All of the combinations will kill many rats, and it seems advisable to change the bait from time to time. Arsenic is a better poison to kill rats than barium carbonate, but the latter is effective, as was found during the period when the city was first covered with poison. In order to kill rats it is necessary for them to take a greater quantity of barium carbonate than arsenic; and when the former is used as the bait the attractive part of the poison package is reduced to nearly half. The greatest fall in the number of rats caught per 100 traps occurred after the use of arsenic. Arsenic is more dangerous to the general population

than barium carbonate, and it is believed that the latter should be used the first time at least when poison is placed in a city in order that the people may become familiar with the poison packages before the stronger arsenic is employed.

Several essential oils, including oil of peppermint, oil of cinnamon, oil of cloves, and oil of anise were experimented with for scenting the poison packages, but all were discarded as useless except the last named. Oil of anise seems to have a certain attractive power for rats but not for other animals.

During the seven months that poison was being continuously placed throughout the city of Guayaquil not a single accident occurred among the inhabitants. The only domestic animals killed by poison were a few cats attracted by the use of fish for bait. The exact number of cats killed is not known but was less than 10. In so far as is known not another animal was killed. The remarkable freedom of accidental poisoning of people and domestic animals can be explained only by the form in which poison was used.

The personnel employed in connection with the use of poison varied during the campaign. Two men and 12 to 18 boys were employed in preparing the packages. During the first poisoning there were 7 field inspectors and 21 poisoners; during the second, 6 inspectors and 16 men; and during the remainder of the poisonings 3 inspectors and 14 poisoners.

The cost of using poison will vary with the cost of labor and materials in a community. To cover Guayaquil four times with poison, a city of about 100,000, the following materials were used: 1,030 pounds of barium carbonate; 500 pounds of arsenic; 3,600 pounds of corn meal; 2,300 pounds of flour; and 340 reams of wrapping paper.

The placing of poison depends upon the conditions existing where it is to be used. In Guayaquil, at the beginning of the campaign, plague could be expected to occur in any city block; therefore the whole city had to be treated. The first poisoning began at one side of the city and advanced across it toward the traps which were set on the outskirts of the opposite side to see whether there was a migratory movement of the rats in front of the poison. There was not the least indication that the rats were scattered ahead of the poison. In the following poisonings the general idea was to poison the area in which the traps were located last. Should plague be confined to a small area, this should be surrounded by a broad zone and poison placed from the outside toward the center. This method was employed in Guayaquil during February and March, when the disease appeared to be limited to definite sections of the city.

Efficiency of poison.—One has only to question the rat trappers or talk with the residents of Guayaquil to learn that since the use of

poison in September the number of rats infesting the city has been reduced to an undreamed of degree. Old residents will tell you that there has never been a time when there was so little evidence of these animals. At the time this report is being written (April 1, 1930), the number of traps in use is nearly five times as great as at the same time a year ago, and fewer rats are being caught. The trappers are disgruntled with the zones in which they are stationed, yet they are all in the most rat-infested section of the city. The trappers now receive 10 centavos for each rat they catch and 1 centavo for each mouse, as well as the pay they were receiving a year ago. Out of this money they must provide bait for their traps, and they complain that they were better off when they received no bonus and bait was provided, because they say that they can not catch enough rats to pay for the bait.

In Table 40 a rough idea of the results from the use of poison can be obtained from the tabulation of data furnished by inspectors who visited the houses in which poison had been placed two or three days previously. The inspectors questioned the householders regarding the number of dead rats found by them. These figures in no way represent the actual number of rats killed, but do furnish a good index of the results found at each poisoning. The first poisoning evidently destroyed the greatest number of rats, as the inspectors found, on an average, approximately two rats killed per house, while in the next poisoning only one rat was reported dead to two houses visited. The number of rats killed as determined by this means has gradually fallen until only one dead rat is reported for six houses visited.

During the first and second poisoning it was necessary to detail one man to answer the telephone, because there were so many calls requesting that men be sent to different premises to search for and remove the dead and malodorous rats from inaccessible places about the houses.

TRAPPING IN CONJUNCTION WITH POISON

There is no doubt that the cause of the reduction of rats in Guayaquil during the last seven months was poison and not the few rats trapped. In 1925, 1926, and 1927 the rat catch was greater every month of the year than during the period of this report, yet there was no apparent decrease in the rat population nor phenomenal effect on the number of plague cases. In an active plague campaign the use of traps should not be discarded, but should be maintained to the greatest extent possible, because many rats are destroyed by trapping and the results are the best indication of the reduction that is taking place in the number of rats.

At first there was no definite plan for trapping. It was not until maps had been prepared showing the location of plague cases during the past five years and in 1929 and the endemic area as already described as well as a study of the *cheopis* index that a definite plan for trapping was evolved. The first consideration in formulating the plan of trapping was to include the endemic section or the part of the city in which plague occurs during the months when it reaches its lowest level. Taking a map of the city, a line was drawn around the above section, modifying it to include near-by blocks in which plague had occurred frequently in the last five years and where cases had been notified in 1929, and also to include blocks that showed a high *cheopis* index, blocks near the endemic area. After this area had been mapped out, it was divided into 28 districts for trapping, and a trapper assigned to each district. By thus concentrating the traps and not having them scattered over the entire city, the trappers were able to supplement the poisoning operations in the destruction of rats in the most dangerous area of the city.

The location of plague cases since January 1, 1930, justified the placing of traps in the manner described above and demonstrated that the trapped area would be the most difficult section of the city, from which to eradicate plague. From January 1 until the middle of April only two cases of plague were reported outside the trapped zone. The first of these was reported in the first half of January and was located several blocks outside the dangerous zone. There were no other cases near it during the next three months. The second case was only one block beyond the trapped zone and the zone was modified to include the block in which the infected residence was located. This case was the sixth reported in 1930 and occurred during the first half of March.

The first four cases of plague reported in 1930 occurred in the first half of January and were widely scattered, showing that plague infection was still widely distributed among the rats, but the incidence was not high or there would have been more cases. At the end of March there appeared to be only two infected centers—one that was quite large in the southwest part of the trapped zone and another smaller one in the central part of the city.

The most convincing data regarding the effectiveness of poison as an antiplague measure is that given in Table 41. This table presents two valuable indices showing the reduction that took place in the rat population. The first of these is the number of rats being caught per 100 traps per day, and the other is the percentage of *norvegicus*, *rattus*, and *alexandrinus* being caught.

In the last column of Table 41 are given the figures for the number of rats caught per 100 traps per day. The low figures for the second half of September and first half of October should be disregarded,

because they represent only the rats caught in a narrow zone in the northern outskirts of the city where the traps were concentrated for a month and before poison had been placed there. The first figure, 11.67, really represents the number of rats that could be caught before poison was used, and it is lower than was frequently obtained in former years. The effects of poison first appear in the second half of October, when 5.84 rats per hundred traps per day were caught in the most highly rat-infested section of the city. From this point the rat catch slowly and progressively falls until the low figure of 2.69 is reached during the first half of January. The rainy season began on January 21, and we find that the number of rats caught is markedly increased by the rains, a point already alluded to in the discussion of the etiology. The heavy rains ceased the latter part of February and the rat catch began to fall again, reaching 3.05 at the end of March. During the rainy season of 1929 the number of rats caught per hundred traps per day was over 13 during the months of February and March, or more than double the figures for 1930. In Table 43 is given a comparison of the number of rats caught in the preceding year with those of the months in which poison was used.

One of the most valuable guides that can be followed in a campaign to eradicate rats is that furnished by the percentage of *rattus* and *alexandrinus*, when normally the percentage of *norvegicus* greatly exceeds the other species in a community. It can be stated as a fact that, when the *rattus* group of rats exceeds the *norvegicus* under the above conditions, the rat population has been reduced to such a degree that plague will probably disappear or, at least, the backbone of the disease has been broken. If we follow the figures given in Table 41 we find, beginning with the second half of October, that only 16 per cent of the rat catch are *rattus* and *alexandrinus*. Following the table downward we see the percentage of these rats increasing until it reaches 44.5 per cent in the second half of March. Figures for the first half of April, which are not included in the table, were 55 per cent *rattus* and *alexandrinus*, or the *norvegicus* catch the second week in April was 5 per cent less than that of the *rattus* group. This condition had never been attained before in Guayaquil during the 22 years that war has been waged on rats.

In observing the figures in Table 41 it must be kept in mind that the number of traps employed has been increased at irregular intervals since September 1, or the impression is likely to be gained that more rats were being caught per trap in March than in October, particularly in the *rattus* group. In reality the number of these rats caught per 100 snap traps in use was three the second half of October, when they formed only 16 per cent of the rat catch, and only 1.5 the last half of March, when they constituted 44.5 per cent.

What has been the actual reduction in the rat population of Guayaquil among the rats living in and invading buildings? Rats that do not live inside or invade buildings can not be affected much by the antiplague measures employed; but it has been shown that these rats are not a great factor in the eradication of plague. This is a question rather difficult to determine; but basing our computation on the results of trapping and the percentage of the different species being caught, it is believed that it can be stated conservatively that the *norvegicus* has been reduced about 75 per cent and the other species about 50 per cent. In order to eradicate plague from Guayaquil at the present time, it is not believed to be necessary to reduce the rat population much below the point arrived at, because a large number of the rats here are now immune to the disease, and rats that harbor outside are not infested with a sufficient number of *cheopis* to transmit the disease; therefore all that is required is that the indoor rats be reduced to a point that the nonimmune rats are separated so widely that plague can not be transmitted from one to the other.

EFFECTS OF ANTIPLAGUE MEASURES ON THE NUMBER OF PLAGUE-INFECTED RATS

The number of individual plague-infected rats detected in the laboratory during this study was so small that no information is available from this source. Only three individual plague-infected rats were discovered, although many were autopsied that had the disease. It should be stated that the detection of plague-infected rats at Guayaquil is a very difficult matter, because typical plague pathology was not found in the rats there. It seems possible that increased tolerance to plague may be responsible for this finding. On the other hand, rats with enlarged spleens and livers were more common than those with normal organs. The reason only three individual rats were detected is not because all suspicious rats were not subjected to microscropical examination, and in many instances to guinea pig inoculation, but because of negative results.

The best index to the number of plague-infected rats is that furnished by the results of mass inoculation of an immulsion formed with small pieces of spleens taken from all the rats in the day's catch. Table 42 gives the results of this procedure. The guinea-pig deaths reported in this table were all proved to be due to plague by autopsy. It will be seen that the average number of rats per guinea pig dying of plague was highest in November, when only 256 rats were autopsied per dead guinea pig. The figure for December was little changed; but in the following months, corresponding to the fall in human cases, the number of rats per dead guinea pig advanced rapidly, reaching practically 3,000 in March. In former years, as shown by

the occurrence of human cases, the number of plague-infected rats should have been much greater in January and February than in October, November, and December. The conclusion seems clear that the use of poison is responsible for the marked reduction this year (1930) in the number of plague-infected rats in January, February, and March.

EFFECTS OF ANTIPLAGUE MEASURES ON THE INCIDENCE OF HUMAN PLAGUE

If we base the prediction of the number of cases of plague that would ordinarily have occurred in January, February, and March, 1930, upon the past history of epidemics in Guayaquil it can be conservatively estimated that there should have been a great many cases in these three months, probably more than in the same months of 1929, when there were 94 cases. In the past, whenever there has been a year with less than 100 cases, as in 1928, there was a marked rise in the following year and a still greater number of cases in the next year, or as there should have been in 1930. Ever since 1916 there have been more cases in the months of January, February, and March than in the preceding months of October, November, and December, with one exception in the year of 1928.

There were 42 cases of plague in the last three months of 1929 and should have been many more than this figure in the first three months of 1930; yet there were only nine cases, or a reduction incomparable with the history of plague in Guayaquil at any previous time and which can be explained only by the successful use of poison. Many other comparisons and predications can be made from the past history, but all result in the same conclusion that some external agency caused the marked fall in plague this year, when there were only 4 cases in January, 2 in February, and 3 in March, or a total of 9 cases during the period when plague reaches its highest point in the yearly epidemic. There were no cases reported in April.

It is believed, with reason, that if the measures used during the last seven months are continued throughout the year, plague will disappear entirely from Guayaquil. However, time will be necessary to prove or disprove this prediction. If plague is eradicated from Guayaquil, it will voluntarily disappear at all other points in central Ecuador, as stated before, under the discussion of epidemiology.

It should be stated that in November and December, 1929, plague was present at the lowland towns of Duran, Milagro, Daule, and Nobol, and that poison without trapping was used in all of them except Duran, with the result that the last case of plague was reported in them as follows: Daule, December; Nobol, January 9; Duran, January 12; and Milagro, January 16. Plague ended in all of these places before the onset of the rainy season, which was unusual, and to be explained only by the steps taken to destroy rats, namely poison.

SUMMARY

(1) The use of poison in the form of paper packages is an inexpensive, safe, simple, and effective procedure to employ in any antiplague campaign.

(2) Poison reduced the incidence of plague and the rat population in a community in which rat harborage and rat infestation were both as great as can probably be found in any other place.

(3) Both plague and rats were markedly reduced without measures of ratproofing.

(4) It can be conservatively estimated that plague was reduced 80 per cent during the months of January, February, and March, 1930, by the measures outlined in this report.

(5) The results obtained in this antiplague campaign were due to the continued use of poison, and the trapping of rats was only a minor accessory factor, but it should not be discarded in any fight against plague.

(6) The use of poison, as shown by the results of trapping, reduced the number of rats caught from over 11 per 100 traps per day in September to 3.05 in March.

(7) The use of poison reduced the percentage of *norvegicus* found in buildings from 84 per cent in October to 45 per cent in the second week in April.

(8) When the percentage of *rattus* and *alexandrinus* exceeds that of *norvegicus* in a community in which the latter species normally predominates, the antiplague campaign is being waged successfully.

(9) *R. norvegicus* has been reduced about 75 per cent and *rattus* and *alexandrinus* about 50 per cent, or the total rat population found in buildings about two-thirds, by the simple antiplague measures in use during the past seven months in Guayaquil.

(10) Plague-infected rats in Guayaquil were reduced from one per 256 caught in November to one per 2,976 in March by the simple methods outlined in this report.

(11) If as active a campaign is maintained in Guayaquil during the next year as in the past seven months plague will probably be eradicated.

(12) When plague disappears from Guayaquil it will also vanish from all other parts of central Ecuador.

(13) The adoption of measures to bring about ratproofing of buildings, especially the large markets and the places where grains as well as other rat foods are stored, would simplify the eradication of plague from Guayaquil and tend to prevent a reoccurrence of the disease.

(14) A modern system for the collection of garbage would assist in reducing the rat population of Guayaquil.

(Tables 1–43 follow)

TABLE 1.—*Cases of plague reported monthly since February, 1908, when the disease first appeared in Guayaquil*

Month	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919
January	------	42	77	85	48	73	56	75	187	105	111	23
February	63	61	48	37	23	61	16	40	151	63	69	21
March	225	63	27	21	12	24	7	15	81	33	37	13
April	175	75	18	5	7	7	3	------	30	10	24	4
May	66	57	5	7	5	10	5	2	5	3	9	5
June	13	39	6	3	------	5	5	------	11	2	4	6
July	9	23	11	16	------	14	2	5	12	3	2	3
August	9	38	27	19	21	23	8	------	15	3	------	------
September	6	85	95	37	40	46	15	3	22	5	2	------
October	3	123	170	92	78	113	45	9	45	20	9	------
November	5	168	105	102	135	197	112	47	88	44	6	2
December	19	130	90	91	124	159	139	133	198	85	14	4
Total	593	904	679	515	493	732	413	329	845	376	287	81

Month	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
January	7	94	20	5	49	16	37	17	4	18	4
February	23	82	12	14	40	33	15	39	5	50	2
March	15	38	13	15	16	14	12	22	6	26	3
April	------	13	2	2	8	8	3	8	------	8	0
May	------	9	2	2	6[4]	1	5	5	2	3	------
June	------	2	------	------	5	1	2	------	5	------	------
July	------	2	------	4	2	------	5	5	------	1	------
August	5	3	------	------	3	------	7	7	------	6	------
September	6	7	------	8	4	5	4	3	3	7	------
October	5	7	5	6	4	11	3	4	3	10	------
November	37	12	3	7	7	10	12	9	10	14	------
December	94	8	15	42	5	18	14	5	16	18	------
Total	192	277	72	105	149	117	119	124	54	161	9

TABLE 2.—*Relationship of plague in Guayaquil to its appearance in the lowland railroad towns and in the mountain towns and haciendas*

Year	Number of cases											
	Port	Lowland railroad towns				Mountain railroad towns			Mountain caserios and haciendas			
	Guayaquil	Duran	Yaguachi	Milagro	Naranjito	Huigra	Alausi	Ambato	Near Alausi	Near Guamote	Pungala	Near Latacunga
1908	593	------	------	------	------	------	------	------	------	------	------	------
1909	904	------	4	23	------	P	------	------	------	------	------	------
1910	679	------	------			P	------	------	------	------	------	------
1911	515	------	------	------	------	------	------	------	------	------	------	------
1912	493	7	------	8	------	------	------	------	------	------	------	------
1913	732	10	6	13	1	12	9	------	P	------	------	------
1914	413	10	1	1	------	------	------	------	------	------	------	------
1915	329	------	------	------	------	------	------	------	------	------	------	------
1916	845	------	------	------	------	------	167	42	------	------	------	------
1917	376	------	------	------	------	P	20	------	------	P	------	------
1918	287	5	------	------	------	------	------	------	------	------	------	------
1919	81	2	------	------	------	------	------	8	------	------	------	------
1920	192	4	------	------	------	------	------	------	------	------	------	------
1921	277	3	------	1	------	------	------	------	------	------	------	------
1922	72	------	------	------	------	------	------	------	------	------	------	------
1923	105	------	------	1	------	------	------	8	------	41	------	------
1924	149	3	------	------	------	------	------	------	------	------	------	------
1925	117	6	2	1	------	------	------	------	------	------	------	------
1926	119	4	------	------	------	------	P	101	P	15	------	53
1927	124	------	------	------	------	------	------	------	------	------	P	------
1928	54	9	------	------	------	------	------	------	------	------	------	------
1929	161	18	------	7	------	3	22	8	20	13	10	------

TABLE 3.—*Plague in Guayaquil during the past five years, 1925 to 1929, inclusive, showing mortality*

Month	Per cent mortality					Total
	1925	1926	1927	1928	1929	
January	43.7	37.8	35.2	100	55.5	44.5
February	39.3	46.6	17.9	60	38	34.5
March	57.1	50	40.9	16.6	26.9	38.7
April	50	66.6	25	----------	12.5	33.3
May	100	----------	40	50	33.3	31.2
June	100	----------	----------	40	----------	37.5
July	----------	40	20	----------	----------	27.2
August	----------	14.2	----------	----------	16.6	10
September	40	----------	33.3	----------	42.5	27.2
October	45.4	----------	75	66.6	40	45.1
November	60	25	33.3	40	35.7	38.1
December	33.3	35.7	40	43.7	44.4	39.4
Total	45.2	33.6	29.0	44.4	36.6	36.8

TABLE 4.—*Average mean temperatures of Guayaquil during the three years 1927, 1928, and 1929, and other climatic conditions*

Month	Mean temperatures			Rainfall and sky conditions	Humidity
	High	Low	Mean		
	°F.	°F.	°F.		
January	84.5	74.5	79.6	Much	High.
February	84.1	74.9	79.5	----do	Very high.
March	84.7	75.6	80.1	----do	Do.
April	84.7	75.6	80.1	----do	Do.
May	83.3	74.1	78.7	Very slight, if any	Moderate.
June	80.1	71.7	75.9	None; cloudy	Do.
July	79.9	71	75.4	----do	Do.
August	81	70.9	76.2	----do	Do.
September	81.9	71.4	76.6	----do	Do.
October	83.1	71	77.2	----do	Do.
November	82	71.6	76.8	----do	Do.
December	85.1	73.6	79.3	Slight, if any	Moderate and high.

TABLE 5.—*Monthly average mean temperatures and rainfall of Ambato and Quito for the past 14 years and the humidity for three months of 1929*

Month	Ambato					Quito				
	Mean high	Mean low	Mean temperature	Rain	Relative humidity	Mean high	Mean low	Mean temperature	Rain	Relative humidity
	°F.	°F.	°F.	Inches		°F.	°F.	°F.	Inches	
January	72.1	48.4	58.4	1.37	----------	67.6	46.6	55.2	5.11	----------
February	71.5	48.8	58	1.85	----------	68.2	46.8	55.2	5.03	----------
March	71	49.2	57.8	2.12	----------	67.6	47.4	55.2	6.22	----------
April	70.5	48.8	57.8	2.36	----------	67.8	47.4	55.2	6.81	----------
May	70.2	48.6	57.4	1.97	----------	67	46.8	55.4	5.19	----------
June	68.2	46.4	55.8	.98	----------	69	45.2	55.4	1.65	----------
July	66.4	46.2	54.8	.70	77	69.7	44.4	54.6	.70	56
August	67.4	45.6	55	.78	76	70.8	44.2	55.4	.86	63
September	69.6	45.8	55.8	1.37	75	71	45	55.6	3.26	69
October	72.4	46.6	57.4	1.57	----------	69.4	45.8	55	5.19	----------
November	73.6	47.4	58.8	2.08	----------	69.2	45.8	55	4.64	----------
December	72.8	48	58.6	1.45	----------	69	46.2	55.2	4.40	----------

TABLE 6.—*Species of rats caught at Ambato and Latacunga in the Sierras*

Month	Ambato (altitude 8,440 feet)						Latacunga (altitude 9,020 feet)			
	Number			Per cent			Number		Per cent	
	Norvegicus	Alexandrinus	Rattus	Norvegicus	Alexandrinus	Rattus	Norvegicus	Alexandrinus and rattus	Norvegicus	Alexandrinus and rattus
January								136		100
February							46	849	5.1	94.9
March	113	120	71	37.1	39.4	23.3	33	665	4.9	95.1
April	158	141	113	38.3	34.2	27.4	24	813	2.9	97.1
May	181	228	203	29.5	37.2	33.1	54	866	6.2	93.8
June	158	167	160	32.5	34.4	32.9		542		100
July	151	173	147	32	36.8	31.2	83	513	16.1	83.9
August	79	131	147	22.1	36.7	41.1	72	375	19.2	80.8
September	43	118	116	15.5	42.5	41.8	62	489	14.9	85.1
October	55	101	124	19.6	36	44.2	15	355	4.2	95.8
November	44	125	123	15	42.8	42.1	36	539	6.6	93.4
December	34	74	66	19.5	42.5	37.9				
Total	1,016	1,378	1,270	27.7	37.6	34.6	425	6,142	6.4	93.5

TABLE 7.—*Flea infestation of rats in the mountain towns of Ecuador where cheopis has been found*

Month	Ambato (altitude 8,440 feet)				Alausi (altitude 8,550 feet)				Latacunga (altitude 9,020 feet)				Quito (altitude 9,350 feet)			
	Number of rats	X. cheopis	Leptopsylla	Ceratophyllus londinensis	Number of rats	X. cheopis	Leptopsylla	Ceratophyllus londinensis	Number of rats	X. cheopis	Leptopsylla	Ceratophyllus londinensis	Number of rats	X. cheopis	Leptopsylla	Ceratophyllus londinensis
January	7	42		14	5	6	2		10	13		8	33	3	77	30
February	16	45		1	4	3	3		43	2	67	50	50	18	293	20
March	30	87		51	13	11	26	3	88	17	11	31	43		175	4
April	5	40		2					45	37	6	13	38		141	40
May	8	66		21					5	14	1	1	45		324	12
June	11	97	2	6					13	18		8	38	6	134	1
July	9	25		10					20	143			53	6	197	22
August	15	1		33	3				15			26	31	13	99	51
September	7	11		32	10	3			2			26	35	52	21	7
October	3	1		2	5		3	2	14		8		14	19	90	3
November					3		3	1					2			7
December	5	14			6		14		4	8		1	21	7	51	
Total	116	429	2	172	49	43	51	6	259	249	93	164	403	124	1,602	197
Total index		3.69	0.01	1.48		0.87	1.04	0.12		0.96	0.35	0.63		0.3	3.97	0.48

TABLE 8.—*Flea infestation of rats in the mountain towns of Ecuador where X. cheopis has never been found*

Month	Riobamba (altitude, 9,020 feet.)			Guaytacama (altitude, 9,500 feet.)			Guamote (altitude, 9,990 feet.)		
	Number of rats	Leptopsylla	Cerato londinensis	Number of rats	Leptopsylla	Cerato londinensis	Number of rats	Leptopsylla	Cerato londinensis
January							50	38	14
February	1		10	14	10	1	22	14	
March				10	11				
April	4		8	31	33				
May				4					
June				14	12		16	38	3
July									
August	2		2	6			5	2	1
September									
October	5			11	52	1			
November	12								
December	10						5	3	2
Total	34		20	90	118	2	98	95	20
Total index			0.58		1.31	0.02		0.96	0.2

TABLE 9.—*Flea infestation of mice in mountain towns of Ecuador*

Month	Ambato (altitude, 8,440 feet)				Alausi (altitude, 8,550 feet)				Quito (altitude, 9,350 feet)				Guamote (altitude, 9,900 feet)			
	Number of Mus musculus	X. cheopis	Leptopsylla	Ceratophyllus londinensis	Number of Mus musculus	X. cheopis	Leptopsylla	Ceratophyllus londinensis	Number of Mus musculus	X. cheopis	Leptopsylla	Ceratophyllus londinensis	Number of Mus musculus	X. cheopis	Leptopsylla	Ceratophyllus londinensis
January	8	1	----	84	371	12	112	73	20	----	----	----	547	----	2,366	85
February	8	3	1	104	223	4	109	16	26	----	17	3	180	----	841	40
March	196	4	5	41	49	1	61	5	23	----	13	1	114	----	356	10
April	26	2	2	72	----	----	----	----	19	----	22	----	282	----	1,127	69
May	81	4	25	61	145	1	85	32	12	----	6	1	59	----	221	19
June	42	3	8	44	----	----	----	----	8	----	----	----	186	----	1,181	38
July	56	2	1	65	----	----	----	----	1	----	----	----	64	----	401	----
August	10	----	----	7	----	----	----	----	----	----	----	----	45	----	291	4
September	23	----	5	86	144	32	324	27	5	----	----	----	44	----	142	7
October	50	4	5	128	271	7	352	41	5	----	----	----	233	----	848	41
November	5	6	----	42	154	3	173	13	----	----	----	----	----	----	----	----
December	55	15	1	70	17	----	11	3	1	----	----	----	104	----	586	25

TABLE 10.—*Comparison of the mean temperatures and cheopis[1] indices of Guayaquil, Ambato, and Quito*

Month	Average mean temperatures			Number of rats and cheopis index					
				Guayaquil		Ambato		Quito	
	Guayaquil	Ambato	Quito	Number of rats	Cheopis index	Number of rats	Cheopis index	Number of rats	Cheopis index
	°F	°F	°F						
October	77.2	57.4	55	----	----	3	0.33	14	1.35
November	76.8	58.8	55	972	8.00	----	----	2	0
December	79.3	58.6	55.2	558	7.59	5	2.80	21	.33
January	79.6	58.4	55.2	681	4.73	7	6.00	33	.09
February	79.5	58	55.2	872	7.02	16	2.81	50	.36
March	80.1	57.8	55.2	665	5.97	30	2.56	43	0
April	80.1	57.8	55.2	----	----	5	8.00	38	0
May	78.7	57.4	55.4	----	----	8	8.50	45	0
June	75.9	55.8	55.4	----	----	11	8.81	38	.15
July	75.4	54.8	54.6	----	----	9	2.77	53	.11
August	76.2	55	55.4	----	----	15	.66	31	.41
September	76.6	55.8	55.6	----	----	5	2.80	35	1.48

[1] The cheopis index given here for Ambato is too high and is listed only to show the presence of cheopis during the different months.

TABLE 11.—*Monthly cheopis index of Guayaquil during the season when plague is most prevalent*

Month	Number of rats	Number of cheopis			Cheopis index		
		Males	Females	Total	Males	Females	Total
November	[1] 972	4,247	3,533	7,780	4.36	3.63	8.00
December	558	2,528	1,711	4,239	4.53	3.06	7.59
January	681	1,869	1,358	3,222	2.74	1.98	4.72
February	872	3,042	3,087	6,129	3.48	3.54	7.02
March	665	2,229	1,744	3,973	3.35	2.62	5.97
Total	3,748	13,915	11,428	25,343	3.71	3.04	6.76

[1] These figures include 169 rats caught during the last 4 days in October.

TABLE 12.—*Cheopis index of Norway adult rats in Guayaquil*

Month	Female adults					Male adults					Total adults, Cheopis index		
	Number of rats	Number of fleas	Cheopis index			Number of rats	Number of fleas	Cheopis index					
			Male	Female	Total			Male	Female	Total	Male	Female	Total
November	112	413	3.68	3.27	6.96	54	488	4.41	4.62	9.03	3.92	3.71	7.63
December	71	425	3.76	2.22	5.98	39	279	3.76	3.38	7.14	3.76	2.63	6.40
January	83	374	2.57	1.92	4.50	55	245	2.74	1.70	4.45	2.64	1.84	4.48
February	109	765	3.22	3.79	7.01	57	343	2.96	3.05	6.01	3.13	3.54	6.67
March	96	384	2.33	1.66	4.00	47	169	1.76	1.82	3.59	2.14	1.72	3.86
Total	471	2,728	3.12	2.67	5.79	252	1,524	3.12	2.92	6.04	3.12	2.75	5.88

TABLE 13.—*Cheopis index of Norway rats one-half to two-thirds grown*

Month	Young females					Young males					Total young, Cheopis index		
	Number of rats	Number of fleas	Cheopis index			Number of rats	Number of fleas	Cheopis index					
			Male	Female	Total			Male	Female	Total	Male	Female	Total
November	87	878	6.03	4.05	10.09	81	834	5.97	4.32	10.29	6.00	4.18	10.19
December	53	379	4.50	2.64	7.15	41	314	4.56	3.09	7.65	4.53	2.84	7.37
January	77	506	4.22	2.35	6.57	50	248	2.88	2.08	4.96	3.69	2.24	5.93
February	68	515	3.80	3.76	7.57	57	483	4.31	4.15	8.47	4.04	3.94	7.98
March	76	328	2.48	1.82	4.30	42	324	4.16	3.54	7.71	3.08	2.44	5.52
Total	361	2,606	4.25	2.96	7.21	271	2,203	4.56	3.56	8.12	4.38	3.22	7.60

TABLE 14.—*Cheopis index of Norway rats less than one-half grown and total Norway rats in Guayaquil*

Month	Less than one-half grown					Total Norway rats				
	Number of rats	Number of fleas	Cheopis index			Number of rats	Number of fleas	Cheopis index		
			Male	Female	Total			Male	Female	Total
November	363	2,657	3.89	3.42	7.31	697	5,637	4.41	3.67	8.08
December	271	2,121	4.71	3.11	7.82	475	3,518	4.45	2.94	7.40
January	355	1,590	2.52	1.95	4.47	620	2,963	2.78	1.99	4.77
February	469	3,238	3.51	3.39	6.90	760	5,344	3.51	3.51	7.02
March	325	2,024	3.54	2.68	6.22	586	3,229	3.11	2.39	5.51
Total	1,783	11,630	3.58	2.94	6.52	3,138	20,691	3.63	2.95	6.58

TABLE 15.—*Comparison of the cheopis index for the three classes of Norway rats*

Month	Cheopis index								
	Adults			One-half to two-thirds grown			Less than one-half grown		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
November	3.92	3.71	7.63	6.00	4.18	10.19	3.89	3.42	7.31
December	3.76	2.63	6.40	4.53	2.84	7.37	4.71	3.11	7.82
January	2.64	1.84	4.48	3.69	2.24	5.93	2.52	1.95	4.47
February	3.13	3.54	6.67	4.04	3.94	7.98	3.51	3.39	6.90
March	2.14	1.72	3.86	3.08	2.44	5.52	3.54	2.68	6.22
Total	3.12	2.75	5.88	4.38	3.22	7.60	3.58	2.94	6.52

TABLE 16.—*Cheopis index of alexandrinus and rattus adults in Guayaquil*

Month	Female adults					Male adults					Total adults		
	Number of rats	Number of fleas	Cheopis index			Number of rats	Number of fleas	Cheopis index			Cheopis index		
			Male	Female	Total			Male	Female	Total	Male	Female	Total
November	13	60	2.30	2.30	4.61	17	149	4.58	4.17	8.76	3.60	3.36	6.96
December	10	82	4.30	3.40	8.20	5	55	6.00	5.00	11.00	4.86	4.26	9.13
January	6	26	2.00	2.33	4.33	13	78	2.84	3.15	6.00	2.57	2.89	5.47
February	9	81	4.55	4.44	9.00	13	114	4.38	4.38	8.76	4.45	4.40	8.86
March	14	159	6.14	5.21	11.35	8	80	5.12	4.87	8.00	5.77	5.09	10.87
Total	52	408	4.07	3.76	7.84	56	476	4.33	4.16	8.50	4.21	3.97	8.18

TABLE 17.—*Cheopis index of young alexandrinus and rattus, one-half to two-thirds grown in Guayaquil*

Month	Young females					Young males					Total young		
	Number of rats	Number of fleas	Cheopis index			Number of rats	Number of fleas	Cheopis index			Cheopis index		
			Male	Female	Total			Male	Female	Total	Male	Female	Total
November	19	230	5.78	6.31	12.10	19	164	4.52	4.10	8.63	5.15	5.21	10.36
December	11	42	2.00	1.81	3.81	13	86	4.07	2.53	6.61	3.12	2.20	5.33
January	7	36	2.00	3.14	5.14	10	53	3.80	1.50	5.30	3.05	2.17	5.23
February	23	133	3.04	2.73	5.78	22	148	2.86	3.86	6.72	2.95	3.28	6.24
March	13	92	3.38	3.69	7.07	15	178	6.60	5.26	11.86	5.10	4.53	9.64
Total	73	533	3.56	3.74	7.30	79	629	4.29	3.67	7.96	3.94	3.70	7.64

TABLE 18.—*Cheopis index of young alexandrinus and rattus less than one-half grown, and total index of these rats in Guayaquil*

Month	Alexandrinus and rattus less than one-half grown					Total alexandrinus and rattus				
	Number of rats	Number of fleas	Cheopis index			Number of rats	Number of fleas	Cheopis index		
			Male	Female	Total			Male	Female	Total
November	38	299	3.97	3.89	7.86	106	902	4.29	4.21	8.50
December	29	318	6.37	4.58	10.96	68	583	4.89	3.67	8.57
January	25	66	1.56	1.08	2.64	61	259	2.29	1.95	4.24
February	45	309	3.08	3.77	6.86	112	785	3.30	3.70	7.00
March	29	235	4.68	3.41	8.10	79	744	5.13	4.27	9.41
Total	166	1,227	3.91	3.47	7.38	426	3,273	4.00	3.68	7.68

TABLE 19.—*Comparison of the cheopis index of the three classes of alexandrinus and rattus in Guayaquil*

Month	Cheopis index								
	Adults			One-half to two-thirds grown			Less than one-half grown		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
November	3.60	3.36	6.96	5.15	5.21	10.36	3.97	3.89	7.86
December	4.86	4.26	9.13	3.12	2.20	5.33	6.37	4.58	10.96
January	2.57	2.89	5.47	3.05	2.17	5.23	1.56	1.08	2.64
February	4.45	4.40	8.86	2.95	3.28	6.24	3.08	3.77	6.86
March	5.77	5.09	10.87	5.10	4.53	9.64	4.68	3.41	8.10
Total	4.21	3.97	8.18	3.94	3.70	7.64	3.91	3.47	7.38

TABLE 20.—*Comparison of the alexandrinus and rattus cheopis index in Guayaquil*

Month	Total rattus					Total Alexandrinus				
	Number of rats	Number of fleas	Cheopis index			Number of rats	Number of fleas	Cheopis index		
			Male	Female	Total			Male	Female	Total
November	67	609	4.62	4.46	9.08	39	293	3.71	3.79	7.51
December	44	358	4.70	3.43	8.13	24	225	5.25	4.12	9.37
January	49	213	2.42	1.91	4.34	12	46	1.75	2.08	3.83
February	72	586	3.80	4.33	8.13	40	199	2.40	2.57	4.97
March	43	392	5.11	4.00	9.11	36	352	5.16	4.61	9.77
Total	275	2,158	4.10	3.73	7.84	151	1,115	3.80	3.58	7.38

TABLE 21.—*Comparison of the norvegicus, rattus, and alexandrinus cheopis index in Guayaquil*

Month	Total rattus and Aloxandrinus					Total Norway				
	Number of rats	Number of fleas	Cheopis index			Number of rats	Number of fleas	Cheopis index		
			Male	Female	Total			Male	Female	Total
November	106	902	4.29	4.21	8.50	697	5,637	4.41	3.66	8.08
December	68	583	4.89	3.67	8.57	475	3,518	4.45	2.94	7.40
January	61	259	2.29	1.95	4.24	620	2,963	2.78	1.99	4.77
February	112	785	3.30	3.70	7.00	760	5,344	3.51	3.51	7.02
March	79	744	5.13	4.27	9.41	586	3,229	3.11	2.39	5.51
Total	426	3,273	4.00	3.68	7.68	3,138	20,691	3.63	2.95	6.58

TABLE 22.—*Analysis of the cheopis infestation of rats less than one-half grown during the months of November and December in Guayaquil*

Age	Rattus and alexandrinus			Norvegicus		
	Number of rats	Number of fleas	Cheopis index	Number of rats	Number of fleas	Cheopis index
Rats one-fourth to one-half grown	45	341	7.57	358	2,218	6.09
Rats one-sixth to one-fourth grown	12	90	7.33	164	1,212	7.39
Rats one-sixth or less	29	306	10.55	181	1,729	9.55
Total	86	737	8.56	703	5,159	7.33

TABLE 23.—*Flea index of rats caught in different establishments in Guayaquil*

Establishments	November	December	January	February	March	Total
Houses	8.52	8.59	4.76	5.43	5.02	6.34
Hotels	8.75	5.33	2.33	6.57	0.50	7.18
Hospitals and barracks	9.62	0.25		18.85	13.50	14.05
Grocery stores and grain stores	9.39	6.20	3.34	7.66	3.59	6.37
Meat shops	10.85	17.00	5.53	9.50	9.75	14.92
Bakeries	6.37	2.00	7.16	2.25	8.42	5.68
Fruit shops	3.75	3.60	1.71	8.44	1.66	3.71
Saloons	1.80	12.00	6.34	8.82	7.00	6.63
Clothing stores	9.54	14.33	4.33	5.22	8.58	8.36
Shoe shops	10.88	4.00	9.76	5.76	3.53	7.50
Tailor shops	10.75	11.25	2.83	10.88	6.00	8.40
Printing shops	1.60		34.38	10.33	125.00	20.90
Cigar factories	9.97	12.40	6.00			9.90
Jewelry and hardware stores	5.66	5.50	11.14	17.37		10.73
Wharves	0.50		0.25			0.47
Lumber and coal yards	0.00	0.40	1.60		0.50	0.50
Carpenter shops	10.84	3.00		11.72	0.72	8.44
Machine shops		2.23	3.33	4.82	4.16	3.80
Ice factory	1.50		0.80	8.25	10.42	5.41
Coffee, cacao, and sugar warehouses					9.00	9.00

TABLE 24.—*Cheopis index in the business section of Guayaquil where grains and foods are sold; an area of 15 blocks*

Month	Number of rats	Number of cheopis	Cheopis index
November and December	206	2,224	10.79
January	74	505	6.82
February	142	1,939	13.63
March	81	481	5.93
Total	503	5,149	10.23

TABLE 25.—*Cheopis index of the better general business section of Guayaquil, also better residence section—an area of 32 blocks*

Month	Number of rats	Number of cheopis	Cheopis index
November and December	303	2,519	8.31
January	105	605	5.76
February	171	1,223	7.15
March	84	521	6.20
Total	663	4,868	7.33

TABLE 26.—*Cheopis index of 85 scattered blocks in Guayaquil composed chiefly of bamboo shacks*

Month	Number of rats	Number of cheopis	Cheopis index
November and December	165	1,041	6.30
January	90	363	4.03
February	92	366	3.97
March	58	219	3.75
Total	405	1,989	4.89

TABLE 27.—*Relative effect of the cheopis index of rats caught in dwelling houses on the total index*

Month	Total number of rats caught	Number of rats caught in dwelling houses	Per cent of rats caught in houses	Total number of fleas recovered	Number of fleas recovered from houses	Per cent of fleas from houses	Total cheopis index	Cheopis index for houses
November	803	348	43	6,539	2,965	45	8.14	8.52
December	558	318	57	4,239	2,733	64	7.59	8.59
January	681	361	53	3,222	1,719	53	4.73	4.76
February	872	461	53	6,129	2,506	41	7.02	5.43
March	662	369	56	3,973	1,854	47	5.97	5.02
Total	3,746	1,857	50	25,343	11,777	47	6.76	6.34

TABLE 28.—*Percentage of norvegicus caught above the ground floor and on the ground floor of houses and in bamboo shacks, with their cheopis index*

Month	Rats caught on upper floors of houses			Rats caught on ground floor and patios of houses			Rats caught in bamboo shacks		
	Number of norvegicus	Per cent of norvegicus	Cheopis index	Number of norvegicus	Per cent of norvegicus	Cheopis index	Number of norvegicus	Per cent of norvegicus	Cheopis index
January	94	29	7.81	116	36	4.01	113	35	2.69
February	111	29	7.73	156	40	4.76	118	31	3.61
March	63	20	9.76	127	39	3.60	134	41	3.37
Total	268	26	8.24	399	39	4.18	365	35	3.23

TABLE 29.—*Comparison of the cheopis index of norvegicus with that of rattus and alexandrinus caught in dwelling houses*

Month	Rats caught above the ground floor of houses				Rats caught on the ground floor and in patios				Rats caught in bamboo shacks			
	Number of norvegicus	Number of rattus and alexandrinus	Cheopis index		Number of norvegicus	Number of rattus and alexandrinus	Cheopis index		Number of norvegicus	Number of rattus and alexandrinus	Cheopis index	
			Norvegicus	Rattus and alexandrinus			Norvegicus	Rattus and alexandrinus			Norvegicus	Rattus and alexandrinus
January	94	17	7.81	8.05	116	10	4.01	3.20	113	11	2.69	1.27
February	111	39	7.73	6.20	156	21	4.76	6.37	118	26	3.61	4.65
March	63	12	9.76	26.50	127	16	3.60	6.25	134	17	3.37	4.23
Total	268	68	8.24	10.25	399	47	4.18	5.72	365	54	3.51	3.85

TABLE 30.—*Cheopis index of norvegicus caught in dwelling houses*

Month	Rats caught above the ground floor of houses			Rats caught on the ground floor and in patios			Rats caught in bamboo shacks		
	Cheopis index			Cheopis index			Cheopis index		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
January	4.52	3.29	7.81	2.22	1.79	4.01	1.59	1.09	2.69
February	3.87	3.86	7.73	2.34	2.42	4.76	1.99	1.61	3.61
March	5.74	4.01	9.76	1.89	1.70	3.60	2.01	1.35	3.37

TABLE 31.—*Number and percentage of norvegicus caught in dwellings, together with classification according to degree of cheopis infestation*

Nature of places rats were caught	Month	Rats without cheopis		Rats with only 1 cheopis		Rats with 2 to 4 cheopis		Total rats with 0–4 cheopis			Rats with 5 or more cheopis	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Index	Number	Per cent
Above ground floor of dwellings	January	14	15	12	13	19	20	45	48	1.46	49	52
	February	15	14	11	10	20	18	46	42	1.45	65	58
	March	9	14	6	10	10	16	25	40	1.48	38	60
Ground floor or patio of dwellings	January	30	26	12	10	42	36	84	72	1.67	32	28
	February	35	22	23	15	43	28	101	65	1.41	55	35
	March	42	33	28	22	25	20	95	75	1.05	32	25
Bamboo shacks	January	23	20	34	30	35	31	92	81	1.44	21	19
	February	41	35	26	22	22	19	89	75	.89	29	25
	March	61	46	22	16	15	11	98	73	.67	36	27

TABLE 32.—*Percentage of rattus and alexandrinus caught in dwellings having none or only 1 cheopis during months of January, February, and March*

Location in which caught	Total number of rattus and alexandrinus caught	Rattus and alexandrinus having 0–1 cheopis	
		Number	Per cent
Above ground floor of dwellings	68	6	8.8
On ground floor or in patios	47	13	27.6
Bamboo shacks	54	22	40.7

TABLE 33.—*Bimonthly climatic conditions and cheopis index*

Bimonthly periods	Cheopis index			Highest temperature	Lowest temperature	Mean high temperature	Mean low temperature	Mean temperature	Approximate humidity	Rain conditions
	Male	Female	Total							
				°F.	°F.	°F.	°F.	°F.		
Oct. 2	[1] 4.29	3.13	7.42	86	68	83.1	70.8	76.9	Moderate / Not high	None.
Nov. 1	4.51	3.80	8.32	87	69	84	70.4	77.2	Moderate / Not high	Do.
Nov. 2	3.79	3.32	7.12	86	70	83.8	70.3	77	Moderate / Not high	Do.
Dec. 1	4.27	2.56	6.84	(?)					Moderate / Not high	Do.
Dec. 2	4.90	3.59	8.50	92	71	87.2	72.2	79.7	Moderate / Not high	Do.
Jan. 1	2.72	2.06	4.78	90	71	87.4	76.8	82.1	Moderate / Not high	Do.
Jan. 2	2.69	1.88	4.57	90	71	85.2	72.9	79	High	Rain Jan. 21 all night; 5 light rains.
Feb. 1	3.63	3.90	7.53	87	71	84.2	75.8	80	do	Rain every day.
Feb. 2	3.33	3.09	6.42	87	71	84.7	72.9	78.8	do	Rain every day to Feb. 26.
Mar. 1	4.23	3.24	7.47	89	72	85.3	74.5	79.9	do	8 days of light rainfall.
Mar. 2	2.36	1.93	4.30	90	73	86.6	74.8	80.7	do	8 days light, 2 days heavy rain.

[1] Index for the last 4 days in October.

TABLE 34.—*Monthly percentage of cheopis females*

	Monthly cheopis index	Monthly per cent female cheopis
November	8.00	45.4
December	7.59	40.3
January	4.73	41.9
February	7.02	50.3
March	5.97	44.0
Total	6.76	45.0

TABLE 35.—*Percentage of female cheopis found on norvegicus having different degrees of infestation and caught in different classes of dwellings during the rainy season*

Location in which norvegicus was caught	Month	Norvegicus with 1–4 cheopis			Norvegicus with 5–9 cheopis			Norvegicus with 10 or more cheopis		
		Number of male cheopis	Number of female cheopis	Per cent of female cheopis	Number of male cheopis	Number of female cheopis	Per cent of female cheopis	Number of male cheopis	Number of female cheopis	Per cent of female cheopis
Above ground floor of dwellings	January	30	36	55	85	63	43	310	211	40
	February	32	35	52	90	89	49.7	308	305	49.7
	March	18	19	51	57	37	39	287	197	41
Ground floor or patio of dwellings	January	81	60	43	63	41	39	114	107	48
	February	59	72	55	112	89	44	195	205	51
	March	49	51	51	54	49	48	138	117	42
Bamboo shacks	January	71	62	47	54	36	40	55	26	32
	February	50	36	42	51	28	35	134	127	49
	March	31	35	53	75	40	35	164	107	39
Total	January	182	158	46	202	140	41	479	344	42
	February	141	143	50.3	253	206	45	637	637	50
	March	98	105	52	186	126	40	589	421	42

TABLE 36.—*Average number of very young cheopis females found on rats caught in different classes of dwellings*

Location in which rat was caught	Month	Number of rats	Number of young female cheopis	Average number of young females per rat
Above ground floor of dwellings	January	94	75	0.79
	February	111	109	.98
	March	63	36	.57
Total		268	220	.82
Ground floor or patio of dwellings	January	116	40	.34
	February	156	93	.59
	March	127	24	.17
Total		399	157	.39
Bamboo shacks	January	113	32	.28
	February	118	43	.36
	March	134	36	.26
Total		365	111	.30

TABLE 37.—*Percentage of rats showing different degrees of cheopis infestation*

Month	Number of rats	Cheopis index	No cheopis	1 cheopis	2 to 4 cheopis	5 to 9 cheopis	10 to 19 cheopis	20 to 49 cheopis	50 or more cheopis
			Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
November	972	8.00	16	13	20	22	20	9	0.6
December	558	7.59	16	11	30	16	17	8	2.0
January	681	4.73	21	18	30	17	11	3	0.1
February	872	7.02	20	12	21	22	16	8	1.0
March	665	5.97	27	14	18	17	17	5	0.6

TABLE 38.—*Percentage of cheopis found on rats having different degrees of flea infestation*

Month	Number of cheopis	Cheopis index	1 cheopis	2 to 4 cheopis	5 to 9 cheopis	10 to 19 cheopis	20 to 49 cheopis	50 or more cheopis
			Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
November	7,780	8.00	2	7	19	35	32	5
December	4,239	7.59	1	11	14	30	31	13
January	3,223	4.73	4	19	23	33	20	2
February	6,129	7.02	2	9	19	30	33	8
March	3,973	5.97	2	9	18	38	24	9

TABLE 39.—*Cheopis index of Mus musculus*

Month	Number of mice	Number of fleas	Cheopis index		
			Male	Female	Total
October	1,240	201	0.088	0.073	0.161
November	504	154	.186	.119	.305
December	574	126	.118	.101	.219
January	437	98	.141	.082	.224
February	447	136	.185	.118	.304
March	531	126	.141	.096	.237

TABLE 40.—*The results of each city-wide broadcasting of poison as reported by householders to inspectors*

Number of poison broadcast	Number of houses visited	Number of rats reported found dead	Average number per house visited	Number of poison broadcast	Number of houses visited	Number of rats reported found dead	Average number per house visited
First	545	956	1.75	Fifth	6,272	1,174	0.18
Second	6,129	3,035	.49	Sixth	5,924	1,084	.18
Third	5,612	1,920	.34	Seventh	7,712	1,212	.16
Fourth	5,037	1,140	.22				

TABLE 41.—*Bimonthly number and percentage of rats trapped during the poison campaign and number per 100 traps per day*

Date of beginning and completion of each poison broadcast	Number trapped					Percentage				Number of rats per 100 traps per day
	Bimonthly period	Rattus	Alexandrinus	Total rattus and alexandrinus	Norvegicus	Rattus	Alexandrinus	Total rattus and alexandrinus	Norvegicus	
First began Sept. 23; completed Oct. 16	Sept. 1	342	134	476	1,450	17.7	6.9	24.7	75.2	11.67
	Sept. 2	277	97	374	1,289	16.6	5.8	22.4	77.6	[1] 3.46
Second began Oct. 17; completed Nov. 16	Oct. 1	244	85	329	1,021	18.0	5.6	24.2	75.6	[1] 2.81
	Oct. 2	337	113	450	2,429	11.7	3.9	15.6	84.3	5.84
Third began Nov. 18; completed Dec. 14	Nov. 1	332	114	446	2,231	12.4	4.2	16.6	83.3	5.07
	Nov. 2	516	324	840	2,270	16.5	10.4	27.0	72.9	4.57
Fourth began Dec. 16; completed Jan. 9	Dec. 1	602	296	898	1,736	22.8	11.2	34.0	65.9	4.18
	Dec. 2	415	165	580	1,544	19.5	7.7	27.3	72.6	3.16
Fifth began Jan. 10; completed Jan 31	Jan. 1	340	97	437	1,237	20.3	5.7	26.1	73.8	2.69
	Jan. 2	772	262	1,034	2,391	23.5	7.6	30.1	69.8	4.21
Sixth began Feb. 1; completed Feb. 20	Feb. 1	773	331	1,104	2,421	21.9	9.3	31.3	68.6	4.95
Seventh began Feb. 21; completed Mar. 19	Feb. 2	738	379	1,117	2,605	19.8	10.1	30.0	69.9	5.23
	Mar. 1	864	340	1,204	2,111	26.0	10.2	36.3	63.6	3.68
Eighth began Mar. 20	Mar. 2	935	369	1,304	1,623	31.9	12.6	44.5	55.4	3.05

[1] Traps concentrated for 1 month on the southern outskirts of the city in a small district extending across the city.

TABLE 42.—*Number of guinea pig deaths from daily mass inoculation of rat spleens and human cases of plague during the intensive poison campaign*

Month	Cases of human plague	Number of rat spleens inoculated	Number of guinea pig deaths	Average number of rats per dead guinea pig
October	10	2,486	8	310.7
November	14	4,109	16	256.8
December	18	3,285	12	273.7
January	4	3,570	4	892.5
February	2	4,818	4	1,204.5
March	3	5,953	2	2,976.5

TABLE 43.—*Comparison of the results of trapping during six months when poison was used with the corresponding six months of the following year*

Month	Poison used indifferently				Poison used intensively			
	Total catch of rats and mice	Number of rats	Per cent of rats	Number of rats per 100 traps per day	Total catch of rats and mice	Number of rats	Per cent of rats	Number of rats per 100 traps per day
October	15,170	3,984	26	10.7	11,081	4,229	38	4.3
November	13,737	4,237	31	11.7	13,440	5,787	43	4.8
December	11,617	3,450	30	8.2	10,426	4,758	46	3.6
January	11,153	4,263	38	11.2	12,081	5,099	42	3.5
February	14,423	4,447	31	13.2	16,264	7,247	45	5.1
March	14,562	5,104	35	13.7	15,671	6,242	40	3.3

DEATHS DURING WEEK ENDED AUGUST 23, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended August 23, 1930, and corresponding week of 1929. (*From the Weekly Health Index, issued by the Bureau of Census, Department of Commerce*)

	Week ended Aug. 23, 1930	Corresponding week, 1929
Policies in force	75,743,912	74,612,447
Number of death claims	13,050	11,660
Death claims per 1,000 policies in force, annual rate	9.0	8.1

Deaths [1] from all causes in certain large cities of the United States during the week ended August 23, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census. The rates are not exactly comparable with similar rates published in the Public Health Reports earlier than the issue of August 22, 1930, which were based upon estimates made before the 1930 census was taken]

City	Week ended Aug. 23, 1930				Corresponding week, 1929		Death rate [2] for first 34 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Total, (78 cities)	6,324	9.5	673	[4] 53	10.3	737	12.3	13.2
Akron	24	4.9	3	27	9.5	16	8.0	9.8
Albany [5]	32	13.1	1	22	13.2	3	15.2	16.7
Atlanta	42	8.2	6	63	13.9	11	16.4	16.6
White	15		1	32		7		
Colored	27	(6)	5	79	(6)	4	(6)	(6)
Baltimore [5]	155	10.1	17	58	12.6	21	14.5	15.4
White	112		13	56		15		
Colored	43	(6)	4	65	(6)	6	(6)	(6)
Birmingham	50	10.0	15	140	13.0	10	14.3	16.9
White	26		8	123		9		
Colored	24	(6)	7	166	(6)	1	(6)	(6)
Boston	169	11.2	20	56	12.4	20	14.5	15.9
Bridgeport	27	9.6	0	0	8.2	2	11.4	12.7
Buffalo	95	8.6	9	40	13.6	14	13.3	14.6
Cambridge	20	9.2	2	37	10.6	4	12.2	13.2
Camden	17	7.6	3	54	13.4	4	14.1	14.9
Canton	18	8.9	3	74	13.5	3	9.5	11.9
Chicago [5]	551	8.5	63	56	9.0	52	10.7	11.8
Cincinnati	110	12.7	8	47	15.7	11	16.0	17.7
Cleveland	177	10.2	27	81	10.3	22	11.4	13.1
Columbus	50	9.0	3	29	12.6	7	16.3	15.5
Dallas	61	12.1	9		8.2	3	12.1	12.2
White	47		7			3		
Colored	14	(6)	2		(6)	0	(6)	(6)
Dayton	38	9.8	2	30	8.7	3	10.6	11.8
Denver	87	15.7	15	156	15.9	4	14.8	15.3
Des Moines	29	10.6	1	17	11.1	1	12.2	12.1
Detroit	227	7.5	35	54	9.9	45	9.7	11.7
Duluth	19	9.8	2	54	8.3	1	11.4	11.8
El Paso	35	17.8	9		15.6	5	18.2	20.9
Erie	28	12.6	3	64	13.6	5	11.6	13.1
Fall River [5] [7]	16	7.3	1	23	11.4	1	12.5	15.0
Flint	25	8.3	9	105	8.6	5	9.5	10.9
Fort Worth	35	11.3	9		7.2	3	11.6	13.1
White	27		7			2		
Colored	8	(6)	2		(6)	1	(6)	(6)
Grand Rapids	18	5.6	2	30	10.7	4	10.6	10.4
Houston	64	11.4	7		9.3	7	12.5	13.1
White	45		6			5		
Colored	19	(6)	1		(6)	2	(6)	(6)
Indianapolis	91	13.0	10	75	13.9	9	15.1	15.2
White	74		8	69		6		
Colored	17	(6)	2	108	(6)	3	(6)	(6)
Jersey City	43	7.1	5	43	9.8	6	11.7	13.1
Kansas City, Kans	34	14.5	0	0	12.9	2	11.4	14.0
White	29		0	0		1		
Colored	5	(6)	0	0	(6)	1	(6)	(6)
Kansas City, Mo	93	12.3	6	47	12.6	12	13.8	14.5
Knoxville	24	11.8	5	117	13.1	2	14.3	14.2
White	19		5	130		2		
Colored	5	(6)	0	0	(6)	0	(6)	(6)
Los Angeles	198	8.3	12	36	9.1	23	11.3	11.7
Louisville	59	10.0	5	43	17.3	10	14.0	15.7
White	43		5	49		6		
Colored	16	(6)	0	0	(6)	4	(6)	(6)
Lowell [7]	29	15.1	5	119	12.9	4	14.1	15.1
Lynn	15	7.6	0	0	9.7	1	11.0	11.8
Memphis	74	15.3	9	107	18.1	6	18.0	19.5
White	37		5	92		3		
Colored	37	(6)	4	135	(6)	3	(6)	(6)

Footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended August 23, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended Aug. 23, 1930				Corresponding week, 1929		Death rate [2] for first 34 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1930	1929
Milwaukee	78	7.1	6	30	7.2	11	10.0	11.4
Minneapolis	57	6.4	3	19	8.8	10	10.8	11.3
Nashville	41	14.5	4	62	19.6	12	17.9	19.8
White	27		3	62		11		
Colored	14	(6)	1	63	(6)	1	(6)	(6)
New Bedford [7]	13	6.0	0	0	8.3	1	11.3	13.2
New Haven	31	9.9	2	39	9.0	1	13.4	13.6
New Orleans	137	15.6	25	145	14.5	15	18.0	18.2
White	80		15	133		9		
Colored	57	(6)	10	168	(6)	6	(6)	(6)
New York	1,071	8.0	108	45	8.4	105	11.2	11.8
Bronx Borough	140	5.7	11	26	6.3	10	8.1	8.6
Brooklyn Borough	378	7.6	47	50	7.4	35	10.1	10.7
Manhattan Borough	404	11.4	41	67	12.0	54	16.8	17.3
Queens Borough	114	5.4	5	145	6.1	4	7.3	7.9
Richmond Borough	35	11.5	4	74	12.2	2	14.8	16.3
Newark, N. J.	66	7.7	5	26	10.1	10	12.4	13.4
Oakland	55	10.0	4	48	12.1	6	11.1	11.7
Oklahoma City	38	10.7	6	118	7.4	0	10.9	11.1
Omaha	38	9.2	3	34	12.0	6	14.1	14.2
Paterson	22	8.3	4	70	6.8	1	12.6	13.9
Philadelphia	409	10.9	39	58	9.8	42	12.9	13.7
Pittsburgh	121	9.4	8	29	11.7	29	14.2	15.3
Portland, Oreg	62	10.8	3	37	12.1	3	12.7	13.2
Providence	36	7.5	3	28	10.0	2	13.6	15.2
Richmond	43	12.2	2	30	10.3	2	15.4	17.0
White	25		1	22		1		
Colored	18	(6)	1	44	(6)	1	(6)	(6)
Rochester	65	10.4	8	71	11.3	6	11.9	13.0
St. Louis	168	10.6	21	68	13.8	27	14.8	15.4
St. Paul	37	7.1	2	20	7.4	3	10.3	10.9
Salt Lake City [8]	29	10.8	2	31	9.8	3	12.8	13.5
San Antonio	73	14.8	11		14.1	16	16.0	15.4
San Diego	35	12.2	1	21	11.3	4	14.5	15.8
San Francisco	145	12.0	4	27	10.0	6	13.4	13.5
Schenectady	19	10.3	2	62	4.9	0	11.5	12.8
Seattle	87	12.5	3	30	8.4	3	11.2	11.3
Somerville	16	8.0	1	33	7.6	0	10.1	9.6
Spokane	19	8.6	1	26	8.6	1	12.5	13.3
Springfield, Mass	26	9.0	4	63	10.9	1	12.5	13.2
Syracuse	44	11.0	7	87	10.7	5	12.1	13.7
Tacoma	25	12.2	2	51	8.3	0	12.9	12.0
Toledo	52	9.3	1	9	9.6	4	12.9	14.0
Trenton	31	13.2	4	74	12.8	5	17.2	17.7
Utica	17	8.6	1	28	9.7	0	15.2	16.0
Washington, D. C	114	12.2	19	110	11.4	18	15.6	16.0
White	68		12	104		9		
Colored	46	(6)	7	124	(6)	9	(6)	(6)
Waterbury	20	10.3	3	77	8.3	3	10.2	10.0
Wilmington, Del. [7]	24	11.9	1	23	9.4	2	15.0	14.3
Worcester	40	10.6	4	52	11.2	2	13.2	13.2
Yonkers	15	5.8	1	24	9.0	6	8.2	9.5
Youngstown	26	7.9	4	63	9.9	4	10.4	12.5

[1] Deaths of nonresidents are included. Stillbirths are excluded.

[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.

[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.

[4] Data for 73 cities.

[5] Deaths for week ended Friday.

[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

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

UNITED STATES

CURRENT WEEKLY STATE REPORTS

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

Reports for Weeks Ended August 30, 1930, and August 31, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 30, 1930, and August 31, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929
New England States:								
Maine	3	2	2	3	3	17	0	0
New Hampshire	1				2		0	0
Vermont	1					2	0	0
Massachusetts	56	34	1		47	28	2	1
Rhode Island	4	3					0	0
Connecticut	6	11	2	2	2	1	1	2
Middle Atlantic States:								
New York	52	100	[1] 5	[1] 3	75	59	8	10
New Jersey	28	65	8	2	19	7	3	3
Pennsylvania	36	79			48	75	17	13
East North Central States:								
Ohio	24	46	9	14	12	32	6	5
Indiana	8	17	9		1	3	5	2
Illinois	68	97	4	13	10	40	5	0
Michigan	23	33			22	30	4	3
Wisconsin	5	12	18	16	44	29	4	1
West North Central States:								
Minnesota	14	8	3	8	2	5	1	2
Iowa	6	4				4	0	2
Missouri	19	11			10	18	5	8
North Dakota	4	5		3		6	0	1
South Dakota	4	2					0	0
Nebraska	1	3	1		6	13	0	0
Kansas	11	10			16	10	4	1
South Atlantic States:								
Delaware	1				1		0	0
Maryland [2]	16	16	7	2	4	3	1	1
District of Columbia	4	11			1	2	0	0
Virginia								
West Virginia	9	8	4		1	1	0	3
North Carolina	67	117			4	1	0	3
South Carolina	21	40	138	180			0	0
Georgia	16	26	4	17	4	5	0	6
Florida	5	24			4	1	0	1

[1] New York City only. [2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 30, 1930, and August 31, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929
East South Central States:								
Kentucky							0	0
Tennessee	10	28	4	16		5	1	1
Alabama	16	49	6	7	27	19	2	0
Mississippi	14	30					1	
West South Central States:								
Arkansas	1	5	9	9			0	0
Louisiana	8	27	6	8	3		3	0
Oklahoma [3]	3	26	2	10	1	4	3	1
Texas	13	39	18	12	2	2	0	0
Mountain States:								
Montana		1			2	10	2	0
Idaho						1	0	2
Wyoming						1	0	1
Colorado	12	2			5	3	2	1
New Mexico	10	2			10		0	0
Arizona	2					1	1	1
Utah [2]		1	4				2	4
Pacific States:								
Washington	2	3			6	7	0	2
Oregon	3	3	1	5	8	6	0	0
California	24	28	15	7	44	23	4	3

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929
New England States:								
Maine	5	0	12	10	0	0	5	4
New Hampshire	0	0	1	4	0	0	2	1
Vermont	0	2	2	2	0	0	1	0
Massachusetts	23	2	42	38	0	0	12	7
Rhode Island	1	0	4	2	0	0	3	4
Connecticut	3	2	8	8	0	0	1	4
Middle Atlantic States:								
New York	29	26	42	46	0	8	30	69
New Jersey	1	2	16	19	0	0	19	20
Pennsylvania	7	13	53	61	0	3	55	43
East North Central States:								
Ohio	28	10	50	48	5	15	39	33
Indiana	4	0	10	20	15	13	19	10
Illinois	19	4	60	74	8	13	41	28
Michigan	5	3	41	53	7	5	21	17
Wisconsin [4]	5	0	27	34	2	6	9	8
West North Central States:								
Minnesota	19	3	14	25	1	4	5	5
Iowa	6	1	5	17	6	5	1	12
Missouri	19	0	17	18	1	2	13	7
North Dakota	1	0	5	9	1	0	16	0
South Dakota	9	0	1	5	4	3	2	5
Nebraska	6	0	5	4	4	4	0	2
Kansas	48	1	12	16	7	9	18	13
South Atlantic States:								
Delaware	0	0	1		0	0	8	10
Maryland [3]	5	1	9	17	0	0	38	33
District of Columbia	0	0	4	5	0	0	[4] 12	2
Virginia		25						
West Virginia	1	6	10	11	7	1	73	35
North Carolina	2	3	45	66	1	4	40	31
South Carolina	0	3	8	17	0	0	48	59
Georgia	0	0	4	22	0	0	35	65
Florida	0	0	5	2	0	0	1	5

[2] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.
[4] Includes nonresidents.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 30, 1930, and August 31, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929
East South Central States:								
Kentucky	1	1	2	14	3	0	39	27
Tennessee	2	4	21	13	0	0	54	65
Alabama	3	1	32	34	1	0	30	30
Mississippi	4	0	1	13	0	0	27	30
West South Central States:								
Arkansas	8	0	3	6	2	1	38	21
Louisiana	13	0	1	7	0	0	36	20
Oklahoma [3]	8	0	3	22	10	6	43	57
Texas	1	0	9	15	7	6	12	13
Mountain States:								
Montana	0	0	5	8	0	0	1	3
Idaho	0	2	1	----	0	1	0	0
Wyoming	2	0	3	1	0	0	1	0
Colorado	2	0	8	4	1	9	15	9
New Mexico	2	0	1	1	10	3	15	6
Arizona	6	1	1	----	0	0	11	0
Utah [3]	0	0	3	7	0	0	4	1
Pacific States:								
Washington	1	0	9	13	11	8	5	6
Oregon	2	1	7	6	3	1	5	5
California	49	7	27	48	5	19	13	7

[2] Week ended Friday. [3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

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

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
April, 1930										
Colorado	11	55	1	----	3,927	----	0	147	63	7
May, 1930										
Colorado	6	37	----	----	3,632	----	0	85	46	13
June, 1930										
Colorado	6	19	----	----	1,616	----	3	53	38	6
Hawaii Territory	6	30	2	----	36	----	1	6	0	8
July, 1930										
Illinois	23	350	40	133	505	1	16	414	185	103
Kansas	11	19	5	9	175	----	47	79	76	64
Missouri	10	70	3	112	126	----	1	103	83	89
Montana	5	3	----	----	16	----	2	35	9	9
Oregon	2	15	8	----	144	----	5	17	36	22
Virginia	16	53	232	71	451	111	28	106	15	259

April, 1930

Colorado:	Cases
Actinomycosis	1
Chicken pox	355
German measles	19
Impetigo contagiosa	1
Mumps	847
Rocky Mountain spotted or tick fever	3
Septic sore throat	2
Vincent's angina	2
Whooping cough	452

May, 1930

Colorado:	Cases
Chicken pox	301
German measles	12
Impetigo contagiosa	3
Mumps	703
Ophthalmia neonatorum	1
Rocky Mountain spotted or tick fever	5
Vincent's angina	1
Whooping cough	332

June, 1930	Cases
Chicken pox:	
Colorado	98
Hawaii Territory	38
Conjunctivitis, follicular:	
Hawaii Territory	14
Dysentery (amebic):	
Hawaii Territory	1
German measles:	
Colorado	4
Hookworm disease:	
Hawaii Territory	12
Impetigo contagiosa:	
Colorado	1
Hawaii Territory	4
Leprosy:	
Hawaii Territory	6
Mumps:	
Colorado	329
Hawaii Territory	24
Opthalmia neonatorum:	
Colorado	1
Rocky Mountain spotted or tick fever:	
Colorado	2
Tetanus:	
Colorado	1
Hawaii Territory	1
Trachoma:	
Hawaii Territory	4
Vincent's angina:	
Colorado	1
Whooping cough:	
Colorado	294
Hawaii Territory	8

July, 1930	
Anthrax:	
Illinois	1
Chicken pox:	
Illinois	319
Kansas	30
Missouri	67
Montana	16
Oregon	65
Virginia	106
Conjunctivitis:	
Illinois	1
Diarrhea and dysentery:	
Virginia	1,758
Dysentery:	
Illinois	42
Kansas	1
Oregon	4
Food poisoning:	
Kansas	2
German measles:	
Illinois	27
Impetigo contagiosa:	
Kansas	1
Oregon	8
Lead poisoning:	
Illinois	15
Lethargic encephalitis:	
Illinois	5
Lethargic encephalitis—Continued.	
Kansas	2
Oregon	1
Mumps:	
Illinois	350
Kansas	83
Missouri	38
Montana	17
Oregon	56
Ophthalmia neonatorum:	
Illinois	33
Missouri	4
Montana	2
Paratyphoid fever:	
Illinois	4
Kansas	6
Oregon	1
Puerperal septicemia:	
Illinois	9
Rabies in animals:	
Illinois	4
Missouri	4
Rocky Mountain spotted or tick fever:	
Montana	4
Scabies:	
Oregon	2
Septic sore throat:	
Illinois	8
Kansas	1
Missouri	25
Oregon	9
Tetanus:	
Illinois	11
Kansas	1
Missouri	1
Tick paralysis:	
Montana	1
Trachoma	
Illinois	9
Kansas	1
Missouri	41
Oregon	1
Trichinosis:	
Illinois	1
Tularaemia:	
Oregon	1
Virginia	3
Typhus fever:	
Virginia	13
Undulant fever:	
Illinois	10
Kansas	8
Missouri	17
Virginia	5
Vincent's angina:	
Kansas	4
Oregon	3
Whooping cough:	
Illinois	825
Kansas	210
Missouri	148
Montana	294
Oregon	174
Virginia	564

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 31,890,000. The estimated population of the 89 cities reporting deaths is more than 29,300,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended August 23, 1930, and August 24, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	574	919	
96 cities	208	366	424
Measles:			
45 States	559	540	
96 cities	169	111	
Meningococcus meningitis:			
46 States	94	94	
96 cities	38	58	
Poliomyelitis:			
46 States	325	103	
Scarlet fever:			
46 States	617	845	
96 cities	197	243	245
Smallpox:			
46 States	149	177	
96 cities	12	21	9
Typhoid fever:			
46 States	1,009	869	
96 cities	118	182	167
Deaths reported			
Influenza and pneumonia:			
89 cities	283	325	
Smallpox:			
89 cities	0	0	

City reports for week ended August 23, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	1	0		0	0	1	1
New Hampshire:								
Concord	0	0	0		0	0	0	0
Manchester	0	0	0		0	0	0	1
Nashua	0	0	1		0	0	0	0

City reports for week ended August 23, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND—con.								
Vermont:								
Barre	0	0	0		0	0	0	0
Burlington	0	0	0		0	0	0	0
Massachusetts:								
Boston	2	19	12	2	0	20	6	11
Fall River	1	1	3		0	1	0	0
Springfield	1	1	0		0	1	0	1
Worcester	0	3	1		0	2	0	0
Rhode Island:								
Pawtucket	0	0	0		0	0	0	0
Providence	0	2	0		0	0	0	1
Connecticut:								
Bridgeport	0	2	0		0	0	0	2
Hartford	0	2	2		0	3	1	6
New Haven	0	1	0		0	0	0	1
MIDDLE ATLANTIC								
New York:								
Buffalo	3	8	9		0	1	1	4
New York	10	80	33	4	2	39	10	70
Rochester	1	2	0		0	0	1	6
Syracuse	0	1	4		1	4	2	1
New Jersey:								
Camden	0	2	0		0	3	0	1
Newark	0	6	6	1	0	3	2	0
Trenton	0	1	0		0	0	0	0
Pennsylvania:								
Philadelphia	7	28	0	2	2	13	6	24
Pittsburgh	0	11	7		1	6	3	10
Reading	1	1	0		0	0	0	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	1	4	1		0	3	1	6
Cleveland	7	19	6	3	0	2	1	4
Columbus	4	2	2		0	6	1	0
Toledo	0	5	0	1	1	0	0	3
Indiana:								
Fort Wayne	0	1	0		0	0	0	2
Indianapolis	0	2	0		0	0	0	12
South Bend	0	1			0	1	0	1
Terre Haute	0	0	0		0	0	0	0
Illinois:								
Chicago	13	52	41	2	1	6	16	13
Springfield	0	0	1		0	0	0	1
Michigan:								
Detroit	3	22	8		1	8	1	2
Flint	0	2	1		0	4	0	0
Grand Rapids	0	1	1		0	0	0	2
Wisconsin:								
Kenosha	1	0	0		0	0	1	0
Madison	1	0	0			2	0	
Milwaukee	6	7	4		0	2	8	1
Racine		0						
Superior	0	0	0		0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	0	0	0		0	0	0	0
Minneapolis	1	10	3		0	1	0	2
St. Paul	1	5	1		0	0	0	3
Iowa:								
Davenport	0	0	0			0	0	
Des Moines	0	1	0			0	0	
Sioux City	0	0	1			0	0	
Waterloo	0	0	0			0	0	
Missouri:								
Kansas City	0	2	0		0	1	0	4
St. Joseph	0	0	0		0	0	0	2
St. Louis	0	16	7			7	0	

City reports for week ended August 23, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST NORTH CENTRAL—continued								
North Dakota:								
Fargo	0	0	0		0	0	10	0
Grand Forks	0	0	0			0	0	
South Dakota:								
Sioux Falls	0	0	0			0	0	
Nebraska:								
Omaha	0	3	1		0	1	0	1
Kansas:								
Topeka	0	0	0		0	0	0	0
Wichita	0	0	0		0	0	0	0
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	1	0		0	0	0	0
Maryland:								
Baltimore	1	13	2		0	1	0	5
Cumberland	0	1	0		0	0	0	0
Frederick	0	1	0		0	0	0	0
District of Columbia:								
Washington	1	6	2		0	8	0	6
Virginia:								
Lynchburg	0	0	0		0	0	0	0
Richmond	15	6	6		0	0	0	1
Roanoke	0	2	1		0	0	0	0
West Virginia:								
Charlestown	0	0	0		0	0	0	1
Wheeling	0	1	1		0	0	0	2
North Carolina:								
Raleigh	0	1	0		0	0	0	1
Wilmington	0	0	0		0	0	0	0
Winson-Salem	2	1	1	1	0	0	0	1
South Carolina:								
Charleston	0	0	3	4	0	0	0	2
Columbia	0	0	0	2	0	1	2	2
Georgia:								
Atlanta	0	3	0		3	0	0	3
Brunswick	0	0	0		0	0	0	0
Savannah	0	1	4		0	0	2	0
Florida:								
Miami	0	0	0		0	0	0	1
St. Petersburg		0			0			0
Tampa	0	1	0		1	0	0	2
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0		0	0	0	1
Tennessee:								
Memphis	0	2	1		0	0	1	1
Nashville	0	3	0		0	0	0	4
Alabama:								
Birmingham	0	3	0	1	0	1	0	4
Mobile	0	0	1		0	0	0	0
Montgomery	2	1	0			0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	0			0	0	
Little Rock	0	0	0		0	0	0	2
Louisiana:								
New Orleans	1	6	7	1	1	0	0	5
Shreveport	0	0	0		0	0	0	0
Oklahoma:								
Oklahoma City	0	1	0		0	0	0	4
Tulsa	0	0	0			0	0	
Texas:								
Dallas	0	4	7		0	0	0	3
Fort Worth	0	2	0		0	0	0	2
Galveston	0	0	0		0	0	0	0
Houston	0	3	3		0	0	0	3
San Antonio	0	2	1		0	0	0	3

City reports for week ended August 23, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MOUNTAIN								
Montana:								
Billings	0	0	0	----	0	0	0	0
Great Falls	1	0	0	----	0	0	0	0
Helena	0	0	0	----	0	0	0	0
Missoula	0	0	0	----	0	0	0	1
Idaho:								
Boise	0	0	0	----	0	0	0	0
Colorado:								
Denver	0	7	5	----	1	1	0	3
Pueblo	2	2	0	----	0	1	2	1
New Mexico:								
Albuquerque	0	0	0	----	0	0	0	0
Arizona:								
Phoenix	0	0	0	----	0	0	0	0
Utah:								
Salt Lake City	3	2	0	----	0	1	0	1
Nevada:								
Reno	0	0	0	----	0	0	0	0
PACIFIC								
Washington:								
Seattle	2	2	0	----	----	11	6	----
Spokane	1	2	0	----	----	2	0	----
Tacoma	0	1	0	----	0	0	0	3
Oregon:								
Portland	1	3	1	----	0	3	2	0
Salem	1	0	0	----	0	0	1	0
California:								
Los Angeles	4	22	8	5	2	4	7	11
Sacramento	1	2	0	----	0	0	2	0
San Francisco	----	10	----	----	----	----	----	----

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	0	2	0	0	0	0	1	0	0	10	18
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	10
Manchester	0	0	0	0	0	0	0	0	0	0	14
Nashua	0	0	0	0	0	0	0	0	0	0	----
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	0
Burlington	0	0	0	0	0	0	0	0	0	0	9
Massachusetts:											
Boston	14	9	0	0	0	15	3	6	0	47	169
Fall River	1	1	0	0	0	3	1	0	0	1	16
Springfield	1	1	0	0	0	0	1	1	0	3	21
Worcester	2	4	0	0	0	4	1	0	0	10	40
Rhode Island:											
Pawtucket	0	0	0	0	0	2	0	0	0	0	7
Providence	2	2	0	0	0	3	1	0	0	1	36
Connecticut:											
Bridgeport	2	1	0	0	0	3	1	0	0	0	27
Hartford	1	1	0	0	0	3	0	0	0	1	33
New Haven	1	0	0	0	0	1	2	0	0	6	31
MIDDLE ATLANTIC											
New York:											
Buffalo	5	10	0	0	0	7	1	1	0	49	95
New York	22	21	0	0	0	82	40	15	1	79	1,070
Rochester	1	3	0	0	0	2	1	0	0	13	63
Syracuse	1	1	0	0	0	1	0	0	0	22	44

City reports for week ended August 23, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
MIDDLE ATLANTIC—continued											
New Jersey:											
Camden	0	0	0	0	0	0	1	2	0	0	17
Newark	3	2	0	0	0	5	1	0	0	10	68
Trenton	1	2	0	0	0	1	1	2	0	0	31
Pennsylvania:											
Philadelphia	15	13	0	0	0	24	8	8	0	18	409
Pittsburgh	7	4	0	0	0	8	3	1	0	36	121
Reading	0	0	0	0	0	0	1	0	0	0	18
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	4	1	0	0	0	9	3	4	0	0	110
Cleveland	9	4	0	0	0	12	4	2	0	33	177
Columbus	3	3	0	0	0	3	1	0	1	13	50
Toledo	2	5	0	0	0	8	3	3	0	0	51
Indiana:											
Fort Wayne	0	0	0	0	0	1	2	0	0	0	21
Indianapolis	2	4	0	0	0	7	1	0	0	13	----
South Bend	1	1	0	0	0	2	0	0	0	0	17
Terre Haute	0	0	0	0	0	1	0	0	0	2	23
Illinois:											
Chicago	24	26	0	0	0	44	5	2	1	65	551
Springfield	0	0	0	0	0	1	0	2	0	4	17
Michigan:											
Detroit	22	8	0	0	0	20	5	4	0	71	227
Flint	4	1	0	0	0	0	0	0	0	6	25
Grand Rapids	3	0	0	0	0	0	1	1	0	1	18
Wisconsin:											
Kenosha	0	1	0	0	0	0	0	0	1	4	4
Madison	0	0	0	0	----	----	0	0	----	9	----
Milwaukee	7	3	0	0	0	2	0	0	0	42	78
Racine	1	----	0	----	----	----	0	----	----	----	----
Superior	1	1	0	0	0	2	0	0	0	0	5
WEST NORTH CENTRAL											
Minnesota:											
Duluth	4	1	0	0	0	1	0	0	0	3	19
Minneapolis	12	2	0	0	0	2	1	3	0	6	57
St. Paul	5	0	1	0	0	0	1	0	0	1	37
Iowa:											
Davenport	0	1	0	2	----	----	0	0	----	0	----
Des Moines	2	0	1	0	----	----	0	0	----	0	29
Sioux City	0	0	0	0	----	----	0	0	----	3	----
Waterloo	0	0	0	0	----	----	0	0	----	1	----
Missouri:											
Kansas City	2	2	0	0	0	8	3	1	1	2	93
St. Joseph	0	0	0	0	0	2	0	1	1	1	26
St. Louis	10	8	0	1	0	5	7	6	0	3	168
North Dakota:											
Fargo	1	0	0	0	0	0	0	0	0	2	----
Grand Forks	0	0	0	0	----	----	0	0	----	0	----
South Dakota:											
Sioux Falls	1	0	0	0	----	----	0	0	----	0	9
Nebraska:											
Omaha	1	2	0	0	0	1	0	0	0	0	38
Kansas:											
Topeka	2	0	0	3	0	0	1	0	0	0	6
Wichita	1	3	0	0	0	0	0	0	0	0	23
SOUTH ATLANTIC											
Delaware:											
Wilmington	0	2	0	0	0	0	0	0	0	0	24
Maryland:											
Baltimore	5	4	0	0	0	19	9	7	0	25	155
Cumberland	0	0	0	0	0	0	0	1	0	0	7
Frederick	0	0	0	0	0	0	0	0	0	0	4
District of Columbia:											
Washington	4	4	0	0	0	15	4	2	0	9	144

City reports for week ended August 23, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
SOUTH ATLANTIC—continued											
Virginia:											
Lynchburg	0	0	0	0	0	2	1	2	1	0	16
Richmond	3	1	0	0	0	2	1	1	0	0	43
Roanoke	1	1	0	1	0	0	1	0	0	0	15
West Virginia:											
Charleston	1	0	0	0	0	0	1	[1]9	0	0	14
Wheeling	0	0	0	0	0	0	1	0	0	5	16
North Carolina:											
Raleigh	0	1	0	0	0	0	1	1	0	0	7
Wilmington	1	0	0	0	0	1	0	0	0	14	14
Winston-Salem	1	1	0	0	0	3	1	0	0	2	17
South Carolina:											
Charleston	0	0	0	0	0	2	3	0	0	0	29
Columbia	0	0	1	0	0	0	0	1	1	0	18
Georgia:											
Atlanta	4	0	0	0	0	4	4	6	0	2	42
Brunswick	0	0	0	0	0	1	0	0	0	0	2
Savannah	0	0	1	0	0	2	1	0	1	1	24
Florida:											
Miami	0	0	0	0	0	1	1	1	0	0	18
St. Petersburg	0	----	0	----	0	1	0	----	0	----	12
Tampa	0	1	0	0	0	1	1	0	1	0	20
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	0	0	0	0	2	0	1	0	0	18
Tennessee:											
Memphis	1	1	0	0	0	3	7	7	2	0	74
Nashville	1	3	0	0	0	4	6	3	2	7	41
Alabama:											
Birmingham	3	0	0	0	0	2	5	0	0	2	50
Mobile	0	0	0	0	0	2	0	0	0	0	24
Montgomery	0	1	0	0	----	----	0	2	----	1	----
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	0	0	0	----	----	0	0	----	0	----
Little Rock	0	0	0	0	0	0	1	0	2	0	----
Louisiana:											
New Orleans	1	5	0	0	0	7	4	2	1	6	137
Shreveport	0	0	0	0	0	0	0	0	1	0	31
Oklahoma:											
Oklahoma City	2	3	0	0	0	3	3	6	0	0	38
Tulsa	1	1	0	0	----	----	2	0	----	1	----
Texas:											
Dallas	2	3	1	0	0	1	4	0	1	4	61
Fort Worth	1	0	0	0	0	0	2	0	0	0	35
Galveston	0	0	0	0	0	0	0	0	0	0	7
Houston	1	1	0	2	0	4	0	4	0	0	64
San Antonio	1	1	0	0	0	7	1	1	0	0	73
MOUNTAIN											
Montana:											
Billings	0	1	1	0	0	0	0	0	0	4	8
Great Falls	0	2	0	0	0	0	0	0	0	0	10
Helena	0	0	0	0	0	1	0	0	0	3	6
Missoula	0	0	0	0	0	0	0	0	0	0	2
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	0	6
Colorado:											
Denver	2	3	0	0	0	9	1	3	0	20	82
Pueblo	0	0	0	0	0	0	0	0	0	1	5
New Mexico:											
Albuquerque	0	0	0	0	0	5	1	0	0	0	11
Arizona:											
Phoenix	0	0	0	1	0	0	0	0	0	0	----

[1] Includes nonresidents.

City reports for week ended August 23, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
MOUNTAIN—con.											
Utah:											
Salt Lake City	2	4	1	0	0	2	1	0	0	20	29
Nevada:											
Reno	0	0	0	0	0	1	0	0	0	0	2
PACIFIC											
Washington:											
Seattle	2	2	0	0			2	0		18	
Spokane	2	0	0	2			0	2		0	
Tacoma	1	1	1	0	0	0	0	0	0	0	25
Oregon:											
Portland	2	1	3	1	0	2	1	0	0	3	62
Salem	0	0	0	0	0	0	0	0	0	9	
California:											
Los Angeles	7	6	2	3	0	21	3	1	1	20	198
Sacramento	1	0	0	0	0	3	1	0	0	0	22
San Francisco	5		1				1				

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	1	2	0
Massachusetts:									
Boston	1	0	0	0	3	0	2	15	1
MIDDLE ATLANTIC									
New York:									
Buffalo	0	1	0	0	0	0	0	17	0
New York	5	8	2	0	0	0	15	5	0
Rochester	0	0	0	0	0	0	1	8	1
Syracuse	0	0	0	0	0	0	2	11	0
New Jersey:									
Newark	0	1	0	0	0	0	1	0	0
Pennsylvania:									
Philadelphia	9	4	3	0	1	1	1	6	0
Pittsburgh	1	0	0	0	0	0	1	2	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	0	0	0	0	0	0	2	1
Cleveland	2	1	0	0	0	0	1	4	0
Indiana:									
Indianapolis	5	2	0	0	0	0	0	0	0
Illinois:									
Chicago	4	1	1	0	0	0	3	2	0
Michigan:									
Detroit	2	0	0	0	0	0	2	0	0
Flint	0	0	0	1	0	0	0	0	0
Grand Rapids	0	1	0	0	0	0	0	0	0
Wisconsin:									
Milwaukee	0	0	0	0	0	0	0	2	0

City reports for week ended August 23, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	1	0	0	0	0	1	0	0
Minneapolis	2	0	0	0	0	0	0	0	0
Iowa:									
Sioux City	0	0	0	0	0	0	0	1	0
Waterloo	0	0	0	0	0	0	0	1	0
Missouri:									
Kansas City	1	1	0	0	0	0	0	0	0
St. Louis	2	1	0	0	0	0	1	1	0
Nebraska:									
Omaha	0	0	0	0	0	0	0	2	0
Kansas:									
Wichita	0	0	0	0	0	0	0	1	0
SOUTH ATLANTIC									
Delaware:									
Wilmington	0	0	0	0	0	0	0	1	0
Maryland:									
Baltimore	0	0	0	1	0	0	1	0	1
District of Columbia:									
Washington	1	0	0	0	0	0	0	1	1
Virginia:									
Roanoke	0	0	0	0	0	0	0	1	0
West Virginia:									
Wheeling	0	0	0	1	0	0	0	0	0
North Carolina:									
Raleigh	0	0	0	0	2	0	0	0	0
Winston-Salem	0	0	0	0	2	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	0	1	0	0	0
Georgia:									
Atlanta	1	1	0	0	0	1	1	0	0
Brunswick	0	0	0		1	1	0	0	0
Savannah [1]	0	0	0	0	1	0	0	0	0
Florida:									
Tampa [1]	0	0	0	0	0	1	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	0	0	0	2	0
Louisiana:									
New Orleans	1	1	0	0	4	1	1	1	0
Shreveport	0	0	0	0	0	4	0	0	0
Oklahoma:									
Oklahoma City	0	1	0	0	0	0	0	5	0
Tulsa	0	0	0	0	0	0	0	2	0
Texas:									
Dallas	0	0	0	0	1	0	1	0	0
Fort Worth	0	0	0	0	0	2	0	0	0
MOUNTAIN									
Colorado:									
Denver	0	0	0	0	0	0	1	1	0
Pueblo	0	0	0	0	0	0	0	1	0
PACIFIC									
Oregon:									
Portland	1	0	0	0	0	0	0	0	0
California:									
Los Angeles	1	0	0	0	0	0	2	18	1

[1] Typhus fever, 5 cases: 4 cases at Savannah, Ga., and 1 case at Tampa, Fla.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended August 23, 1930, compared with those for a like period ended August 24, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, July 20 to August 23, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	July 26, 1930	July 27, 1929	Aug. 2, 1930	Aug. 3, 1929	Aug. 9, 1930	Aug. 10, 1929	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929
98 cities	38	68	39	67	[2] 38	[3] 63	31	61	[4] 34	61
New England	22	58	33	54	31	45	40	38	40	63
Middle Atlantic	35	75	35	67	[5] 35	70	23	59	28	58
East North Central	49	103	49	99	48	81	36	86	[6] 41	69
West North Central	34	21	34	25	[7] 30	31	27	23	25	25
South Atlantic	35	28	37	47	16	30	35	47	37	75
East South Central	27	27	7	34	[8] 27	[8] 30	34	82	13	55
West South Central	34	99	37	95	[9] 54	118	52	122	67	141
Mountain	69	9	34	9	17	35	17	44	43	26
Pacific	33	31	52	46	66	43	35	31	[10] 26	29

MEASLES CASE RATES

98 cities	107	69	68	49	[2] 51	[3] 30	33	24	[4] 28	20
New England	175	101	97	97	91	31	60	29	60	38
Middle Atlantic	152	27	91	35	[5] 67	15	41	15	33	13
East North Central	60	149	34	84	28	58	19	35	[6] 20	33
West North Central	63	58	42	38	[7] 47	33	30	13	19	8
South Atlantic	46	17	55	11	22	9	22	15	18	0
East South Central	61	7	40	7	[8] 27	[8] 7	20	0	7	14
West South Central	7	27	11	8	[9] 14	19	7	23	0	4
Mountain	172	70	154	26	112	61	43	52	26	52
Pacific	191	77	118	43	73	24	50	46	[10] 55	39

SCARLET FEVER CASE RATES

98 cities	50	59	39	40	[2] 32	[3] 44	31	39	[4] 33	41
New England	66	56	55	63	42	52	51	49	47	45
Middle Atlantic	36	19	22	24	[5] 19	23	18	17	27	15
East North Central	76	110	50	62	46	72	39	50	[6] 34	63
West North Central	30	77	49	35	[7] 28	44	28	40	34	58
South Atlantic	37	60	40	28	18	41	26	73	27	34
East South Central	54	27	7	34	[8] 18	[8] 15	54	14	34	68
West South Central	49	57	56	38	[9] 45	42	34	38	37	65
Mountain	26	26	60	9	69	44	43	78	86	44
Pacific	45	65	40	48	45	56	38	53	[10] 29	51

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1930 and 1929, respectively.
[2] Rochester, N. Y., Wichita, Kans., Memphis, Tenn., and Houston, Tex., not included.
[3] Montgomery, Ala., not included.
[4] Racine, Wis., and San Francisco, Calif., not included.
[5] Rochester, N. Y., not included.
[6] Racine Wis., not included.
[7] Wichita, Kans., not included.
[8] Memphis, Tenn., not included.
[9] Houston, Tex., not included.
[10] San Francisco, Calif., not included.

Summary of weekly reports from cities, July 20 to August 23, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

SMALLPOX CASE RATES

	Week ended—									
	July 26, 1930	July 27, 1929	Aug. 2, 1930	Aug. 3, 1929	Aug. 9, 1930	Aug. 10, 1929	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929
98 cities	7	8	4	7	[2] 2	[3] 5	3	7	[4] 2	3
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	[5] 0	0	0	3	0	0
East North Central	8	16	2	13	6	12	3	16	[6] 0	4
West North Central	21	21	13	6	[7] 4	10	6	4	8	6
South Atlantic	2	0	4	0	2	0	0	0	2	0
East South Central	20	7	0	7	[8] 0	[3] 7	7	7	0	0
West South Central	4	8	15	4	[9] 5	0	4	0	7	8
Mountain	17	9	0	26	0	0	0	9	0	26
Pacific	26	22	26	34	5	17	14	12	[10] 16	17

TYPHOID FEVER CASE RATES

98 cities	18	18	18	19	[2] 17	[3] 17	21	20	[4] 20	30
New England	7	29	7	11	4	13	4	11	16	27
Middle Atlantic	7	7	5	11	[5] 10	11	15	19	14	34
East North Central	13	8	13	10	11	11	10	5	[6] 9	12
West North Central	47	13	23	33	[7] 20	15	28	6	21	13
South Atlantic	38	37	48	22	60	22	40	39	55	51
East South Central	74	103	121	150	[8] 54	[3] 45	148	123	88	103
West South Central	41	69	45	53	[9] 5	61	45	46	26	88
Mountain	17	44	26	9	34	9	26	61	26	70
Pacific	12	7	19	19	12	29	14	17	[10] 10	5

INFLUENZA DEATH RATES

91 cities	3	3	1	3	[2] 3	1	1	3	[4] 3	3
New England	0	2	0	0	0	0	0	0	0	2
Middle Atlantic	1	2	0	2	[5] 2	1	2	2	3	3
East North Central	3	4	1	4	1	1	0	2	[6] 1	4
West North Central	3	3	0	0	[7] 3	6	3	3	0	0
South Atlantic	4	4	5	4	9	0	0	0	7	2
East South Central	0	0	0	15	[8] 0	0	0	22	0	0
West South Central	11	4	0	8	[9] 0	0	0	12	4	8
Mountain	0	9	0	9	17	0	0	17	9	9
Pacific	3	0	3	0	6	0	0	3	[10] 10	0

PNEUMONIA DEATH RATES

91 cities	57	49	53	54	[2] 54	53	55	57	[4] 47	54
New England	40	31	38	43	42	38	38	52	51	25
Middle Atlantic	72	57	62	61	[5] 61	60	72	71	55	60
East North Central	38	38	44	47	47	43	28	35	[6] 28	47
West North Central	56	51	47	39	[7] 44	45	27	33	35	49
South Atlantic	79	60	60	51	66	41	68	62	48	73
East South Central	103	52	59	75	[8] 51	60	59	90	74	37
West South Central	77	86	61	78	[9] 56	121	92	78	61	66
Mountain	77	61	60	61	69	61	120	35	51	52
Pacific	9	25	46	59	43	41	49	72	[10] 67	50

[2] Rochester, N. Y., Wichita, Kans., Memphis, Tenn., and Houston, Tex., not included.
[3] Montgomery, Ala., not included.
[4] Racine, Wis., and San Francisco, Calif., not included.
[5] Rochester, N. Y., not included.
[6] Racine, Wis., not included.
[7] Wichita, Kans., not included.
[8] Memphis, Tenn., not included.
[9] Houston, Tex., not included.
[10] San Francisco, Calif., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended August 16, 1930.—The Department of Pensions and National Health reports cases of certain communicable diseases in Canada for the week ended August 16, 1930, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia [1]					
New Brunswick					10
Quebec			1	2	14
Ontario	6	2	57	5	9
Manitoba			1		2
Saskatchewan					4
Alberta			14		4
British Columbia				2	1
Total	6	2	73	9	44

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended August 23, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended August 23, 1930, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Poliomyelitis	1
Diphtheria	27	Scarlet fever	34
Erysipelas	2	Tuberculosis (pulmonary)	18
Influenza	1	Tuberculosis (other forms)	5
Measles	2	Typhoid fever	19
Mumps	6	Whooping cough	28

CZECHOSLOVAKIA

Communicable diseases—June, 1930.—During the month of June, 1930, cases of communicable diseases were reported in Czechoslovakia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	10	1	Puerperal fever	55	23
Cerebrospinal meningitis	12	4	Scarlet fever	1,632	39
Diphtheria	1,366	80	Trachoma	292	----
Dysentery	9	----	Typhoid fever	439	30
Malaria	57	----	Typhus fever	1	----
Paratyphoid fever	34	----			

PORTO RICO

San Juan—Communicable diseases—Five weeks ended August 9, 1930.—During the five weeks ended August 9, 1930, cases of certain communicable diseases were reported in San Juan, Porto Rico, as follows:

Disease	Cases	Disease	Cases
Diphtheria	2	Tetanus	4
Dysentery	1	Tuberculosis	74
Malaria	8	Typhoid fever	7
Measles	1	Whooping cough	3
Ophthalmia neonatorum	2		

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

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930 7	14	21	28	July, 1930 5	12	19	26	August, 1930 2	9	16	23	30
Afghanistan	C										[1] P						P	
China:																		
Canton	C				3		2				2	1						
Manchuria—Dairen	C	1																
Swatow	C				3	4	3							1				
India	C	5,914	10,817	41,462	56,311	10,088	10,103	10,162	6,767	6,728	5,520							
	D	3,371	5,866	27,906	44,878	7,802	7,110	6,455	4,344	3,712	3,095							
Bassein	C			7	7													
	D			5	5													
Bombay	C		4												2			
Calcutta	C	269	354	647	609	78	78	94	77	81	53	49	37	18	10	17		
	D	153	220	414	372	44	36	36	63	54	28	23	23	7	7	10		
Negapatam	C						1											
	D						1											
Rangoon	C	3	2	1	9	1	1	2	2	1								
	D	1	2	1	3	1	1	1	1	1								
India (French):																		
Chandernagor	C	4	1	6	6			1	2			1						
	D	2	3	5	6			1	1									
Karikal	C	4	12	1					3									
	D	1	9	1					3									
Indo-China (see also table below):																		
Pnompenh	C	9		2	1	5	10	11	14	9	16	7		5	3	3		
	D	7	6		5	1	4	7	6	6	9	5	2	3	2	1		
Saigon and Cholon	C	5	14	76	160	17	19	7	5	7	1	1	1	2	2	1		
	D	4	6	55	101	11	10	2		3					1			
Philippine Islands: [2]																		
Ports—																		
Cebu	C								1	20	13	13	9	5	4			1
	D									9	7	12	8	4	4			1

Iloilo	C											1	11	17	9	19	32	4	3
	D												9	13	10	18	19	9	4
Manila	C				1											1			16
	D																		5
Provinces—																			
Antique	C														14	4		3	2
	D														7	4		2	1
Bohol	C															45	67	31	24
	D															26	37	15	11
Bulacan [3]	C					1			2		1	1	2	1					1
	D					1													1
Capiz	C											2	1	1	1	1			1
	D											1	1	1	1	1			
Cebu [3]	C				1	13	26	118	198	313	222	115	63	55	37	4			1
	D				1	11	23	50	86	131	83	60	29	32	27	3			1
Iloilo [3]	C							1	1	20	45	85	159	143	227	176	88	74	
	D								1	10	23	64	96	77	164	119	64	51	
La Union	C										1								
Leyte	C							21	26	11									
	D							12	7	11									
Masbate [3]	C								10	14	32	25	21	15	27				
	D								3	2	18	5	10	5	11				
Misamis, Occidental	C									1	2								
	D									1	2								
Negros, Occidental [3]	C				10	5	55	50	30	62	163	172	171	151	99	50	72	40	
	D				7	2	27	36	23	42	90	122	114	97	72	34	47	31	
Negros, Oriental [3]	C									1	1	6	15	6	2				
	D										1	3	9	1	3				
Nueva Acija	C												1						
	D												1						
Pampanga	C							1	1	2									1
Pangasinan	C									2		1		1					
	D									2				1					
Rizal	C						1				1								
	D						1				1								
Samar	C															5	4	10	
	D															5	3	8	
Surigao	C															15	4	21	3
	D															9	2	19	3
Tarlac [3]	C													1					
Siam	C	7	1	29	33	8	10	6	3	8	3	8							
	D	4		13	21	3	9	4	3	4	1	3							
Bangkok	C	2	2	15	9	5	3	3	1		3	4	1	1			1		
	D		1	4	3		3		2		1	1	1	1			1		
Nagara Pathom	C	1		10															
	D	1		2															
Songkla	C										8		2						
	D										4		2						

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.
[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] Figures for cholera in the Philippine Islands for the weeks ended July 26 and August 2, 1930, have been corrected from late reports since the last issue of the Public Health Reports.

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

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4-31, 1930	Week ended—												
						June, 1930				July, 1930				August, 1930				
						7	14	21	28	5	12	19	26	2	9	16	23	30
On vessel:																		
S. S. at Suva, Fiji Islands	C	1																
S. S. Sutley at Batavia, from Calcutta	C	1																
S. S. Sassari at Massoua, from Jeddah	C				1													
	D				1													
On small boat at Port Cebu, from Bantayan Island	C					1												
	D					1												

Place		January, 1930	February, 1930	March, 1930	April, 1930			May, 1930			June, 1930			July, 1930		
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31
Indo-China (French) (see also table above):																
Annam [1]	C	1	4	52			60		20	3	2	14				1
Cambodia [1]	C	147	90	81	18	6		5	31	52	56	88				43
Cochin-China [1]	C	177	65	82	48			188	224	259	147	126				46

[1] Reports incomplete.

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

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930 7	14	21	28	July, 1930 5	12	19	26	August, 1930 2	9	16	23	30
Algeria:																		
Algiers	C										1	2			1			
Constantine	C					1				1								
Oran	C											2	1		1		1	
Argentina:																		
Andalgala [1]																		
Villa Lia	D	2																
Azores: Ponta Delgada	C			8														
	D			5														
Belgian Congo	C									2				1		1		
	D									2				1		1		
British Africa: Gambia	C																4	
British East Africa (see also table below):																		
Tanganyika	C	7		44														
	D			20														
Uganda	C	47	98	117	227	121	77	105	103		50							
	D	43	87	105	195	75	70	93	90		47							
Canary Islands: Las Palmas	D														1			
Ceylon:																		
Colombo	C	3	4	1	6	1				1	2					1		
	D	3	4	1	5	1				1	2					1		
Plague-infected rats		3	2	4		1												
Chile: Antofagasta	C	1	1	1														
	D		2	1														
Dutch East Indies:																		
Batavia and West Java	C	153	124	87	82	19	27	28	24	19	25	18						
	D	150	122	81	82	19	27	28	24	19	25	18						
Plague-infected rats		3	3	8	5	3	1								1			
Java and Madura	D	296	223	173	185	40	55	56										
Ecuador (see table below).																		

[1] On Mar. 11, 3 deaths from bubonic plague were reported in Andalgala, Catamarca Province, Argentina, since Feb. 5, 1930.

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

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930 7	14	21	28	July, 1930 5	12	19	26	August, 1930 2	9	16	23	30
Egypt:																		
Alexandria	C	1	4	2	13	3	6	6	4	8	8	3	4	2	2	4	3	3
	D		1	2	3	2		2	5	2	3	2	3	2	1	3		5
Assiout	C			14	20	4	2	3		1	1							
	D			5	5		1		2	1	1							
Beheira	C		4															
Beni-Suef	C		4														1	
Dakahlieh	C	8	5	5	11	1												
	D		1		2													
Gharbieh	C			1										3				
	D			1										1				
Girga	C			1							1							
Minieh	C				7	1	1	4	4	2	1							
	D				1		1											
Port Said	C			1	2	1			1				1	1				
France:																		
Marseille	C																	2
St. Ouen	C											1						
	D											1						
Greece (see also table below):																		
Patras	C		1					1				1						
Pyrgos	C		1															
Hawaii Territory, Hamakua, Hawaii: Plague-infected rats								1										
India	C	5,639	4,087	2,215	648	55	59	62	64	70	75							
	D	3,940	3,344	1,960	635	42	52	43	50	46	46							
Bassein	C		3															
	D		1															
Bombay	C	1	7	4	6	1		2					1					
	D	1	5	8	5			1	1				1					
Plague-infected rats		31	86	108	81	6	7	8	5	13	14	10	15	10	8	9		

Madras Presidency	C	230	157	44	38	26	10	3		10	1	10				7		
	D	140	87	19	11	15	2	5		4	1	9				1		
Rangoon	C	7	3	5	4				1				2	2	1			
	D	6	3	4	3				1				2	1	1			
Plague-infected rats		7	3	4	5			1		2	2		2	4		2		
India (Portuguese)	D				7													
Indo-China (see also table below):																		
Pnompenh	C			3	3	6					1	1			2			
	D	13	13	4	1	5	1		1		1	1						
Saigon and Cholon	C		1		1	1		1										
	D		1					1										
Iraq: Baghdad	C	6	7	6	37	12	4	8	4	10	4	2	2	4	3	2		
	D	1	4	2	18	7	3	5		5		1	1		2	1		
Japan: Osaka (vicinity of)—Plague-infected rats		6	4	3														
Kwang-Chow-Wan	C	25	7	37	34	23		8								4		
Madagascar (see also table below): Tamatave	C			1		1												
Morocco	C	48	55	121	71	2		1					1		8			
	D	13	18	45	34	4									1			
Nigeria: Lagos	C	7	13		2	1		3	1	1				2	1			
	D	7	5		2	1		3	1	1				2	1			
Plague-infected rats		42	25	7	17	1	4	1	5	2	3	6						
Senegal (see table below).																		
Siam	C	17	16	5	5													
	D	13	15	6	4													
Bangkok	C	1	5		5									1	2			
	D	1	4		4										2			
Nagara Pathom	C	5	1	10														
	D	6	1	9														
Nagara Rajsima	C	2	1	1										1				
	D		1	1										1				
Syria: Beirut	C						2	5	5		2	4	3		1		1	3
Tunisia:																		
Sfax district	C	22		1	21	6		3					6		1			
Tunis	C	5	1	4	1		1				1	4						
	D					1					1							
Union of Socialist Soviet Republics:																		
Salsk Region	C					1			1									
	D					1												
Stavropol Region	C					1												
	D					1												
Union of South Africa:																		
Cape Province	C	2	1		P	1												
	D	1	1															
Orange Free State	C	11	5	1														
	D	3	3															
Transvaal	C	2	1															
	D		1															

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

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930	July, 1930
British East Africa (see also table above):							
Kenya	C	69	85	16	171	107	36
Uganda	C	109	-------	-------	-------	-------	50
	D	90	-------	-------	-------	-------	47
Ecuador: Guayaquil	C	2	2	0	-------	-------	-------
	D	2	-------	0	-------	-------	-------
Plague-infected rats		2	2	0	-------	-------	-------
Greece (see also table above)	C	-------	-------	1	-------	1	-------
Indo-China (see also table above)	C	30	27	4	-------	11	1
Madagascar (see also table above):							
Ambositra Province	C	49	25	14	1	-------	-------
	D	41	20	12	1	-------	-------
Antisirabe Province	C	22	38	46	19	-------	-------
	D	22	36	45	19	-------	-------
Itasy Province	C	-------	4	-------	-------	-------	-------
	D	-------	4	-------	-------	-------	-------
Miarinarivo Province	C	25	14	1	5	1	-------
	D	25	14	1	5	1	-------
Madagascar—Continued.							
Moramanga Province	C	7	5	3	1	3	-------
	D	4	5	3	-------	3	-------
Tananarive Province	C	110	52	39	15	6	-------
	D	107	52	38	14	6	-------
Senegal:							
Baol [1]	C	-------	18	24	13	2	62
	D	-------	8	12	11	2	48
Dakar [1]	C	-------	-------	2	52	53	140
	D	-------	-------	2	42	117	122
Louga [1]	C	2	-------	33	54	60	138
	D	-------	-------	10	27	21	103
Thies [1]	C	-------	3	12	21	52	54
	D	-------	2	9	8	35	30
Tivaouane [1]	C	-------	11	71	135	43	119
	D	-------	8	38	69	28	70

[1] Incomplete reports.

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

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930 7	14	21	28	July, 1930 5	12	19	26	August, 1930 2	9	16	23
Algeria:																	
Algiers	C	1	5	1	3						1						
Constantine	C							1				1					
Oran	C		1														
Arabia: Aden	C	2	3	1						1							
Bolivia: La Paz.[1]																	
British Borneo: Sarawak	C	19															
British East Africa (see also table below).																	
Tanganyika	C	49	103	57	409	385	755	196	274	64	4						
	D	8	7	14	70	154	90	31	26	13	2						
British South Africa:																	
Northern Rhodesia	C		9	1	59												
	D			2	9												
Southern Rhodesia	C	6		66	155	75	1	3		1	12	18					
	D			1	13												
Canada:																	
Alberta	C	4	10	4							2	1	2	1			
Edmonton	C	1	4	3													
British Columbia—Vancouver	C	16	20	17	4	1	1			2	2	1	1	1	1		2
Manitoba	C	2	4	4	10			4									
Ontario	C	86	100	77	82	14	10	13	10	3	5	6	10	8		3	4
North Bay	C	1			1												
Ottawa	C	11	19	21	25	6		8	1	1	1	4	7	5	1	1	
Toronto	C				4	2	1	1			1						
Quebec	C								4	3							
Montreal	C													7			
Saskatchewan	C	76	47	41	39		12	10			2		3				8
Regina	C				4												
Ceylon:																	
Angoda, Western Province	C	10		6													
	D	1		2													
Colombo	C	3															
	D	2															

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia

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

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930 7	14	21	28	July, 1930 5	12	19	26	August, 1930 2	9	16	23
China:																	
Canton	C	11	6	3		1											
	D	3	2	3													
Chungking	C	P		P	P	P			P	P	P	P	P				
Foochow	C	P		P	P		P		P								
Hong Kong	C	62	38	18	12	2	1	1			2						
	D	51	25	23	9	1		1	1		1						
Manchuria—																	
Harbin	C			1	20												
Kwantung—Dairen	C	5		2	8		11	5		8							
	D				4			1									
Nanking	C	P	P	P	P	P	P				P	P	P	P			
Shanghai—																	
Foreigners only	C	2	2	3	2	1	1	1	2	1	1	1	1	3			
Including natives	D	7	10	10	5	1		1	1								
Swatow	D	6	6	3	6	1		1	2	1				1			
Tientsin	C	1	2	2	1												
Chosen (see table below).																	
Columbia:																	
Barranquilla	C	102	2	1													
Buenaventura	C	1		15	4	1	1		4	4	3	2	1				
Costa Rica:																	
Port Limon	C			6	2	2											
San Jose [2]	C		10	7	2												
Curacao (alastrim)	C		14	2	2		1			2							
Dutch East Indies:																	
Borneo	C		185	90	16	2	10				2						
	D		12	31	1		1										
Java—																	
Batavia and West Java	C	14	78	64	12	1	4	6	2	3	1	3	1	1		1	
	D	7	6	11	7		1	2		2	1	1	1	1		1	
East Java and Madura	C			4								1					
Sanggi Islands	C	12	5	160	26												
	D		1	24	5												
Sumatra	C		48														
	D		5														

Egypt: Port Said	C			1	1						2		1				
Great Britain:																	
England and Wales	C	1,530	1,700	1,427	1,417	237	266	241	182	156	138	126	109	70	86	95	
Ashton under Lyne	C	29	15	18	17			3	4		4	2	2				
Bradford	C	2		3	2					1							
Cardiff	C		2	3						2							
Leeds	C	11	16	2						1							
London	C	699	710	602	637	130	136	125	107	84	52	62	48	36	50	41	
London and Great Towns	C	1,156	1,239	1,066	1,078	197	208	190	158	127	96	102	83	61	73	71	
	D	5	3	3													
Sheffield	C		8	2													
Stoke-on-Trent	C	41	122	85	62	3	10	15	4	3	2	1	3	1	1		
Scotland	C					1		3			1						
	D										1						
India	C	36,036	39,329	34,843	22,835	3,686	3,559	3,174	2,552	2,258	2,006						
	D	7,710	9,109	6,983	5,451	1,065	913	905	648	733	580						
Bombay	C	638	718	430	218	36	35	23	19	17	15	11	7	6	2		
	D	314	431	270	161	27	23	19	10	13	9	9	2	5	2		
Calcutta	C	399	361	495	302	46	45	45	25	27	19	13	14	4		12	
	D	287	305	403	258	50	37	29	30	17	17	12	10	4		8	
Cochin	C	184	291	183	37	4	1	10	1	27		4	2	2	4	4	
	D	29	35	13	8	2	1	1		17							
Karachi	C	38	33	30	14	5		1	1				1	2		2	
	D	16	47	17	4	2		1						2		1	
Madras	C	159	173	133	72	9	10	8	8	6	10	17	16	19		9	
	D	29	36	27	15	6	3	1		4	1	3	4	3		5	
Moulmein	C	143	146	43	89		9	6	6	4	10	3	1				
	D	40	41	7	21		3	3	1	3	4	1	2				
Negapatam	C	1			1		1		1			1		2		2	
Rangoon	C	7	10	4	6	1	5	1	2	2	1	1		1	1		
	D	2	5		1			1	1								
Tuticorin	C				5			1									
Vizagapatam	C	9	69	6	5		1										
	D	1	18	2	3												
India (French):																	
Chandernagor	C	11	6	10	24	4	8	5	2	3	1	4					
	D	5	2	2	7			2	1	1	1	1					
Karikal	C	12	24	19	12	4	3	1	3	1		1					
	D	8	7	8	3	2	2	1	3	1		1					
Pondicherry Province	C	52	21	24	40	4	4	9	6	4	9	8	5				
	D	40	13	20	36	4	4	9	6	3	9	8	5				
India (Portuguese)	C	50	38	44	47		3	18	7	1							
	D	5	2	8	8		2	2	6								
Indo-China (see also table below):																	
Pnompenh	C				3							1					
	D			2		1						1				1	
Saigon and Cholon	C	4	3	5	3	1											
	D	2	1	5	2									1	1	1	

[1] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930 7	14	21	28	July, 1930 5	12	19	26	August, 1930 2	9	16	23
Iraq:																	
Baghdad	C	3		8	1	1				1	1	1				1	
	D	1		1	1							1				1	
Basra	C	1		1													
Mossoul Liwa	C	12		22	21		1		3	47	20						
	D	2		3	3		1			19	1						
Ivory Coast (see table below).																	
Jamaica (alastrim)	C				2												
Japan: Tokyo	C			1													
	D			1													
Macao	D	2	3	2	1												
Mexico (see also table below):																	
Jalisco (State) Guadalajara	D	14	22	20	7	4		5	6	3	1				1		
Juarez	C	3	2					6									
	D	1						1									
Mexico City and surrounding territory	C	38	106	99	80	17	23	20	17	10	12	4	11	2	3		
	D	21	31	47	32	5	4	3	5	2	3	1	2	1	3		
Progreso	C				1												
	D				1			1									
San Luis Potosi	C	1															
	D	1															
Morocco (see table below).																	
Nigeria: Lagos	C	2	1	1					1								
Philippine Islands: Sarangani and Balut Islands	C	3															
Poland	C	2		7	3												
Portugal: Lisbon	C	7	7	8	8	1		2	7		7		6		6	5	
Rumania	C	1	2														
Siam	C	2		8	2					2		4					
	D			4								3					
Somaliland, British: Boales	C	19	2														
	D	2	6														
Spain	C						4		8		1	1	3	2			
Straits Settlements	C		5	5	11	5		1	3	1	2	7	1	1	1	1	
	D		1	2	3	1		1		1	1	1				1	
Sudan (Anglo-Egyptian)	C	79	60	42	19	4	8	1	54	8	1		3				42
	D	6	5	4	2				3		1						3

Place		January, 1930	February, 1930	March, 1930	April, 1930			May, 1930			June, 1930			July, 1930		
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31
Sudan (French) (see table below).																
Switzerland: Berne Canton	C													1	1	
Syria (see table below).																
Taiwan: Taihoku (see table below).																
Tunisia: Tunis	C	3	3	4	2			2						1		
Turkey (see table below).																
Union of South Africa:																
Cape Province	C	P	P	P	P											
Orange Free State	C	P	P													
Transvaal	C	P	P													
Upper Volta	C	26	2	3	1			8	5							
Zanzibar	C		13													
On vessel:																
S. S. Tairoa, at Liverpool, from London	C	1														
S. S. Karagola, at Lourenco Marques, from India	C	1														
S. S. Elysia, at Port Sudan, from Bombay	C			1												
S. S. Naldera, at Port Said	C				1											
S. S. Manoa, from Honolulu to San Francisco	C								1							

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
British East Africa (see also table above):							
Kenya	C	12	12	175	174	171	142
Uganda	C	184	109			78	
	D	155	99			69	
Chosen	C	1	4		5	2	
	D		1		1	1	

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
France	C	9	23	8		3	
Mexico: Durango (see also table above)	D	12	6	5	4	4	3
Morocco	C	29	74		10	18	5
Turkey	C	215	114		3	16	
	D	66	42				

Place		January, 1930	February, 1930	March, 1930	April, 1930			May, 1930			June, 1930			July, 1930		
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31
Indo-China (see also table above)	C	460	434	26	261				173	132	80	133				238
Ivory Coast	C			7												
Sudan (French)	C	229	213	609	371		150	40	56	178	76				34	
	D	25	11	49	30		6	7	7	18	18					
Syria: Beirut	C	70	18	17	10	2	7			7	6	1				2
Taiwan: Taihoku	C		43	58	10	2										

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

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930				June, 1930				July, 1930				August, 1930			
					10	17	24	31	7	14	21	28	5	12	19	26	2	9	16	23
Algeria:																				
Algiers	C	4	6	8	1	2	4	8	2	------	1	------	------	1	2	3	------	------	------	------
Constantine Department	C	5	11	15	------	4	------	2	11	------	1	------	------	1	1	------	------	------	------	------
Oran	C	------	------	------	------	------	------	3	------	------	------	4	------	2	1	------	------	1	------	------
Arabia: Aden	C	------	1	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
	D	------	1	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Bolivia: La Paz.[1]																				
Brazil: Porto Alegre	C	2	------	------	1	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Bulgaria	C	13	9	15	1	------	5	------	1	------	9	6	------	4	5	1	------	1	------	------
	D	1	------	1	1	------	1	------	1	------	------	------	------	------	1	------	------	------	------	------
China:																				
Manchuria—Harbin	C	1	4	52	------	------	------	------	2	------	------	------	------	------	------	------	------	------	------	------
Shanghai	C	------	1	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Chosen (see table below).																				
Czechoslovakia (see table below).																				
Egypt:																				
Alexandria	C	------	------	1	------	------	------	------	------	------	1	1	1	------	------	------	------	------	1	------
Beheira Province	C	18	2	2	9	21	9	10	17	16	7	5	------	5	1	9	------	------	------	------
	D	5	------	------	4	4	4	1	1	1	------	2	------	1	------	1	------	------	------	------
Cairo	C	1	------	------	------	------	------	------	------	------	------	------	------	------	------	------	2	------	------	------
Port Said	C	1	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	4
Great Britain: Scotland—																				
Dunfermline	C	------	------	------	------	------	------	------	------	------	------	------	------	1	------	------	------	------	------	------
Glasgow	C	------	------	------	------	1	------	------	------	------	------	------	------	------	------	------	------	------	------	------
	D	------	------	------	------	1	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Greece (see table below):																				
Iraq: Baghdad Liwa	C	------	2	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Ireland:																				
Irish Free State—																				
Galway County—Oughterard	C	------	------	------	------	------	------	------	------	------	------	------	------	------	------	2	------	------	------	------
Kerry County—Dingle	C	------	------	5	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Leitrim County—Mohill	C	------	------	------	------	------	------	------	------	------	------	9	------	------	------	1	------	------	------	------

Mayo County—																					
Ballina	C								2		1				1						
Swinford	C					7	7														
Westport	C															2		1			
Roscommon County—																					
Roscommon	C															1					
Strokestown	C															1					
Wicklow County—Shillelagh	C										1		3	1		1					
Northern Ireland—Cookstown	C	3																			
Latvia (see table below).																					
Lithuania (see table below).																					
Mexico: Mexico City, including municipalities in Federal District	C	9	4	4		2		4	2	3	1	3	2		2	1	2	2			
	D		1	4				3		1							1	1			
Morocco	C	21	38	15	3	6	1	1	1		6	8			4	3	4				
	D		7	3																	
Palestine	C	1	6	1		2			2					3	1	1	1		1	1	
Poland	C	183	228	243	64	45	34	28	39	15	26	37			24		12	10	15		
	D	8	13	15	2	2		1	3	3	2	3			4			1			
Portugal:																					
Lisbon	C			4																	
Oporto	C	1	2	1																1	
Rumania	C	293	185	186	60	58	61	48		32	26										
	D	23	12	11	10	11	6	8		3	2										
Spain: Valencia	C									2		1			3						
	D														1						
Tunisia	C	3			2	2	1	1			2	16				14	10	2	5		
Turkey (see table below).																					
Union of South Africa:																					
Cape Province	C	P	P	P	P	P	P	P			P	P	P	P							
Natal	C	3	P	P	P	P		P			P		P	P							
Orange Free State	C	P	P		P	P	P	P			P	P	P	P							
Transvaal	C			P																	
Yugoslavia (see table below).																					

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

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

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
China: Harbin	C	----	----	37	204	240	----
Chosen: Seoul	C	----	17	----	3	----	----
Czechoslovakia	C	10	2	42	29	12	----
Greece: Athens	C	12	6	3	1	3	3
Latvia	C	18	----	----	----	3	3
Lithuania	C	2	70	62	73	27	16
	D	----	5	4	4	----	----
Turkey	C	2	3	1	3	16	2
Yugoslavia	C	26	33	46	22	16	6
	D	3	5	2	4	1	----

YELLOW FEVER

Brazil:	Cases
Mage, on the Leopoldina Railway, between Rio de Janeiro and Nictheroy, Apr. 22, 1930	2
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2

Gold Coast:	Cases
July 10, 1930	1
Albosso, Aug. 5, 1930 (deaths)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1