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THE MOVEMENTS OF EPIDEMIC MENINGITIS, 1915-1930[1]

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Although infection with the meningococcus apparently becomes extremely widespread at times, the clinical disease is fairly rare. Even during the year 1929, representing the crest of an epidemic, there were reported in the United States scarcely 11,000 cases. Doubtless, less than one physician in thirteen diagnosed even a single case during the year.

The seriousness of the disease lies in its fatality, for about half the reported cases died. The 5,208 deaths from meningococcus meningitis[2] during 1929 (1) in the registration area were only about three thousand less than the average annual number of diphtheria deaths during recent years, and were practically equal to the average measles mortality. An epidemic of meningitis is, therefore, not a trivial matter.

Because epidemic meningitis is one of the less familiar diseases, a brief general review of its characteristics will not be out of place, particularly as some of these have an important bearing upon some of the striking epidemiologic effects which the disease shows.

Historical.—It is generally acknowledged that cerebro-spinal fever was first differentiated by Vieusseaux, at Geneva, in 1805.

The prevalence of meningitis from that date until about 1882 has been recorded in great detail by Hirsch (2), using as his sources the accounts in the medical literature. Bruce-Low (3) brought this record down to the English outbreak in the World War, about 1915, using mainly statistical sources. A concise general review is also given by Heiman & Feldstein (4).

In the United States, the disease was recognized in Medfield, Mass., in 1806, a year after its first record in Geneva. Its subsequent American history may be summarized as follows:

1806–1816. Epidemics in other North Atlantic States, in Canada, and possibly in the South and West.

[1] From the Office of Statistical Investigations, U. S. Public Health Service, and from the department of biostatistics, School of Hygiene & Public Health, The Johns Hopkins University, Baltimore, Md. (Department Paper No. 155.)

[2] The commoner synonyms are "epidemic meningitis" and "cerebrospinal fever." In this paper, "meningitis" will refer solely to the epidemic variety, excluding nonmeningococcal types.

1817–1841. Judged by the absence of medical references, this quarter-century was an interval of relative quiescence. Outbreaks were reported only from Middletown, Conn. (1823), and Trumbull, Ohio (1828).

1842–1850. Beginning with an outbreak in Rutherford, Tenn., in 1842, a succession of outbreaks were reported from various States along the Mississippi River; later from Ohio, Pennsylvania, and several small towns in Massachusetts.

1851–1855. No epidemics reported in the literature.

1856–1873. Mention of outbreaks in North Carolina and at three places in New York State in 1856, but epidemics became more frequent during the Civil War period (1861–1865). Both the Northern and Southern armies were affected, and many States, north and south. Reports continue from various places until 1873. In that year, Massachusetts was visited by a severe epidemic, "after an immunity of many years."

1874–1892. No American epidemics recorded during this 18-year period in the three reviews mentioned. In closing his record (publication date 1886), Hirsch wrote that, judging from the silence of American writers, "the disease would appear to have ended for the present on American soil." In the light of the more continuous records of recent times, it seems more likely that the disease merely declined to a low ebb.

1893–1915. The prevalence was relatively high in Chicago in 1891–1893. In the latter year, New York City also showed an excess; in 1897, Massachusetts; in 1899, Michigan. The first volume of United States Mortality Statistics, covering the years 1900–1904, shows pronounced excesses during 1900 in about half of the 10 original registration States. In 1904–1905, New York City experienced the most severe outbreak of her history. Indiana, Connecticut, and Maine showed excesses a year or two later.

During 1910, a severe epidemic is said to have visited the Pacific coast (4); in 1911–1913 the Southwestern States had an epidemic. The Texas outbreak has been described by Sophian (5). Some Northern States also showed excesses at this time. At about the end of this period the statistics of the present paper begin.

Etiology.—Epidemic meningitis is now generally attributed to the meningococcus. Credit is given to Weichselbaum for establishing the etiologic relationship in 1887. Considerable care and skill are required in the cultivation of the organism, which is, in general, quite fragile outside the human host. According to Rosenau (6) it dies rapidly on drying, does not long survive room temperature, is easily overgrown by other organisms, but is, curiously enough, more resistant to sunlight than most other pathogens. The earlier difficulties encountered in cultivating and identifying the organism account for

some of the numerous conflicts in the meningitis literature, e. g., as to the frequency and duration of the carrier state.

Gordon and others have identified four or more types of the meningococcus, but McCoy (7) says that, so far as we know, they have no reference to type of cases, clinically, or to epidemiology. Branham (10), in 1928, found a new form, *Neisseria flavescens*, in Chicago. Glover in England (8) and Branham et al (9) in this country, found that, during epidemics, the proportion of agglutinable types increases. The results of both groups of workers also suggest that the distribution of types may be different in successive epidemics. It is probably not yet known how the changes in type are related to the epidemic cycle, e. g., whether such a change usually precedes the approach to an epidemic.

Infection, attack, carrier state.—Vaughan says (11) "There can be no possible doubt that the meningococcus is carried into the body with the inspired air. There is doubt, however, whether this is the sole avenue of invasion. It must be admitted that it may reach its normal habitat in the naso-pharynx through the mouth in food or drink * * * from drinking cups, etc."

There is ample evidence to show that in the great majority of instances infection fails to go on to frank attack, or even to produce recognizable symptoms. The clinical disease results when the meninges are invaded. Apparently infection results in attack with much greater frequency among children than among adults; for the attack rate among children is higher than the adult rate, although adults are, during epidemics, found oftener to harbor the organism. In the English epidemic of 1915–16, for example, it was found that the proportion of infected persons among adults was usually two or three times as high as among children (13).

Some of the epidemiological riddles provided by meningitis began to clear up when Albrecht and Ghon, in 1901, found that healthy persons could become carriers of the meningococcus. Numerous workers[3] have subsequently confirmed this finding. Glover (12), for example, concluded that in military recruiting camps a proportion of carriers of 2 to 5 per cent of the camp strength must be regarded as normal. At times of intense crowding of such camps, when the disease became epidemic, the proportion of carriers rose above 70 per cent. The cases, he says, are merely the visible foam on top of the huge carrier wave. In American cantonments, also, during mobilization, carrier rates of around 35 per cent were, according to Rosenau (6), not uncommon.

[3] Frost, in 1912, prepared a summary of the results of twelve groups of observers who found carrier rates during epidemics varying from a low rate up to 70 per cent, depending upon degree of exposure to infection, and doubtless upon technique, phase of epidemic, season, and similar factors. These findings were abundantly confirmed during the World War.

In civilian communities, observed carrier rates have not been as high as in armies, but may, nevertheless, be surprisingly large, in view of the small numbers attacked clinically. Eighteen series of examinations were made in 1915–1917 (an epidemic period), mainly in London, among persons not known to have been exposed to meningitis cases. Of the 1,881 noncontacts cultured, 253, or 13.5 per cent, were found to harbor meningococci; one group, consisting of 100 healthy work people, revealed 37 per cent positives (3a).

If, in spite of technical laboratory difficulties, proportions of 35 to 70 per cent of the examined populations can be found to carry the meningococcus at one time, the conclusion is inescapable that during the course of a heavy epidemic, very considerable proportions of the population must eventually become infected with the meningococcus; indeed, under congested conditions, as in army camps, it seems likely that, during epidemics, practically the entire population may become infected once or oftener [4] with the meningococcus.

Newsholme has estimated (3d) that, in the London epidemic of 1915–1917, less than 1 per cent of the infected persons [5] contracted the disease. In the light of footnote 4, his estimate certainly does not seem too low, since the annual attack rate was less than 1.5 per 10,000 in a population, of which the overwhelming majority had probably been infected.

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[4] In the 1917 report to the Local Government Board of Great Britain, summarizing extensive researches on cerebrospinal fever, Eastwood states (3b):

"There is, I believe, general agreement on the following matters * * * :

"Carriers may retain the meningococci in their throats a long time, though not, as a rule, for more than two or three weeks."

In the introduction to the same report, Newsholme (3c) adds that this usual limit of two or three weeks has been confirmed repeatedly.

If a limit of, say, three weeks is taken as an average, the way is opened to the estimation of various interesting velocities, or time rates, of infection; for the carrier prevalence at any point of time becomes approximately equal to the sum of the persons infected during the preceding three weeks or so.

The series of 18 samples of noncontact civilians, referred to in the text, were examined over a period of two years (March, 1915, to February, 1917). The mean carrier prevalence, from the combined 18 samples, was 13.5 per cent of the examined persons; hence, in the light of the foregoing paragraph, the carrier production, or carrier incidence rate, probably averaged about 13.5 per cent of the population per three weeks of time. The mean rate of *infections* per time unit in the sampled populations would doubtless be somewhat higher, as some of the carriers will have been infected more than once during the three weeks. Therefore, even allowing for sampling bias (the sampled populations consisted largely of routine hospital out-patients, with some nonmeningitis in-patients, "healthy workpeople" and the like), and for other errors in the underlying assumptions, it still seems safe to infer, for the 2-year period, an average infection rate of more than one per person. Actually, the prevalence rate cited above leads to a calculated average of 4.7 infections per person during the two years. The proportion escaping infection entirely must be small (30).

The foregoing data refer to civil conditions; in army camps the estimated carrier production rates would, under the indicated assumptions, be considerably higher, and the chance of escaping infection correspondingly smaller.

[5] Newsholme's estimate referred to the ratio of the attack rate to the "carrier rate." Obviously, the carrier incidence (production) rate was meant, not the more common carrier prevalence rate.

TABLE 1.—*Cases of meningococcus meningitis; also carrier rates among the general population* [1] *and among contacts to cases. Ruhr district, 1907. (After Bruns and Hohn (14))*

Month	Cases of meningitis in Ruhr districts	Among "healthy persons" [1]			Among contacts to meningitis cases		
		Persons cultured	Carriers found		Persons cultured	Carriers found	
			Number	Percentage of examined population		Number	Percentage of examined population
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total, six months	1,155	1,786	401	22.4	609	224	36.8
March	148	56	34	[2] 60.7	23	14	[2] 60.8
April	278	360	116	32.2	135	67	49.6
May	327	408	97	23.8	172	81	47.2
June	188	352	84	23.9	93	34	36.6
July	146	323	49	15.1	67	18	26.8
August	68	287	21	7.3	119	10	8.5

[1] The authors lead (p. 19) to the inference that these "healthy persons" had not been in contact with cases. The table is so interpreted by Heiman and Feldstein (p. 60) and by others. The nature of the examined population is inadequately described, however, and there is room for doubt. The table is quoted chiefly in order to emphasize the need of more observations of this sort.

Columns (3) to (5) relate to locally cultured samples. Samples sent by mail from near-by places were excluded, because of lower percentages of positives, presumably through delay in incubation.

[2] In March, the "healthy persons" group showed virtually as high a carrier rate (60.7 per cent) as the contacts to cases (60.8 per cent). This may be partly due to the small number of cultures in March among healthy persons, and especially among the contacts. Note that during the remaining months the contacts showed higher carrier rates than the general population.

Table 1 is a composite of the carrier rates found in 1907 by Bruns and Hohn (14) during an epidemic in the Ruhr district of Prussia. The table indicates that, both among contacts and non-contacts to cases, the carrier rate was much higher in the earlier stages of an epidemic than at the end. It suggests further that the carrier rates may be at their maximum more than a month before the attack rates reach their peak. The English Army statistics likewise suggest that the case epidemic is preceded by a carrier epidemic.[6] Glover (15) (16) maintains that when the carrier prevalence reaches 20 per cent, an epidemic is likely to result. Newsholme, on the other hand, felt that his studies were consistent with the view that "the case rate is not deducible from the carrier rate, and the occurrence of an epidemic can not be satisfactorily explained as being due to the latter. The percentage incidence of carriers * * * shows no correlation with the incidence in time of cases of cerebrospinal fever * * *" (3d).

Further information on this important subject is clearly needed, particularly continuous observations which take in periods before and after epidemics, as well as the outbreaks themselves.

[6] This interesting possibility finds a parallel in the case of some other diseases. Compare the epidemics of "diarrhea" which often precede water-borne epidemics. There is some evidence that in diphtheria epidemics, the carrier peak may come a week to two weeks before the cases reach their maximum (21).

TABLE 2.—*Meningococcus meningitis—Monthly case rates (calculated from reported cases) (annual basis) per 100,000 population, in 28 States,*[1] *1913–1931*

Year	Midyear population, in millions	January	February	March	April	May	June	July	August	September	October	November	December
1913	55.0	3.21	2.89	3.55	3.61	2.55	2.43	1.35	1.71	2.21	1.97	1.53	1.91
1914	55.9	1.77	2.15	3.06	2.48	2.34	2.16	1.60	1.37	1.57	1.56	1.37	1.90
1915	56.8	2.50	2.41	2.43	2.68	1.89	2.06	1.62	1.02	1.41	1.18	.71	1.16
1916	57.7	1.80	1.79	2.43	2.55	2.29	2.70	2.29	2.16	1.50	1.69	1.43	1.53
1917	58.6	2.57	4.18	7.27	8.02	8.64	7.12	4.66	3.12	3.01	2.67	3.65	7.58
1918	59.5	10.27	13.24	13.32	12.29	9.10	4.99	4.55	3.86	3.46	4.02	2.78	3.48
1919	60.4	3.51	4.58	3.72	3.87	3.45	2.54	2.92	2.18	2.12	2.48	2.50	2.59
1920	61.3	3.63	4.48	3.44	3.12	3.28	2.74	2.40	2.69	2.72	2.44	2.56	2.82
1921	62.5	2.92	3.25	3.46	2.37	2.00	2.26	2.65	2.90	2.37	2.35	2.26	2.15
1922	63.5	2.10	3.25	2.97	2.42	2.41	1.84	1.28	1.69	1.55	1.50	1.73	1.49
1923	64.6	2.35	2.40	3.12	2.56	2.33	2.00	1.70	1.88	1.68	1.90	1.92	1.42
1924	65.8	2.11	1.84	2.13	2.26	1.75	1.65	1.68	1.59	1.76	1.56	1.55	1.02
1925	66.8	1.99	1.85	2.10	2.40	1.87	1.60	1.53	1.50	1.77	1.20	1.20	2.64
1926	67.9	2.29	3.53	3.95	3.08	2.53	2.19	1.92	1.28	1.95	1.66	1.85	2.44
1927 [2]	66.4	4.13	4.10	4.40	4.95	4.02	4.05	3.12	2.91	2.91	2.68	3.24	3.51
1928 [2]	67.2	5.01	5.80	7.30	7.69	7.74	6.10	4.39	5.27	4.25	4.86	5.21	8.28
1929 [2]	70.0	12.53	13.70	15.59	16.54	15.96	11.15	7.65	5.62	5.47	5.95	6.50	8.73
1930 [2]	71.1	11.79	12.58	11.48	11.40	7.34	4.96	4.12	4.60	3.22	3.68	3.90	4.97
1931	73.3	7.02	6.54	7.44	7.64	5.44	3.67	2.92	2.91				

[1] The States included, and their regions are as follows:
New England and Middle Atlantic: Massachusetts, Connecticut, New York, New Jersey.
North Central: Michigan, Indiana, Illinois, Wisconsin, Minnesota, Iowa, South Dakota, Nebraska, Kansas.
South Atlantic: Maryland, District of Columbia, Virginia, South Carolina.
South Central: Alabama, Oklahoma.
Mountain: Montana, Idaho, Wyoming, Arizona, Utah, Nevada.
Pacific: Washington, Oregon, California.
The rates were calculated from cases as reported by State health officers to the Public Health Service, and published currently in Public Health Reports, and as annual summaries published separately by the service.

[2] Data not available for the following States: For 1927 and 1928—Nevada, South Carolina, and Utah; for 1929—South Carolina; for 1930—Utah.

Case fatality.—Although, as we have seen, the ratio of cases to infections is very small, the clinical disease is a very serious matter. The case fatality, as measured by the ratio of deaths to *reported* cases was, during the recent epidemic, as follows in certain large cities: Chicago, 53 per cent; Detroit, 50 per cent; New York, 49 per cent; San Francisco, 76 per cent (27), (28), (29).

Accuracy of statistics.—In an investigation in Prussia, in 1923 and 1924, under the auspices of the League of Nations, Seligmann (17) found that some 5 to 10 per cent of the cases reported as cerebrospinal meningitis were not of meningococcal origin, and an additional 20 per cent were of doubtful origin. Among the misdiagnosed cases, the pneumococcus and the tubercle bacillus were found most often to be the infecting organism. Similar results were obtained in a Danish investigation. These results do not necessarily imply that the disease is over-reported by 30 per cent, for, as has been pointed out (18), there are certainly diagnostic errors in the opposite direction, and other sources of under-reporting, particularly among mild and abortive cases.[7]

[7] Mortality reports also are in an unsatisfactory state; the deaths attributed to meningitis were increased 15.6 per cent in 1918 by inquiries sent by the division of vital statistics of the Census Bureau to physicians who had made vague entries on death certificates (20).

In spite of these defects, meningitis statistics probably rank among the best of our routine communicable disease records. The disease is serious, and is, therefore, more likely to receive medical attention and to be reported than is the case with the majority of children's diseases. Moreover, even defective statistics can be very useful when used in bringing out relative differences, for example, in tracing epidemic movements, such as will next be examined.

TABLE 3.—*Meningococcus meningitis cases (reported) and case rates per 100,000 population by regions,*[1] *calendar years, 1915–1930*

Year	Pacific		Mountain		West North Central		East North Central		New England and Middle Atlantic		South Central		South Atlantic		Total	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
1915	[1] 59	1.4	[1] 0	0	[1] 71	1.8	[1] 485	2.9	[1] 323	2.9	[1] 117	1.9	[1] 348	6.3	[1] 1,403	2.9
1916	78	1.5	22	1.2	11	1.8	477	2.9	741	2.9	100	1.6	216	3.9	1,748	2.6
1917	176	3.2	14	.7	577	8.1	1,308	7.8	1,969	6.8	157	2.0	504	9.0	4,705	6.4
1918	298	5.3	42	2.1	394	5.5	1,052	6.2	2,017	6.9	911	11.3	1,035	18.2	5,749	7.7
1919	148	2.7	18	1.7	165	2.4	486	2.8	1,132	3.9	236	3.1	232	4.0	2,417	3.3
1920	200	4.7	51	2.5	201	2.8	540	3.0	946	3.2	155	2.9	177	4.2	2,258	3.2
1921	194	3.3	30	1.4	207	2.8	481	2.6	934	3.1	73	1.4	30	1.6	2,002	2.8
1922	150	2.5	39	1.8	143	2.0	287	1.6	787	2.6	55	1.0	66	2.0	1,527	2.1
1923	147	2.3	32	1.5	191	1.5	256	1.5	570	2.7	163	1.2	147	1.4	1,506	1.8
1924	137	2.0	21	1.0	166	1.3	179	1.1	544	2.5	95	.7	81	.8	1,223	1.5
1925	257	3.7	21	1.0	152	1.2	136	.8	450	2.1	125	.9	112	1.1	1,253	1.5
1926	548	7.6	68	3.2	169	1.3	195	1.1	475	2.1	119	.9	126	1.2	1,700	2.0
1927	547	7.3	194	8.9	384	2.9	760	4.3	446	2.0	106	.8	117	1.1	2,554	2.9
1928	481	6.2	494	22.5	716	5.4	986	5.4	1,603	7.0	152	1.1	127	1.1	4,559	5.1
1929	1,108	13.9	448	20.3	1,207	9.1	2,776	15.1	1,796	7.7	457	3.2	297	2.6	8,089	8.9
1930	513	6.2	261	11.7	1,009	7.6	1,964	10.5	1,181	5.0	717	5.0	427	3.7	6,072	6.6

[1] For the years prior to 1923 there are gaps in the records of some States. In such instances, both cases and populations were omitted in calculating the regional rate. Data for the year 1915 were especially incomplete in this respect. The years 1917 and 1918, however, which are more important for the purposes of the text, have only one State missing, viz, New Jersey for 1917.

The States included in each region for the years 1923 et seq., and the aggregate populations as of July 1, 1930, based on the April, 1930, census are as follows (estimated populations were used for the earlier intercensal years):

Pacific: Washington, Oregon, California. Population, 8,251,000.
Mountain: Montana, Wyoming, Colorado, New Mexico. Population, 2,228,000.
West North Central: Minnesota, Iowa, Missouri,* North Dakota,* South Dakota, Nebraska,* Kansas. Population, 13,305,000.
East North Central: Indiana, Illinois, Michigan,* Wisconsin. Population, 18,676,000.
New England and Middle Atlantic: Maine, Vermont, Massachusetts, Connecticut, New York, New Jersey. Population, 23,757,000.
South Central: Alabama, Mississippi, Arkansas, Louisiana, Texas. Population, 14,473.000.
South Atlantic: Maryland, District of Columbia, West Virginia,* North Carolina,* Georgia,* Florida.* Population, 11,423,000.
Total population, 92,114,000.

NOTE.—(For reasons associated with tabulation details, the following States were included in the period prior to 1923, but not thereafter: Rhode Island, Pennsylvania, South Carolina, and Virginia.)
States marked with an asterisk were not included for the years prior to 1923.

The recent epidemic in the United States.—Reviews of the meningitis situation in this country were published by Sydenstricker (18) in 1928, and by Williams (19) in 1930. The upper portion of Figure 1 brings to date Sydenstricker's graph, showing the monthly attack rates since 1913, in a group of 28 States. (All sections of the United States are represented in this aggregate, but the North and West have heavier representation than the South, as is shown in the footnote to Table 2.) In this interesting picture we see—

(*a*) An unusually systematic "epidemic wave" with maxima in 1918 and 1929. The interval between these two peaks was 11 years.

The gradual and orderly rise and fall of this wave is brought out more emphatically when the curve is shown on an arithlog scale (lower portion of the figure), so that the proportional *rates* of increase and decrease are depicted, rather than arithmetic changes. From Table 3 it can easily be calculated that, for the United States, the annual increase of cases during the years of epidemic build-up, 1925–1929, varied from about 40 per cent per year to a maximum of 80 per cent—not a very rapid rate of growth. It will later be seen that this was partly due to the fact that the peaks in different regions came in three different calendar years, so that the rise and fall for the combined regions are somewhat gentler than for smaller areas.

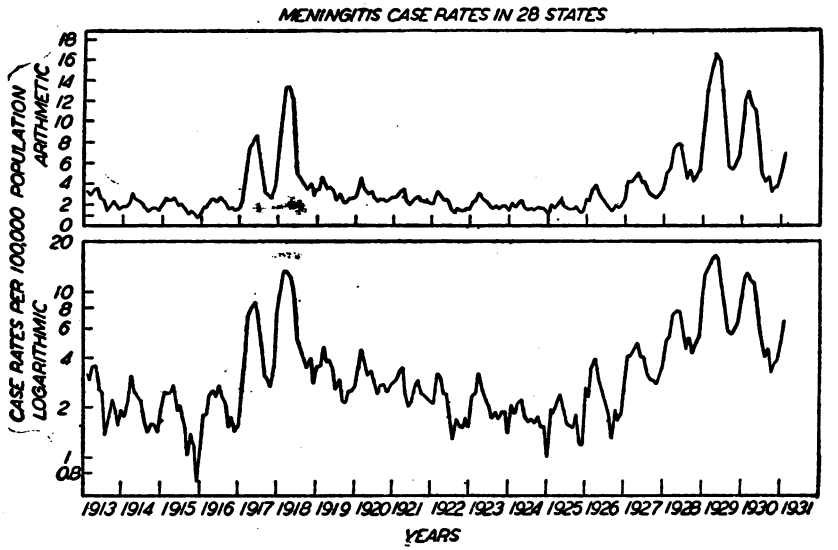

FIGURE 1.—Monthly meningococcus meningitis case rates in 28 States, January, 1913, to January, 1931, inclusive, as reported to health departments. (Upper scale, arithmetic; lower scale, logarithmic)

The smooth and orderly rise and fall of the epidemic wave is in apparent contrast with the frequent impressions gained from the literature that meningitis is essentially erratic in its movements. Thus a reviewer writes in the Epidemiological Report of the League of Nations (22): "The fact which strikes one when examining these figures is their *irregularity and utter irrationality.*" Similarly, Geiger (22a) refers to the "piquant irregularity" of the disease. The basis of these impressions will be clearer later as we examine the statistics of other types of areas. We also see in Figure 1—

(*b*) An annual seasonal swing whose high points in this series always came after midwinter, oftenest in March or April, and whose low points came oftenest in October or November. On the arithmetic scale the seasonal swings are seen to increase in amplitude with rising epidemic wave, and the peak years stand out in bold relief;

but on the logarithmic scale the seasonal waves remain fairly constant with rising epidemic wave, and the peak year loses much of its distinctiveness, since it shows roughly the same proportionate annual rise as its predecessors on the upgrade of the epidemic wave.

The observed fact that the seasonal wave is much more constant on the ratio scale than on an arithmetic scale has important theoretical implications which will not be discussed at this time, except to point out (*i*) that when the epidemic wave doubles its height, the summer cases are approximately doubled as well as the winter cases, and (*ii*) that the annual round of climatic conditions seems to produce about the same *relative* swing in the meningitis incidence whether the epidemic wave is in a high or low phase. These same phenomena have been observed in the case of other diseases, but not so clearly as in the case of the meningitis series under discussion.

(*c*) Finally, it is clear from Figure 1 that attack rates, as indicated by reported cases, were somewhat higher in the 1929 epidemic than in 1918, but not strikingly higher.

Regional differences in the United States.—From the right-hand half of Figure 2[8] it is evident that the recent epidemic did not strike simultaneously in all sections of the United States. The earliest beginnings were first perceptible in 1925 or 1926 in the Far West. In the remaining sections, the first traces of a rise came one to three years later.

Epidemic crests were likewise passed earliest in the West. Although the upward movement apparently began earliest on the Pacific coast, the rise was sharper in the Mountain States, with the result that the latter reached their crest earliest, namely, in 1928; of the remaining sections, those in the North followed mainly in 1929. From this graph of the annual data it is not possible to say whether the crest was attained in the two southern groups, even in 1930. However, a more detailed analysis, based upon monthly data, suggests that in the South, as a whole, the crest was passed in the spring of 1930, although the situation in the spring of 1931 has been uncertain in some sections of the South.

Turning now to the left-hand portion of the graph, it is seen that, in the 1917–18 epidemic, the peak was first attained in the Northern Mississippi Valley and New England. The two southern sections followed about a year later. In the West the picture is rather confused, but a slight rise on the Pacific coast appears to have lagged somewhat, and to have come to a head during the second year, viz, 1918.

Collins (23) has shown that for influenza epidemics, likewise, the point of origin and direction of geographic movement has varied

[8] In order to eliminate the confusion due to seasonal swings, data in Figure 2 and Table 3 are shown by years instead of months.

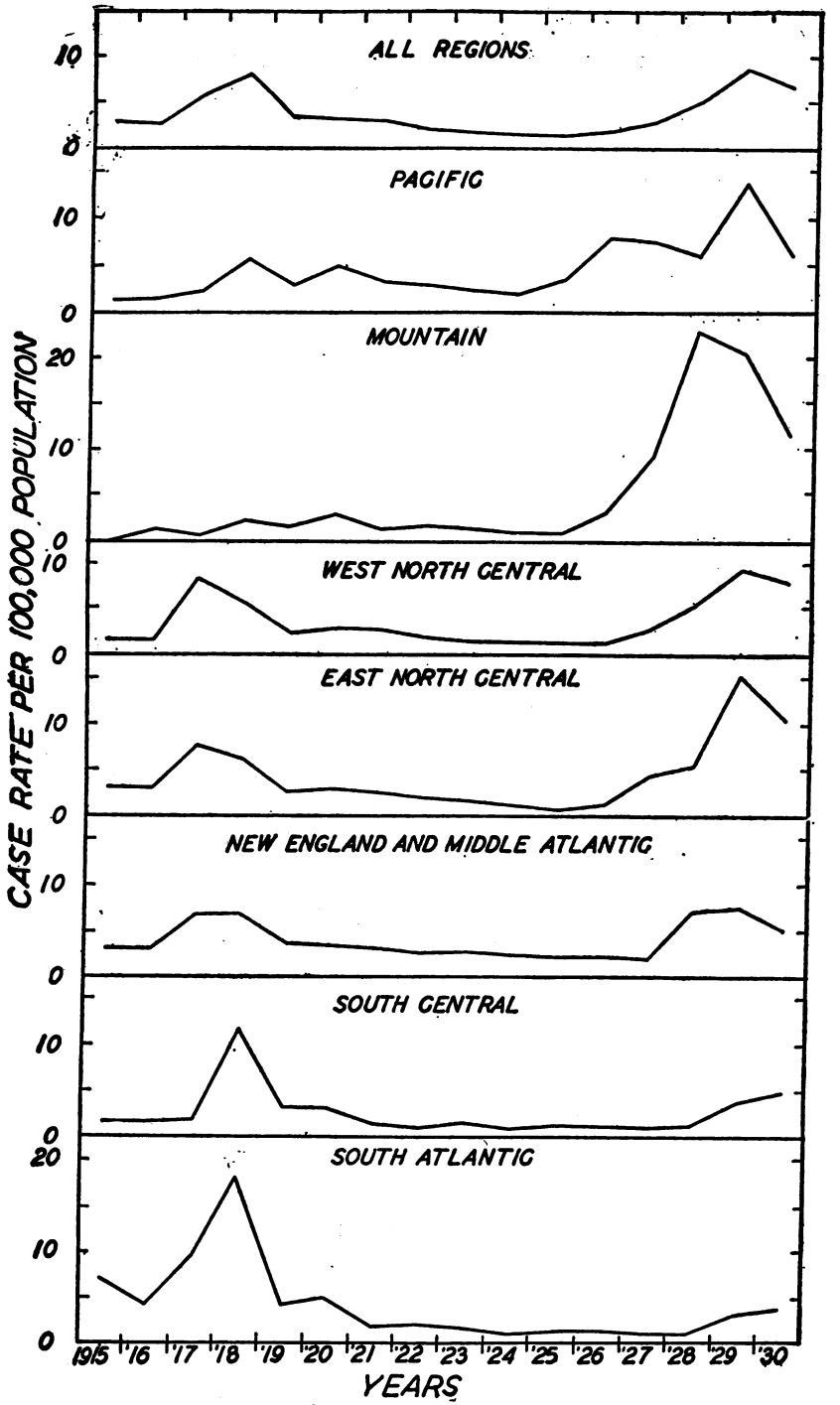

FIGURE 2.—Annual meningococcus meningitis case rates in the United States and in each of 7 regions, 1915–1930, as reported to health departments

from one epidemic to the next. For these two diseases, at least, no one section of the country can claim distinction as the "endemic source" of epidemics. It is not intended to imply, however, that in some instances the larger cities may not serve as foci for the surrounding areas.

A second point of decided interest in Figure 2 is that the southern regions, which had the highest attack rates in 1917–18 (due possibly to the large number of Army camps there) seem likely to have had the lowest rates in the epidemic just passing. Conversely, the Mountain region, which had scarcely a perceptible rise in 1918, has had the highest rates during the later epidemic.

Meningitis in foreign countries.—A detailed study of the statistics for earlier times and for other places will not be undertaken here. Nevertheless, as a safeguard against overinterpretation of the comparatively systematic pictures thus far seen it will be prudent to examine briefly into the experience of several other types of areas, including the available foreign material.

Although the published meningitis records of the League of Nations begin only with the year 1919, it is known that meningitis became epidemic in Europe shortly after the outbreak of the World War. In England, Germany, France (24), (25), (26), and probably in other European countries, the crest came in 1915; in Denmark it came a year later.

A graph for England and Wales in one of the Epidemiological Bulletins of the League of Nations (24) shows, after the 1915 crest, a secondary rise in 1917, and thereafter a gradual decline down to 1923; thereupon the rise began, which Table 4 shows to have continued in fairly regular fashion until 1930. There was, therefore, in England a period between peaks of 13 to 15 years.

TABLE 4.—*Annual cerebrospinal meningitis cases reported in various countries,*[1] *1919–1930*

Geographic division and country	Calendar year								Year ended June 30—			
	1919	1920	1921	1922	1923	1924	1925	1926	1926–27	1927–28	1928–29	1929–30
NORTH AMERICA												
Canada	(2)				[3] 82	[3] 182	[3] 167	[3] 206	[3] 210	[3] 223	[3] 224	[3] 196
United States [1a]	1,901	1,953	1,782	1,464	1,343	1,134	1,153	1,616	1,857	3,018	5,664	4,903
Mexico									[3] 30	[3] 18	[3] 140	[3] 324

[1] Data mostly from publications of the health organization of the League of Nations, Geneva, Switzerland: 1920–1925 from Statistics of Notifiable Diseases, Year 1925 (Epid. Intell. No. 10, p. 52); 1926–1930 from 1926 Annual Report, pp. 63–64, and from Mo. Epid. Report (R. E. 141) Aug. 15, 1930, p. 334. In a few cases it was necessary to take data from intermediate reports.

[2] In this table leaders imply "no data available."

[1a] Data from notifiable disease reports, U. S. Public Health Service, 30 States.

[3] Deaths.

TABLE 4.—*Annual cerebrospinal meningitis cases reported in various countries, 1919–1930*—Continued

Geographic division and country	Calendar year								Year ended June 30—			
	1919	1920	1921	1922	1923	1924	1925	1926	1926–27	1927–28	1928–29	1929–30
EASTERN EUROPE [4]												
Sweden	116	102	*120*	79	85	115	136	143	131	140	127	96
Scotland [5]	191	86	121	116	114	118	157	188	220	265	390	400
England and Wales	848	583	411	344	301	397	402	385	479	421	582	624
Denmark	[6] 227	[6] 144	[6] 92	[6] 84	[6] 87	[6] 107	[6] 139	[6] 129	127	92	91	93
Germany	[7] 422	.....	696	1,622	1,149	742	750	746	780	846	*993*	769
Netherlands	122	133	120	132	111	106	115	93	103	113	123	162
Belgium	63	38	35	50	56	34	*62*	55	49	73	60	69
France	494	417	398	379	381	562	653	432	432	376	429	413
Switzerland	30	39	32	30	*69*	33	31	28	43	42	79	37
Austria	46	34	21	38	38	39	38	37	36	39	44	36
Italy	266	110	86	66	368	409	472	*532*	463	461	754	516
Portugal	.....	.....	.....	.....	.....	.....	.....	.....	.....	208	213	211
WESTERN EUROPE												
Estonia	2	.....	.....	.....	12	12	7	5	6	47	36	10
Latvia	.....	.....	.....	.....	19	20	34	15	36	70	110	106
Lithuania	.....	.....	.....	.....	13	15	14	16	10	31	13	[8] 50
Poland	330	596	477	533	*597*	414	[9] 396	543	483	684	800	712
Czechoslovakia	67	75	80	*190*	142	145	154	*220*	181	184	241	171
Hungary	.....	.....	35	49	29	23	41	51	58	45	52	47
Greece	.....	.....	.....	.....	[10] *239*	155	153	136	205	109	184	236
Turkey	.....	.....	.....	.....	.....	.....	.....	.....	13	35	151	214
EASTERN AFRICA												
Algeria	39	25	31	61	*61*	38	51	32	23	20	52	116
Morocco	.....	.....	.....	.....	.....	.....	.....	.....	[11] 28	31	31	65
Nigeria	.....	.....	.....	.....	[8] 154	[8] 244	[8] 1,322	[8] 931	90	13	45	54
Angola	.....	.....	.....	.....	.....	.....	.....	.....	[11] 3	39	8	[11] 2
WESTERN AFRICA												
Egypt	85	43	43	41	44	18	32	25	34	26	26	62
Anglo Egyptian Sudan	.....	.....	.....	.....	.....	.....	.....	34	449	16	430	1,276
Uganda	.....	.....	.....	[10] 677	207	118	*298*	73	193	110	3	20
Kenya	.....	.....	.....	.....	.....	41	30	26	10	43	65	39
Northern Rhodesia	.....	.....	.....	.....	.....	0	1	6	6	28	60	133
Southern Rhodesia	.....	.....	.....	.....	.....	4	5	4	7	29	64	59
U. of So. Africa	21	128	113	[11] 58	[12] 515	[12] *826*	[12] 552	389	297	[11] *978*	.....	.....
Madagascar	.....	.....	.....	.....	.....	.....	1	6	7	10	30	4
ASIA												
Korea	.....	.....	.....	.....	.....	53	17	12	15	93	149	44
Shanghai [13]	.....	.....	.....	.....	0	[8] 2	[8] 4	[8] 2	[8] 8	[8] 18	[8] 368	[8] 234
Japan	[14] *2,458*	951	772	935	708	1,348	447	407	384	320	306	303
Formosa	.....	.....	.....	.....	.....	.....	[10] *179*	96	36	13	46	11
Hong Kong	[14] *269*	158	125	53	*107*	81	77	14	15	32	26	16
Indo-China	.....	.....	.....	.....	.....	.....	18	7	89	66	46	45
Java and Madura	.....	.....	.....	.....	.....	21	11	11	8	1	4	49
Hawaii	.....	.....	.....	.....	.....	.....	.....	.....	15	44	196	[8] 62
AUSTRALASIA												
Australia	[14] *100*	100	80	69	61	73	91	73	78	51	*80*	67
New Zealand	[14] *96*	79	56	42	36	31	31	35	*41*	24	27	34

[8] Deaths.
[4] The geographic arrangement within groups is roughly from north to south.
[5] 16 towns.
[6] The reports from Denmark for specific years vary from one summary to the next, possibly due to revisions in diagnosis. In this table the latest available data are taken for each year.
[7] Refers to deaths. Datum from note in *Mitteilungen* (25).
[8] 11 months only.
[9] Including Department of Lodz, 1925 (*et seq.* ?).
[10] Possibly epidemic maximum.
[11] Only one-half year.
[12] Years ending June 30.
[13] International settlement of Shanghai.
[14] Possibly not a peak. A chance reference suggests that Hong Kong suffered a heavy incidence in 1918.

TABLE 5.—*Annual number of cerebrospinal meningitis cases in European countries reporting since 1921* [1]

	1921	1922	1923	1924	1925	1926	1926–27	1927–28	1928–29	1929–30
14 countries	2,724	3,712	3,527	3,244	3,546	3,582	3,535	3,731	4,765	4,145
The same, after omitting Germany	2,028	2,090	2,378	2,502	2,796	2,836	2,805	2,935	3,772	3,376

[1] Data from Table 4: The last four years end on June 30, in order to utilize the latest available data for 1930 from the League of Nations.

In Table 4 the annual meningitis reports from various parts of the world have been brought together from the various summaries of the health organization of the League of Nations. The cases or deaths for peak years since the 1915–1919 outbreak are shown in bold-face type; secondary peaks are shown in italics.

It is quite evident from this table that the remainder of Europe did not synchronize perfectly with the wave in England and North America. Germany experienced a pronounced epidemic in 1922, and a number of countries showed minor peaks that year or the next. Then followed France (1925), Denmark (1925), and Sweden (1926). These increases occurred at a time when the United States and England were approaching their minima.

In spite of these exceptions, Europe as a whole tended to fall into step with the wave seen in the United States and England. If we aggregate the cases from countries which show continuous records since 1921, omitting only Germany, it will be seen that after that year there was, with possibly one minor exception, a steady, year-by-year increase, culminating in the 1928–29 climax. (Table 5.) A third of the European areas came to a peak in 1929, and another third followed a year later.

As to the remainder of the world,[9] although appreciable increases were reported about five years ago in African and Asiatic areas, notably Nigeria and Japan, it is clear from Table 4 that there was, in many places, a coordination with the movement in Europe and North America. Fully half of the reporting areas showed peaks in 1929 or 1930.

It is to be noted from Table 4 that, even in Germany and in the other countries which showed interpandemic increases, the movements were not outstandingly erratic, but usually showed rises and declines of moderate orderliness.

[9] Data from South America and India are too scanty to yield a judgment in this connection.

Contrasts between local areas.—In Figure 3 are shown annual meningitis mortality rates in New York City, Baltimore, and the State of Massachusetts.[10] A period of 50 years or more is covered.

From examination of the graphs for individual cities, it is evident that, although continuity of wave movements between epidemics is still traceable in a portion of the periods, there is a great variability in the magnitudes and patterns of the epidemic movements. The individual graphs are not as systematic and orderly in their movements as are the regional graphs of Figure 2. In New York City, for example, the first three epidemics are sharper and better defined than its own later increases, or those of the other two areas.

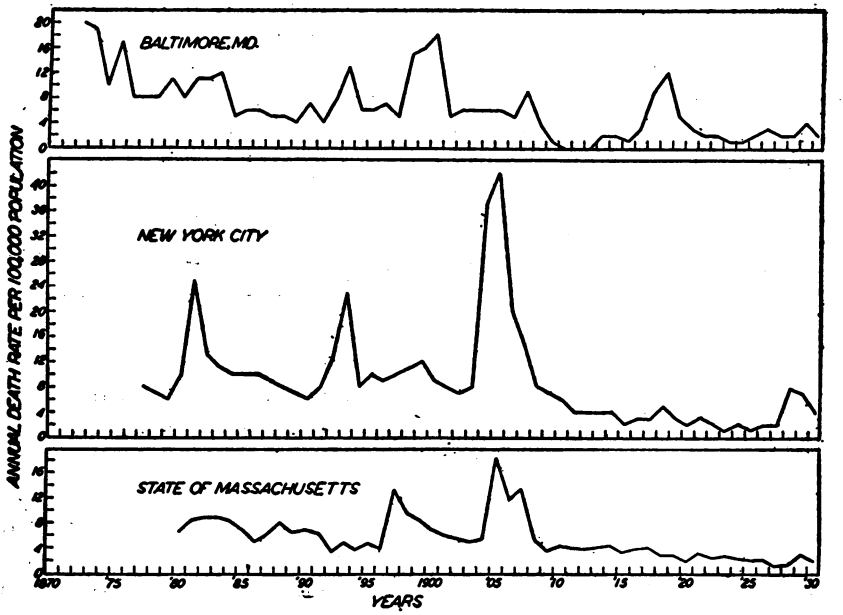

FIGURE 3.—Annual cerebrospinal fever death rates in Baltimore, New York City, and the State of Massachusetts, 1872-1930. (Massachusetts data include cerebrospinal fever and nonepidemic cerebrospinal meningitis. See footnote regarding sources)

It appears difficult to establish either the presence or absence of any significant synchronism in the meningitis experience of the three areas, notwithstanding that the maximum distance between these areas is less than 500 miles. It is striking that New York City, certainly a major hub of world contacts, after a huge epidemic in

[10] For the Massachusetts data it was found expedient to include deaths from epidemic and nonepidemic cerebrospinal fever. Source: State registration reports. The years 1880-1920 were taken from an unpublished table in the epidemiology department of the School of Hygiene. Data for 1929-30 were received by correspondence through the courtesy of F. W. Cook, secretary of state.

New York City data, 1810-1912, are from Heiman and Feldstein (4a), pp. 52-53; later years from condensed annual report of the New York City Health Department, 1929.

Baltimore data, 1872-1920, are from W. T. Howard, jr.: "Public health administration in Baltimore," Washington, Carnegie Inst., 1924, pp. 418-428. Later data from annual reports of the Baltimore Health Department.

1904–5, participated in the last two pandemics with only the merest ripples in her meningitis curve. In Massachusetts it is difficult to find even the ripples. One gets the impression from such records that the presence and extent of a meningitis epidemic in any one city may depend more upon local conditions than upon interregional factors, such as imported infection. Dr. W. H. Frost makes the comment that, in this respect, the epidemiologic picture of meningitis resembles that of poliomyelitis.

The orderly, systematic waves for large areas must be thought of as composed of multitudes of smaller waves, the majority of which probably synchronize approximately with the major wave, but some of which are completely out of harmony. Moreover, since statistical composites are almost always smoother in their movements than their components, it should be borne in mind that the build-up and decline of the epidemic phase of a wave in a local area is usually considerably more abrupt than the rise and fall of the national wave. It follows from this that the meningitis incidence can better be forecast for large areas than for small.

Interval between epidemics.—No attempt will be made in this paper to analyze thoroughly the question of periodicity in meningitis, but it is obvious on casual inspection of the data which have been presented in this paper and elsewhere, that there is no clocklike regularity in the interepidemic period. The interval falls oftenest between about 6 and 12 years, but it is to be noted that Massachusetts and New York City have recently run 20 years, or more, between appreciable increases. It will further be recalled that in the historical review given earlier in this paper, there were indications of one quiescent period in the United States of nearly 25 years, and another of 18 years.

Meningitis must clearly be placed on the list of those diseases which have relatively long intervals between epidemics.

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SUMMARY

This paper reviews some of the general epidemiological characteristics of epidemic meningitis, and the recent movements of the disease as to time and place.

1. The available evidence indicates that, during epidemics, surprisingly large proportions of the population may at one time or another become infected with the meningococcus. Under highly congested conditions, as in Army camps, it appears that practically the entire population may become infected once or oftener during epidemics. Probably far less than 1 per cent of such infections result in clinical attack, as annual attack rates in excess of 1 per thousand population are rare. The case fatality, however, is heavy; approximately half of the reported cases died during the recent epidemic, in spite of fairly widespread use of serum.

2. Meningitis became increasingly prevalent in Europe shortly after the opening of the World War, and in the United States shortly after her entry, when mobilization began. The highest attack rates in England came in 1915, and in the United States in 1918. In 1928–1930, the disease was again epidemic in most parts of the world.

3. The interval between the last two epidemic maxima was 11 years in the United States, and a few years longer in most European countries. The interepidemic interval is highly variable. It has oftenest been 6 to 12 years, but some areas have run as long as 25 years without epidemics. Massachusetts, for example, has had no appreciable epidemic since about 1905, and New York City only a minor one, namely, in 1928–1930.

4. Over broad areas, such as large groups of States, epidemics have appeared, not as sporadic explosions but as crests of rather smooth and systematic waves, the rising and declining phases of which have covered a period of three to six years or longer. Within smaller areas, such as individual cities, the movements of the disease have been less systematic.

5. Neither of the last two epidemics was synchronous in different parts of the United States, some regions having lagged two years behind others. The time rate of epidemic development within specific areas, and the rate of geographic movement are very much slower for meningitis than for influenza.

6. In the 1918 epidemic the reported attack rates were highest in the southern sections, probably due to the large number of military concentration camps; the Rocky Mountain States had the lowest rates. In the 1928 outbreak the Southern States had the lowest and the Mountain States the highest rates.

BIBLIOGRAPHY

(1) Deaths for 1929, by correspondence, from the division of vital statistics, U. S. Bureau of the Census. (Mort. Stat. 1928, Part I, p. 30.) Cases for the entire United States estimated from Table 3.
(2) Hirsch, A.: Handbook of geographical and historical pathology. London, 1886, pp. 549–564.
(3) Bruce-Low, R.: The prevalence of cerebrospinal meningitis throughout the world during recent years. Report on cerebrospinal fever. Local Govt. Board. London, 1916. New Series, No. 110, pp. 115–183.
(3a) Report on cerebrospinal fever. Local Govt. Board. London, 1917. New Series, No. 114. Introduction, p. ix.
(3b) *Ibid.*, Eastwood, A., p. 5.
(3c) *Ibid.*, Introduction, p. ii.
(3d) *Ibid.*, p. x.
(4) Heiman, H., and Feldstein, S.: Meningococcus meningitis. Philadelphia. Lippincott, 1913, pp. 5–10.
(4a) *Ibid.*, pp. 52–53.
(5) Sophian, A.: Epidemic cerebrospinal meningitis. St. Louis. C. V. Mosby & Co., 1913.
(6) Rosenau, M. J.: Preventive Medicine and Hygiene. pp. 252–56.
(7) McCoy, G. W.: Meningococcus meningitis * * * control. Pub. Health Rep., Vol. 44, No. 27 (July 5, 1929), p. 1596.
(8) Glover, J. A.: Jour. Hyg., XVII (Oct. 1918).
(9) Branham, Sara: Type distribution of meningococci in the United States during 1928 and 1929. Pub. Health Rep. (May 16, 1930), p. 1133.
(10) Branham, Sara: A new meningococcus-like organism from epidemic meningitis. Pub. Health Rep. (April 18, 1930), p. 845.
(11) Vaughan, V. C., *et al.*: Epidemiology and public health. 1922, Vol. I, p. 572.
(12) Glover, J. A.: Observations on the meningococcus carrier rate * * *. Report on cerebrospinal fever. Studies in bacteriology * * * military forces, 1915–1919. Med. Res. Council. London, 1920. (Special Report Series, No. 50.) p. 164.
(13) From report in reference (3a): C. J. Lewis, p. 198; D. Nabarro, p. 209; A. Eastwood, p. 7.
(14) Bruns, H., and Hohn, J.: Meningokokken im nasenrachenraum. Klin. Yahrb., Jena, XVIII (1908), pp. 285, 297, 299, 300.
(15) MacNalty, A. S.: Epidemic increases of the nervous system. London, 1927, p. 40.
(16) Glover, J. A.: Jour. Hyg. XVII (Oct., 1918). Graph of cases and carriers.
(17) Seligmann, E.: Cerebrospinal meningitis in Prussia in 1923–1924. Health Organization, League of Nations, C. H. 405 (Jan., 1926), pp. 7, 15.
(18) Sydenstricker, E.: (Unsigned report.) The rise in the meningitis rate. 1926–1928. Pub. Health Rep., Vol. 43, No. 39 (Sept., 1928), pp. 2519–25.
(19) Williams, R. C.: The prevalence * * * of meningitis in the United States. Pub. Health Rep., Vol. 45, No. 29 (July, 1930), p. 1657.
(20) Mortality Statistics. Bureau of the Census, 1928. Part II, p. 26.
(21) Keefer, F., Friedberg, S., and Aronson, J.: Jour. Am. Med. Assoc., Oct. 12, 1918. (Graph.)
(22) Epidemiological Bulletin, League of Nations. R. E. 141 (Aug. 15, 1930), p. 335.

(22a) Geiger, J. C.: Control measures * * * on ships. Am. Jour. Pub. Health XXI. No. 2 (Feb., 1931), p. 163.
(23) Collins, S. D.: Influenza-pneumonia * * * in 95 cities. 1920–29. Pub. Health Rep., Vol. 45, No. 8 (Feb. 21, 1930), pp. 21, 22.
(24) Epidemiological Bulletin. League of Nations, R. E. 114 (May 15, 1928), p. 193.
(25) Mitteilungen a. d. Reichsgesundheitsamte. Berlin. 1925, p. 122.
(26) Annuaire statistique de la ville de Paris. 1914–18. (Sections on cases treated in hospitals.)
(27) From cases and deaths for three year periods, by courtesy of the health officers of Chicago, New York, and San Francisco.
(28) Norton, J., and Gordon, J.: Meningococcus meningitis in Detroit in 1928–29. Jour. Prev. Med., Vol. 4, No. 3 (May, 1930), p. 214.
(29) Pope, A., and White, J.: An epidemiological and bacteriological study of epidemic meningitis in Chicago. Jour. Prev. Med., Vol. 3, No. 1 (Jan., 1929), pp. 63–76.
(30) Wilson, E. B.: Morbidity and the association of morbid conditions. Jour. Prev. Med., Vol. 4, No. 1, Jan., 1930, p. 28.

PERMANENT COMMITTEE OF THE INTERNATIONAL OFFICE OF PUBLIC HYGIENE[a]

Special Session of May, 1931

The Permanent Committee of the International Office of Public Hygiene held its special 1931 session from May 11 to 20 in Paris.

Those present were Messrs. Velghe (Belgium), president; Hamel (Germany); Araoz Alfaro (Argentine Republic); van Campenhout (Belgian Congo); A. Viel (Chile); Th. Madsen (Denmark); Shahin Pacha (Egypt); Hugh S. Cumming (United States of America); Barrère (France); Boyé (French Equatorial Africa); Gaston Joseph (French West Africa); Lasnet (French Indo-China); l'Herminier (Madagascar); G. S. Buchanan (Great Britain); J. D. Graham (British India); A. T. Stanton (British colonies and territories under the mandate of Great Britain); McCallum (Australia); H. B. Jeffs (Canada); S. P. James (New Zealand); P. G. Stock (Union of South Africa); Boyd Barrett (Irish Free State); A. Lutrario (Italy); M. Tsurumi (Japan); P. Schmol (Luxemburg); Colombani (Morocco); F. Roussel-Despierres (Monaco); K. W. Wefring (Norway); N. M. Josephus Jitta (Netherlands); W. de Vogel (Netherlands Indies); Mohsen Khan Rais (Persia); W. Chodzko (Poland); Ricardo Jorge (Portugal); J. Cantacuzène (Rumania); O. P. H. Atkey (Sudan); C. Kling (Sweden); L. Prochazka (Czechoslovakia); de Navailles (Tunis); Hussameddin (Turkey); Syssine (Union of Socialist Soviet Republics); José Scoseria (Uruguay); G. Yoannovitch (Yugoslavia); and Messrs. Abt, director of the International Office of Public Hygiene and Marianac, assistant director.

[a] Translation.

There were also present at certain of the meetings of the committee M. Roper, secretary general of the International Commission on Air Navigation, and Doctor Garsaux, medical expert of this commission.

I

The committee proceeded to the final draft of the convention project for the sanitary regulation of aerial navigation, the preparation of which it had been engaged in for several meetings.

The Commission on the Control of Aerial Navigation, established for this purpose, held in March, 1931, a meeting in order to examine the observations and proposals received from the governments to which had been submitted the tentative plan drawn up in May, 1930. Adherence to the basic principles of this preliminary draft having been general and the proposals formulated having been for the most part only on particular points, it seemed quite frequently possible to incorporate these propositions in a new edition slightly different in the aggregate from the first. On the other hand, the Yellow Fever Commission, according to its decision on this question, prepared a set of provisions relative to yellow fever to constitute a separate chapter in the future convention.

The new preliminary draft thus completed in detail having been promptly transmitted to the delegates, in case some suggestion might still be made by competent authorities of their respective countries, the commissions and later the committee in plenary session took up, examined, and finally adopted the terms, taking into account suggestions which had been under consideration. The committee took into consideration notably the opinions expressed at the conclusion of the Pan American Conference of the Directors of Public Health which had met a short time previously in Washington.

In spite of the diversity of the conditions existing in the different countries interested in the future convention, it seemed that, in their entirety, the provisions adopted—and which constitute the final project—correspond to the general needs essential to sanitary defense and, while not excluding any legitimate intervention in case of real danger, guarantee international air relations against any arbitrary action.

Confirmation in the form of a convention will be proposed to the governments through diplomatic channels, it being understood that each country will be free to define its position on the articles relative to yellow fever, the application of which it considers justified in its territory.

II

The committee has been kept informed of the progress realized, notably concerning the system of international communication of individual sanitary passports in case of sanitary surveillance (recently put into effect in the Belgian Congo) and the carrying out of the recommendations of article 49 of the international sanitary convention of 1926 on the subject of bills of health. In this regard, in consequence of steps undertaken some time ago with the assistance of the French Government, the putting into effect of agreements is expected (on July 1, 1931) between different countries for the abolition of consular visas; moreover, the conclusion of a convention has been prepared to facilitate the general acceptance of this abolition (or of the whole system of bills of health) in countries which could and would accept it.

The position of the committee remains unchanged as to the points with which, on several occasions, it had under consideration relative to the application of article 28 (periodic deratization of ships). In consideration of this, and through

the kind intervention of their respective delegates, several countries, such as the Argentine Republic and Turkey, although not yet having ratified the convention of 1926, have agreed from now on to draw up their regulations in accord with the provisions of this article. Similar steps are in progress in other countries. The notifications and publications relative to the ports designated by the governments for periodic deratization have been carried on by the Office, and new countries—Japan, Latvia, and French Indo-China—have adopted the international form indicated by the committee for the certificates (of deratization or exemption) issued in their ports.

Several countries, such as Great Britain, Australia, and France, have sent information concerning the status of deratization carried on and certificates of deratization or of exemption, respectively, issued in their ports. These are useful indications of appreciation of the system introduced by the convention of 1926 for extending the campaign against rats on shipboard—a system the first results of which seem more and more to confirm its value.

Information of this nature is included in the International Sanitary Maritime Annual, the 1930 editions of which (French and English) should soon be published, supplemented by documents sent to the office by a group of countries which have not before been represented here.

The question of international quarantine messages by wireless is, for the time being, to be left to the optional application of the system by means of mixed messages ("clear" or in code) until the adoption of an international code of signals.

As to the electric rat guards, their use was considered only under reservations, for it seemed to present difficulties such as those which arose in recent experiments carried on at Hull. The study of the possible perfecting of these guards should, doubtless, not be abandoned; but in any case the earlier conclusions of the committee hold good as to their merely accessory and relative value for the protection of the moorings by the means at present in use.

Several new points, directly related to the international sanitary convention, were submitted for the consideration of the committee which examined them in conjunction with its quarantine commission:

(*a*) A system of port-to-port notifications (also to foreign ports) of the cases of diseases reported on ships was organized in Great Britain, and the Office (which published in its February (1930) bulletin the description of this organization) should try to bring this into the most general possible use.

(*b*) The difference between the regulations of certain countries as to the conditions (especially the delay) required for validity of vaccination certificates presented by persons coming from countries where smallpox exists is a source of inconvenience. The committee proposes uniformity in these regulations on the following basis: Extending privileges to the persons in question if they can furnish a certificate of successful vaccination executed at least 12 days and not more than 3 years before the date of departure, or if they show scars proving that they have previously had smallpox.

(*c*) Difficulties also arise in connection with the requirement (in a limited number of countries) of antiplague vaccination. The committee, in the face of contradictory views expressed on the value of this vaccination, expressed the opinion that in any case its application should not yet be required in international relations.

(*d*) The stowing of cargoes of grain (especially of rice) coming from ports where plague is endemic very often makes a complete fumigation with full holds impossible. Consequently, it has been suggested that a uniform system of small passages, permitting access of the gas, be prescribed for this kind of cargo stowing, whether in bulk or in sacks. The committee did not consider this suggestion

possible of practical realization because of the serious objections of a nautical nature which it seemed to encounter. The advantages which it would afford, however, might be counterbalanced by the additional avenues it would create for the passage of rats.

(*e*) On the other hand, the committee has recognized the possibility and utility of granting a preliminary surface fumigation of cargoes of grain coming from ports where rat plague exists or is suspected. This entirely provisional measure is intended to limit the risk of introduction of plague-infected rats into warehouses by means of the modern methods of aspiration; it is not prescribed by the international sanitary convention (which requires, in all cases, a "complete" operation) and does not constitute a deratization in the sense and for the purposes of the convention. On the other hand, its object is the protection of the port itself, and the expenses should be borne by it.

(*f*) After a fumigation by hydrocyanic acid, the delay of 24 hours allowed by the international sanitary convention for the finishing of the deratization operations is sufficient in the sense that the work of unloading or loading may be continued on the ship, but an additional delay (an average of 6 hours) should still be allowed (as is already allowed in several ports without any objection being made on this score) before final authorization should be given for people to sleep or stay on board, especially when conditions of temperature and humidity are unfavorable for the complete evacuation of the toxic gas.

As questions bearing on the pilgrimage of Hedjaz are not customarily considered in the spring session of each year, when the pilgrimage is in progress, the special commission did not meet; but mention may be made of the two conferences held at the Ministry of Foreign Affairs of France, October 23, 1930, and May 15, 1931, to complete the work begun, on the proposal of the said commission and of the permanent committee of the Office, at Beirut in January, 1929. They were concerned with coordinating the sanitary protection of the pilgrims in the different countries that they cross in going to or returning from Mecca. A final agreement between the Governments of these countries has been prepared and will doubtless be concluded in the near future.

The committee heard a description of the quarantine provisions adopted at Suakin during the pilgrimage of 1930; the measures, followed for two years in the Sudan with regard to the pilgrimages, have already shown results. Preliminary information has been received, moreover, concerning the measures applied in Eritrea by the Italian Government for the sanitary protection of the pilgrims, as well as those followed in British India on the recommendation of the Haj Inquiry Committee.

The status of the question of sanitary and medical service on shipboard is at present as follows: In Turkey a regulation based on the sanitary law specifies the conditions placed by the State on the appointment of ships' doctors.[1] The Government of the Netherlands expressed its point of view. The provisions made in Great Britain to organize, with optional privilege, special complementary courses of instruction for ships' doctors, those expecting to be or already in the service, will be applied next July.

The system of international "commissions" has not yet been tested sufficiently to justify conclusions as to the results; it is to be given a new trial in the countries of South America. In several countries, however, opinion remains adverse not only to giving ships' doctors an official responsibility in quarantine matters, but to the institution of an official certificate of ability, mandatory for their nomination by the companies. Everywhere, however, it is recognized that the *authorized* opinions of the ships' doctors should be (and generally are) taken into consideration.

[1] See Bulletin of the International Office of Public Hygiene, v. XXIII, No. 6, June, 1931.

Indirect methods have been suggested for guaranteeing absolute respect for the regulations for the protection of the health of persons on board and those of the countries visited by the ship in the rare cases where this would be necessary. The expediency of a special detailed journal kept by the ship's doctor is also to be considered. But, especially, it is more and more apparent that it is to the general interest that, first, the quality as well as the professional ethics of the ships' doctors be brought to the highest possible level, so as to develop a really specialized corps, all of whose members shall be thoroughly competent to fulfill their mission, shall have a high sense of moral responsibility, and shall be able, in return, to hope for larger material advantages and greater stability.

This result may be attained either by insisting, in the general medical training, on the study of subjects indispensable for service on shipboard or by organizing complementary courses of study bearing on this essential knowledge and open to aspiring ships' doctors as well as (as a recruiting measure) to the physicians already in the service.

As to this last point, it is evident that the improvement in the material condition of doctors, especially on board ships other than those which carry numbers of wealthy passengers, would make available more applicants of better quality. But it is to be feared, perhaps, that present economic conditions will retard for some time such improvement and consequently delay correspondingly the solution of the entire question.

III

The committee, according to the provisions of article 3 of the convention, relative to antidiptheria serum, signed at Paris April 1, 1930,[2] designated the Serotherapeutic Institute, of Denmark, at Copenhagen to preserve the standard unit and to perform the related duties provided for by this article.

It has received notice of the new provisions made by different countries participating in the international agreement of Brussels of December 1, 1924,[3] for the application of this agreement.

A proposal was made to it, on the one hand, to strengthen the provisions concerning sailors (by compulsory declaration and treatment of those suffering from venereal diseases in the contagious stage), and, on the other hand, to provide for passengers of all classes (and especially certain categories of these) similar compulsory provisions. It has seemed to the committee practically impossible, under present conditions, to establish such a system internationally.

IV

The committee has received and approved the annual report of the health section of the League of Nations for the year 1930. It has, moreover, taken account of the resolutions adopted by the health committee of the League of Nations in its seventeenth session, held at Geneva from May 4 to 8, 1931.

It was informed by this committee of new questions in the execution of articles 8 and 10 of the opium convention of Geneva of 1925. After consultation with its special committee of experts on pharmacology and on the report of the Opium Commission, it gave its opinion, required by these articles, concerning (1) the list of preparations to which the Estonian Government demanded application of the exemption of control allowed by article 8; (2) the application of the provisions of the convention, according to the terms of article 10 to salt of acedicone and preparations which contain it. It has reserved temporarily its opinion as to preparations with a base of ipecopan, for which the application of article 8 was proposed and for which a new examination by experts is anticipated.

[2] See Bulletin of the International Office of Public Hygiene, v. XXIII, 1931, p. 183.
[3] Idem, v. XVIII, 1926, p. 1092.

V

Numerous communications were presented during the course of the session on the different subjects within the activities of the Office.

The study of a succession of plague epidemics, mild from 1924 to 1926 and more serious in 1927, 1928, and 1929, showed that a new focus of endemic plague exists in the northeastern part of Inner Mongolia. The reservoir of the virus seemed to be a spermophile, *Citellus mongolicus umbratus;* it was the only rodent which was found to be infected, and the seasonal incidence coincides with the issue of the spring generation of the spermophile. In 1929 the extension of the epidemic from the primary focus was caused by interhuman transmission. Likewise in Morocco, in Chaouia, the epidemic which prevailed from November, 1929, to June, 1930, had its origin in a rodent epizootic at Settat; but it was carried from this place to the surrounding regions by the natives coming to the town on business. In Senegal, plague occurred when after the cold season, fleas appeared in large numbers in the dwellings of the natives. It was proved that certain of these fleas were infected with plague. On the other hand, at that time very few plague-infected rats were discovered. In Egypt, in the villages where plague recurs almost every year, plague rats were looked for before the usual time of the outbreak of the epidemic, but none was found. Likewise cases of plague have been observed among the Bedouins living in tents on the sand where there are no rats. Although rats, domestic or wild, are still to be considered as a reservoir of the plague virus, proofs of the existence of other links in the propagation of the infection are multiplied. The origin of a small outbreak of pulmonary plague, observed in January, 1931, in Azeirbeidjan, has not been cleared up.

Inquiries as to the species of flea present in the Madras Presidency have been carried on in some 30 localities. They have shown that *Xenopsylla astia* is indigenous to south India; that *X. brasiliensis* has been established on the Mysore plateau and in the surrounding regions; and finally, that *X. cheopis* is of relatively recent introduction and is spreading, expecially by means of the transportation of grain and cotton. Epidemics of plague caused by *X. astia* are rare and mild; the seriousness of the epidemic is parallel with the number of *X. cheopis* present. Climate plays a part only because of the favorable conditions created for the multiplication of fleas. Some localities seem to be chosen spots for plague without having climates that are particularly favorable.

In Madagascar, from 1926 to 1930, the development of plague has followed superposed curves from year to year. It begins in August, toward the end of the cold season, which extends from May to September, inclusive, and reaches its maximum in December–January; the outbreak coincides with the period of the multiplication of fleas. There is a parallel between the curve of bubonic plague and that of pulmonary plague; but the proportion of pulmonary cases is notably higher in the cold months.

Antiplague serotherapy has given decidedly favorable results in British India. In a series of about 75 cases, of which about half were treated with serum, the mortality fell from 100 per cent to 27 per cent for cases with severe septicemia, from 50 per cent to 21 per cent for cases with light septicemia or without septicemia, and from 25 per cent to 0 for cases without bacteriological confirmation.

Antiplague vaccination was extensively practiced in Morocco during the course of the epidemic of Chaouia. Ordinary vaccine from the Pasteur Institute, vaccine of the bacillus of pseudotuberculosis of rodents, and lipovaccine were employed. There appeared to be no clear difference in efficacy between the three vaccines. The second seemed to be the most suitable because, while requiring only a single injection, it is less fatiguing for the physician to inject than the lipovaccine. This inconvenience of the lipovaccine, however, may now be partly eliminated by the use of a special syringe provided with a screw plunger. Im-

munity did not appear to be established until three weeks after vaccination. The results have been inconstant; side by side with examples showing individual or collective protection, there have been failures. In short, in Morocco, as in French West Africa, where in 1930 nearly 500,000 vaccinations were made, it was ascertained that vaccination en masse causes an epidemic to recede, but that it does not assure immunity to all the individuals vaccinated.

Along with countries where antiplague vaccination has been considered efficacious (in addition to the preceding, Egypt, India, and Italy), there are countries in which its value is doubted (Dutch East Indies, Japan, and Portugal). The Committee of the International Office of Public Hygiene has decided to collect definite information on the experience of the different countries in antiplague vaccination, including exact information on the type of vaccine employed, the number of injections, etc.

When several cases of plague appeared in the Algerian ports and at Marseille during the summer of 1930, the Office requested information on the results of the search for plague-infected rats in the Mediterranean ports. This investigation showed that the foci of rodent epizootics were much less numerous and much more discrete than was thought several years ago. In Algeria, 27 plague-infected rats were discovered at Algiers, 37 at Oran, and 4 at Mostaganem during the summer months and the beginning of the autumn of 1930; then the epizootics apparently died out. In Marseille, outside of one rather important focus discovered in October in a grain silo and quickly eliminated, only about 10 plague-infected rats were found during the summer; none after the end of October, 1930. In Egypt, in spite of the endemicity of human plague in several ports, only 4 plague-infected rats were found in Alexandria in 1930; none in the two preceding years. In Beirut, 4 plague-infected rats were found in 1930; none were found in Morocco, Tunisia, the Sudan, Palestine, Cyprus, Malta, Gibraltar, in the Russian ports of the Black Sea, at Istanbul, and at Lisbon.

The two strains of cholera vibrios isolated at the Tor quarantine station on the return of the 1930 pilgrimage and the discovery which among noncholera carriers had motivated quarantine measures have been studied in the Laboratory of Public Health at Cairo and at the Institute of Experimental Medicine at Bucharest. It was observed that they were agglutinated by the anticholera serum of the laboratory at Tor, and by another, but they were not by a series of serums from divers sources. It has been possible to establish that this peculiarity of the serum of Tor was due to the presence of group agglutinins and that these agglutinins were in relation to the receptors of the vibrios which are destroyed by heat at 100° C.; from whence the conclusion that it is necessary to employ for the identification of cholera vibrios, above all when the necessity of quarantine measures depends on it, an agglutinating serum and a technique of agglutination tests which eliminate those reactions not strictly specific.

The Committee of the International Health Office has intrusted to a commission the task of making a preliminary study of the preparation of a serum type destined to the various uses which are concerned with the identification of vibrios. The method of work will consist in the selection of well-known strains, the most part freshly isolated, studying their antigenic properties, then preparing a polyvalent serum which will be finally tried out and controlled in the countries where cholera exists.

The confusion really lies in the question of the relations between agglutinable vibrios and the nonagglutinable vibrios. In India certain investigators have observed the transformation of nonagglutinable vibrios into agglutinable, and vice versa, but these results have not been confirmed by other investigators. The commission has just been established by the Government of India for a period of five years with the object in view of studying, with the participation

of the Indian Research Association, the whole problem relating to the epidemiology of cholera.

As to healthy carriers of cholera vibrios, although it may be proved that, in certain circumstances, carriers may live in a locality without causing a single case of cholera, and whatever may be the diminution of the risk of contagion which can result from the presence of a bacteriophage among the carriers, these latter should none the less continue to be considered as a menace. Anticholera vaccination has, besides, no influence on the condition of the healthy carrier. One should then admit, from the point of view of quarantine measures, that it protects the vaccinated against an attack of acute cholera, and in consequence it notably diminishes the risk of importation of cholera, but it does not radically suppress it.

The committee of the Office, realizing that the primary question for the prophylaxis of yellow fever was the knowledge of endemic areas where the virus is preserved during the interval between epidemics, requested the cooperation of the Rockefeller Foundation in the organization of systematic inquiries in the suspected regions. The foundation responded favorably to this request and proposes that the existence of antibodies, evidence of a previous attack of yellow fever, be sought in the blood of groups of children aged less than 10 years in the localities capable of being permanent foci of the disease. It offers to train in its laboratories physicians from divers countries in the technique of study of these antibodies by the inoculation in the mouse of mixtures of serums with the yellow-fever virus and to continue examinations of this kind, up to a certain number, in its institutes at Lagos and New York. These studies, the obligation for which is inscribed in the project of the Sanitary Convention on Aerial Navigation, established by the committee of the Office, will comprise then at first the determination of an index of immunity in the suspected regions; then, once the existence is demonstrated, at a recent period, of yellow fever under the form of aborted cases, they will consist in careful surveillance of the zones thus delimited in the effort to uncover the disease. It has been called to the attention of the committee that lately, in Colombia, an infection which at first had been taken for influenza had been identified as yellow fever. In Brazil the activities of the sanitary services uncover from time to time a case of yellow fever in the interior of the State.

The projected studies have become realizable only since the possibility of substituting the mouse for the *rhesus* in the research on yellow-fever antibodies. The work of the Institute of Tropical Medicine at Amsterdam made a useful contribution to the perfection of these new methods.[4] They have clearly demonstrated, completing the work of Max Theiler, that the virulent products (blood, brain) injected in the cerebrum of the mouse provoke a fatal encephalomyelitis without apparent lesions of other organs; that the emulsion of the brain of the infected mouse can, after numerous passages, cause yellow fever in the monkey, even by the bite of the *Aëdes aegypti;* that the yellow-fever virus is present in the suspension of brain made in a 10 per cent peptonized and unsalted solution of rabbit serum, filtrated through a Seitz filter; that the addition to this filtrate of serum containing the antibodies protects the mouse in 96 per cent of cases when 75 per cent of the controls die.

An observation has been made at Amsterdam that the yellow-fever virus, having remained for a short time at 16° C., no longer causes yellow fever in the *rhesus* but immunizes the animal.[5] This opens up an avenue for the preparation of a vaccine.

Finally, it can be seen that as a consequence of inquiries for the discovery of subjects having an immunity, it may be possible some day to secure serums of recovered cases susceptible of use in the treatment of yellow fever.

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[4] For more detailed report see Public Health Reports for Oct. 2, 1931, pp. 2366-2371.—Ed.

[5] For more detailed report see p. 2739 of this issue of Public Health Reports.—Ed.

The commission on smallpox and antismallpox vaccination reported that the difference between variola major and variola minor, which it pointed out, is being accepted more and more. It has been accepted in Great Britain and the Belgian Congo. For several months variola minor has existed only in Great Britain; it has not seemed to invade new regions; Scotland and Ireland have remained free up to the present time. In the United States, where the number of cases of mild smallpox now exceeds 40,000 per year, there have been during the last 10 years small epidemics of virulent smallpox with a mortality from 2 to 33 per cent in some 20 States.

The use of the Leake method of vaccination, a multiple-pressure method, is spreading in the United States. In Great Britain two-thirds of the public vaccinators vaccinate with only a single linear scarification; the immunity acquired following this vaccination seems sufficient to protect contacts. An inquiry has been made of all the directors of the German vaccine institutes on the subject of the influence on the local and general reactions, as well as on the degree and duration of the immunity obtained, of the number and length of the vaccinal incisions. The conclusion of this investigation is that, in general, new research would be necessary in order to reply correctly to the questions asked; this will be undertaken at Munich and Schwerin. The general tendency is to state provisionally that, though one scarification may suffice, it is preferable to make at least two, and that the best length of the scarification is 0.5 centimeter. Finally, the German specialists think that, in view of the often unfavorable conditions under which vaccinations are carried out, it is to be recommended that the vaccine institutes supply the still active lymphs at dilutions of 1/5,000 to 1/10,000.

The method of purification of the antismallpox vaccine by adsorption on kaolin, elaborated in Japan, has not seemed, in Egypt, to be useful in practice at the present time, especially on account of the decrease in virulence and the short duration of conservation in a warm country. New experiments on vaccination, made in Japan on about 600 persons, have led to interesting observations on the use of subcutaneous injection. The advantages of the procedure would be more exact dosage of the vaccine, the insignificance of the local reaction, and even of the general reaction in the adult, and the absence of scar. Immunity, controlled by trial vaccination, seems to be obtained even when the reaction is absent. The application of this method is, however, only in the trial stage.

Postvaccinal encephalitis appears to be clearly on the wane in Great Britain, Germany, and Holland. Some infrequent cases only have been observed in Great Britain since the summer of 1930. In Germany, where each case reported is seen by a neurologist and then examined by a special commission, 9 cases, and 1 doubtful one, have been verified, as compared with 20 and 22 in the two former years; these figures are compared with the two million to two and a half million vaccinations per year. In Holland no new cases occurred since May, 1930, although about 25,000 vaccinations have been done. For the period 1924–1931 the average has been 1 case to 4,695 vaccinations and 1 death to 16,000 vaccinations; but among children under 2 years of age the rate is only 1 case to 25,000 vaccinations. As in England, the primary vaccinations at school age, which are manifestly the most dangerous, are much more rarely done than formerly. In the United States recognized cases were extremely rare before 1928; during the last three years the total is 40, of which 18 were in 1930. Five of these cases occurred simultaneously in one city, in children of about 6 years of age, vaccinated by a single scarification. One case had been reported in Turkey, at Istanbul, among a thousand vaccinations. Encephalitic syndromes following divers infectious diseases were observed among 30 cases in Great Britain in 1930. There were, moreover, reported cases of acute disseminated encephalomyelitis

which occurred spontaneously in 17 cases in Poland, the anatomopathologic lesions of which were not distinct from those of postvaccinal encephalitis.

While in France, North Africa, and the Iberian Peninsula, exanthematic fever, the type of which was established at Marseille, is to-day a well characterized and classified disease, the Italian clinicians are not inclined to classify with this type the analagous diseases observed in Italy, especially in the vicinity of Catania and at Rome. They tend to classify these rather with Brill's typhus. The disease is mild, seasonal, not contagious, and probably caused by the dog tick; but the eruption is more often macular than papular, and the Weil-Felix reaction, tested at the end of the febrile period or in convalescence, is generally positive. The principal objection to the identification with typhus is the absence of cross immunity, established by Burnet and Olmer, who state that, in Italy, the differences between the viruses are explained by the passage through different intermediary hosts. However, the observation may be made that these carriers are indifferent hosts, hardly likely to cause an adaptation of the virus. As to the Weil-Felix reaction, the different results in different exanthematic fevers are due perhaps to the use of different strains. It would be of value if the laboratories used uniform strains and the same technique.

Researches on the virus of Japanese fluvial fever, tsutsugamushi, showed corpuscles of the *Rickettsia* type, mostly intracellular, in the cutaneous lesions, the lymphatic glands, and the spleen of patients. These organisms, inoculated into the anterior chamber of the eye of the rabbit, multiply very rapidly, especially on the posterior surface of the cornea. They give rise to a well-defined condition, a severe iritis, and after cure cause a local immunity. With the same technique a culture is obtained of the *Rickettsia* of typhus exanthematicus. However, the incubation is shorter, the alterations of the small blood vessels are clearer, and the virus in the guinea pig becomes generalized in the organism. Moreover, the corpuscles are smaller and less numerous. The authors of these studies see here a proof favoring the hypothesis that the *Rickettsias* are the agent of typhus exanthematicus. There seems to be an analogy between the virus of the latter and that of fluvial fever.

Recurrent fever, the occurrence of which in the Union of Soviet Socialist Republics reached a rate of 51.2 per 10,000 in the period 1916–1922, decreased in 1930 to the rate of 0.1 per 10,000, and is no longer met with except in emigrants who move in the interior of the Union. The mortality is 4 to 5 per cent.

In the Sudan the epidemic which broke out with intensity in Darfur in 1926 was controlled immediately; but there remained carriers who presented no symptoms and whose blood contained spirochetes. It is probable that certain of these carriers moved into the Province of the Blue Nile, where immigrants come from the west for agricultural pursuits; they gave rise to an epidemic in 1930, especially in the vicinity of Gezirah. Some cases occurred in other Provinces, always in immigrants from the west. The conditions under which this moving population lives make the definite extinction of the disease slow of achievement. A typical case permitted the fixing of the duration of the incubation period of recurrent fever at 15 days.

Cerebrospinal meningitis has been increasing in frequency in the United States during the last three years, and in Egypt and Great Britain. It presents no parallelism with the epidemics of grippe in this latter country. In Turkey it was believed to have disappeared toward the end of 1930 in the region of Adana, after the epidemics of 1929 and 1930; but there was a recrudescence in the winter season of 1931. A new prophylactic method seemed to give good results in that region. It consisted in instilling, twice a day, in the nostrils of all the menaced population two or three drops of a 1/250 solution of trypaflavine.

Antimeningococcic serotherapy has registered failures in the United States where the mortality in certain groups reached 50 per cent. In other groups, however, the results were more favorable (mortality of 17.8 per cent, in 606 cases). In Great Britain the efficacy of the serum has not been very satisfactory except during the war. In Sweden a retrospective investigation on 3,000 cases is still in progress. In Yugoslavia the mortality in 1930 was 54 per cent. In Belgrade it was 30 per cent in 13 cases in 1929, and 40 per cent in 5 cases in 1930; but all the deaths were in children from 4 months to 10 years of age. Moreover, four children from 4 months to 4 years recovered. In Poland the results are reported to be very satisfactory. The sera, almost entirely polyvalent, are prepared with several strains belonging, according to the case, to one or several types of meningococci. The titer of the sera, estimated by the agglutination and deviation from the complement methods, was always above 1/200. It appears from information gathered by the Office that the efficacy of the serotherapy presents differences according to the country. The introduction into the preparation of sera of fresh and numerous strains is certainly a condition to success, but there seem to exist factors of efficacy which escape us.

The epidemiology of poliomyelitis presents difficulties. However generally accepted is the theory of communication of the disease by contact, it must be recognized that often no case occurs in the household of the patients, and that the existence of chronic carriers has not been proved experimentally.

In Yugoslavia all the cases reported in 1930 occurred in the outer edge of the country.

The Central Hygiene Council of Belgium has prepared instructions urging the medical corps to use more extensively vaccination against tuberculosis by the B.C.G., at the same time recommending the greatest care. In the United States, a study on vaccination by B.C.G. made in a limited group of infants will be carried on, trying to find for each infant vaccinated a suitable control. In Great Britain extended application of this mode of vaccination is not considered. They refer, on the one hand, to the experiments of Dreyer and Vollum, who conclude that there is a possibility of a revival of virulence by the culture of B.C.G. in a liquid medium, and those of St. Griffith, who considers as nil or weak the immunization obtained in the monkey, and, on the other hand, to the results of the same author and of Buxton, who have reported the absence of virulence in cows and the development of a notable resistance to test inoculation, especially after intravenous vaccination.

Two new occurrences, one in England and the other in the United States, which have showed that the possibility of a reappearance of psittacosis can not be disregarded, have led the committee of the Office to express the opinion that the removal of the prohibition of the importation of parrots should be decided on simultaneously in the different countries, and that the decision should not be made before the end of the year 1931. In the light of information collected, especially in Brazil, and the Argentine Republic, there will be considered in the next session of the committee the degree of danger and whether it would be possible to lessen it sufficiently by requiring adequate precautions during transportation on the part of importers.

Different reports have been brought to the committee on the practice of preventive medical examinations in the United States, Germany, Italy, France, Great Britain, Switzerland, and Turkey. In the United States the movement is extending to the policyholders in the life insurance companies, to the personnel of private enterprises, to the employees of certain public services, and to the private clientele of certain physicians. Statistics, based on the examination of 100,000 persons, have permitted the drawing up of curves for the frequency of different diseases according to age. The desire developed to introduce a quantita-

tive evaluation and, failing in that, an estimation of the degree of disturbance found on examination. Consideration is being given, however, to definite instructions and special training for the physicians in order to perfect and make uniform the technique of the examinations. In Germany the number of insurance companies grouped in the German Central for life insurance sanitary service is 25. The "Central" has concluded an agreement for examinations with the Syndicate of Leipzig, which includes the majority of German doctors. Any person insured for a minimum of 5,000 reichsmarks has the right to a free examination every 3 years; 28 per cent of those insured now use this privilege. No special document is issued after the examination, which is kept secret by the companies. This system is valued as much by those insured as by the companies. Publicity is given by a special journal, by quarterly pamphlets, by lectures, by films, and by radio broadcasting.

Recently the delegation of the Reich for the instruction of the people in matters of health prepared a health book, in which there is provided space for remarks on the periodical examinations. The fear was expressed in certain circles that this book might be demanded by the employers and be a cause of embarrassment to persons whose condition of health was not the best. In Italy the Instituto Nazionale delle Assicurazion has made arrangements with the National Syndicate of Fascist Doctors to offer free medical visits every two years to persons insured for 20,000 lira and more, consisting of urological tests and measurement of the blood pressure. It also provides free laboratory examinations (for example, glycemia, azotemia), climatic or thermomineral cures, and dental care. In France the movement for preventive examinations has had a different development. There is a center for examination and surveillance of children from birth to 14 years of age at the Winburn Foundation, at Courbevoie; the institution of the book of health and biennial examination of the students in the grammar schools of the Academy of Paris; the examination of all first-year voluntary students at the University of Strasburg; the creation of a medical center at the University of the City of Paris; periodic examination of the policyholders in the insurance company "Le Nord"; and the creation of a health society to procure for its members periodic examinations in the Department of the Aube. In Great Britain insurance companies grant reductions in rates to policyholders who submit to periodic examinations. In certain companies this provision affects 25 per cent of those insured. In Switzerland the company "Vita" procures for persons insured for more than 6,000 Swiss francs a free medical examination every three years. It grants the doctor 8 Swiss francs per examination. In 1929, 46.4 per cent of the policyholders benefited by these advantages. In Turkey free examinations, made by official physicians, have been instituted for different classes of persons—merchants selling drinks or foodstuffs, venders, officials, school children, infants, cooks, and domestics and persons who wish to marry. These examinations consider especially the discovery of tuberculosis, trachoma, venereal diseases, malaria, and ancylostomiasis, but include also the general capacity for work.

The final result aimed at by the preventive examinations will be the lowering of the death rate for all ages up to 50 years. Does the normal age of death, as defined by the highest mortality rate of a mortality table, vary according to countries, and has it been extended in relation to the general decrease in mortality? This question is going to be studied by the committee of the Office.

The measures taken in the Belgian Congo for the sanitary protection of the native workman have been submitted in detail to the committee. Different bodies are charged with studying periodically the possibilities of rational planning with regard to the native population, of controlling methods of recruiting, organizing recruiting, preparation, acclimatization, repatriation of the workers, and surveying the work with the employers. Three medical examinations

are regularly practiced—one at the time of recruiting, another at the time of arrival at the acclimatization camp, and another on arrival at the place of employment. At the acclimatization camp there have been instituted rational gymnastic exercises, the natives being, with the exception of the hunters and boatmen, stooped individuals with narrow chests. The creation of native cities in the working regions—cities in which the natives own the houses but not the ground—develops family life and the feeling of personal dignity. The former practice of giving presents to the chiefs is largely replaced by payments to the funds of the leaders, who buy agricultural implements, medicines, and establish dispensaries for sleeping sickness and native leprosariums. Insurance chests for those injured at work have been instituted, with a view of avoiding the squandering of indemnities granted by tribunals in reparation for accidents. Altogether, the mortality of the workers in the service of whites is about the same as in certain native villages. It decreases as the employment continues, because of adaptation. The birth rate reached 152 per 1,000 in the native city of the Mining Union at Elisabethville. If there is depopulation, the cause is attributed to the general breaking down of morals.

In France an appropriation of 10 per cent of all the colonial loans for sanitary services has just been made. Important resources are now going to be devoted to (1) the protection of the health of native workmen and (2) the demographic development of the populations furnishing the workers. The program consists particularly in the creation of a mobile, medical control of the workman; the verification of plans of sanitary and demographic protection, the establishment of which is compulsory before the opening of yards; the improvement of medical attention; the creation of a school for the recruiting of civil, colonial doctors, and similar activities.

The protection of maternity and infancy has made notable progress in French West Africa and in French Equatorial Africa, thanks to the institution of prenatal clinics, clinics for babies and children, to the care at childbirth, and to the increase in the number of European midwives, who serve as supervisors, and of native midwives in the colony, and especially to the native visiting nurses. Thus, in Ubangui-Chari the infant mortality, which was about 31 per cent, has fallen to 4 per cent in the radius of activity of the infant clinics. In the United States the Indian population lives under mediocre sanitary conditions, with small material resources, without individual hygiene, and in small and overcrowded dwellings. The mortality is twice as high as in the remainder of the population in the same region. There has been created for them a complete sanitary organization, with a large medical and nursing personnel, hospitals placed at the most accessible points in the reservations, asylums, a sanatorium, and a school medical service.

A comparison of the mortality rates by age groups and by causes of death in an urban and a rural population in France has shown that the higher total mortality rate in the rural population is due to the larger proportion of children and aged persons in this population. The mortality from the period from 20 to 39 years of age also presented a higher rate in the rural group, and this higher mortality appears attributable especially to tuberculosis and to diseases of the respiratory tract. The infant mortality from infectious diseases and from infantile diarrhea is twice as high as in the towns; and the rates of mortality in the towns from diseases of the heart, kidney, liver, and arteries largely exceed those from similar diseases in the country.

In Yugoslavia the mortality is lower in the prosperous towns than in the rural areas, where it is thought that there is reason for studying and combating the causes.

There is reported in the United States a constant increase in the need for hospital beds. There is a tendency to increase the number of persons to whom the

Federal Government assures hospital treatment. One of the main deficiencies in equipment is hospitals for tuberculous children.

Statistics of local administration recently required in England under the provisions of the law of 1929 [6] give the number of hospitals and beds organized by the local authorities (tuberculosis, acute infectious diseases, assistance to mothers and babies) and those which were administered before the new law by the authorities charged with the application of the poor law.

The study of the regulations which might be proposed for the transportation by sea of ferrosilicum is being continued; up to the present time 15 countries have made known their point of view. Experiments have been carried out in Holland for the detection in the atmosphere of toxic gases (phosphorated hydrogen, arsenicated hydrogen) by means of papers impregnated with silver nitrate or sublimate; the reactions were immediately positive in a boat loaded with ferrosilicum of dangerous composition. It seems that two precautions would be useful: (1) Not to accept the content of silicum reported as corresponding to the average composition of a lot, but to take it as of all the samples of the lot; (2) that the shipping of products of intermediate content, obtained when the mixture made in a furnace changes type, shall be prohibited.

Finally, the following reports have been made to the Office: On the organization in Canada of a system of clinics for diseases of the heart, and in particular for the surveillance of children inclined to rheumatic diseases in special clinics, on the one hand, and at home by a visiting nurse, on the other; on the results obtained in Great Britain with malaria therapy in 3,155 cases of general paralysis, of which 19 per cent were cured, and on the new methods bearing on this treatment; on the research and treatment of ancylostomiasis in the Rize district (southwest of the Caucasus) in Turkey and on the experience in the use of carbon tetrachloride; on the investigation and destruction (especially with the aid of *Gambusia*) of larvae of *Stegomyia* (carried on in 1929 in the U. S. S. R.) for the control of dengue in the region of Sukhoum at Batum; on the investigation which revealed in Mexico the existence of onchocerciasis, with ocular localization in about 20,000 persons, in the vicinity of the boundary of Guatemala, and on the organization of a suitable prophylactic service; on a series of cases of rabic paralysis, some serious, observed at the Antirabic Institute at Cairo and attributed to the probable action of a toxin; on the activities of the public health service of Egypt from 1923 to 1929, which have consisted in the creation of hospitals, laboratories, centers for the protection of the mother and child, of a nursing school, and in the organization of the fight against trachoma, bilharziasis, ancylostomiasis, the venereal diseases, tuberculosis, malaria, the communicable diseases, rats, flies, and mosquitoes.

INFLUENCE OF TEMPERATURE ON THE INFECTING POWER OF *Aëdes aegypti* CONTAINING THE YELLOW FEVER VIRUS

NOTE COMMUNICATED TO THE PERMANENT COMMITTEE OF THE INTERNATIONAL OFFICE OF PUBLIC HYGIENE, IN ITS SESSION OF MAY, 1931, BY DR. W. DE VOGEL, FORMER INSPECTOR IN CHIEF OF THE CIVIL MEDICAL SERVICE OF THE NETHERLANDS INDIES, DELEGATE FROM THE NETHERLANDS INDIES [a]

An interesting observation relative to the influence which temperature seems to have on the infecting power of the *Aëdes aegypti* containing the yellow fever virus, was given by Professor Schüffner during the September, 1930, session of the Royal Academy at Amsterdam.

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[6] See Bulletin of the International Office of Public Hygiene, v. XXII, 1930, p. 239.

[a] Translation from the Bulletin Mensuel, Office International d'Hygiene publique, July, 1931, pp. 1216-1217.

Two groups of *Aëdes aegypti*, from Habana, had imbibed the blood of a *rhesus* which was suffering the onset of an attack of yellow fever. After having been held for a month in a room (called "tropical") of the Laboratory of Tropical Hygiene of the Colonial Institute of Amsterdam, at a temperature of from 26° to 28° C. [78.8°–82.4° F.], mosquitoes from one of these groups showed themselves capable of transmitting yellow fever to a *rhesus*, killing the monkey in five days from the time of the bite. The animal showed all the symptoms of yellow fever.

The experimenter having been on leave for some time, the heating of the room was inadvertently neglected; the temperature was lowered to about 16° C. [60.8° F.] On his return he tried again to infect two healthy *rhesus*, each by a group of these same *Aëdes aegypti*, which had been kept for the same time in the same room, thus under the same conditions of temperature.

Contrary to all expectation the two *rhesus* survived the infecting bites; these monkeys reacted only by a slight elevation of temperature. A month later they received an injection of virulent blood, taken from a *rhesus* infected with yellow fever; they showed themselves to be immune to the disease.

The temperature of the tropical room having been reestablished at 26° C. and kept for 20 days at that temperature, the bites of 4 *Aëdes aegypti* belonging to the same group of mosquitoes caused the death of a *rhesus* in 7 days, with all the symptoms of yellow fever.

It is obviously important to carry on experiments on the immunizing property of "cold" mosquitoes.

Although the results of researches on the monkey can not be stated from the onset to be applicable to man, however more thorough investigations in this direction may well result in a method of efficient immunization against yellow fever.

Moreover, the observation may explain why yellow fever, introduced into a port of the temperate zone, spreads during the summer and disappears at the beginning of the cold season.

COURT DECISION RELATING TO PUBLIC HEALTH

Liability of city for negligent operation of incinerator.—(Florida Supreme Court; Chardkoff Junk Co. *v.* City of Tampa, 135 So. 457; decided July 21, 1931.) An action was brought against the city of Tampa for damages resulting from the destruction by fire of certain property of the plaintiff. It was alleged that the fire was caused by the city's operation of an incinerator for the burning of the refuse of the city. Respecting the question of whether the operation of an incinerator was a governmental or municipal function, the supreme court said:

It appears that the operation of an incinerator is not an exclusive governmental function, if it may be considered such in any event. The operation of the incinerator is for the specific benefit and advantage of the urban community embraced within the corporate boundaries. It is especially maintained to peculiarly promote the comfort, convenience, and welfare of the citizens of the municipality, and such benefits are not enjoyed by, nor do the results accomplished affect, the general public beyond the corporate limits.

With regard to the liability of a city to respond in damages because of the negligent operation of an incinerator, the holding of the court was "that a municipality may be held liable for damages occasioned by the negligent operation of its incinerator, whether it be alleged or not that the manner of operation constituted a public nuisance."

DEATHS DURING WEEK ENDED OCTOBER 24, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended October 24, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Oct. 24, 1931	Corresponding week, 1930
Policies in force	74, 520, 708	75, 394, 853
Number of death claims	12, 648	13, 092
Death claims per 1,000 policies in force, annual rate	8. 8	9. 1
Death claims per 1,000 policies, first 43 weeks of year, annual rate	9. 7	9. 6

Deaths [1] from all causes in certain large cities of the United States during the week ended October 24, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (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]

City	Week ended Oct. 24, 1931				Corresponding week, 1930		Death rate [2] for the first 43 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (82 cities)	7,407	10. 8	688	[4] 54	11. 1	738	11. 9	11. 9
Akron	31	6. 3	5	49	7. 8	8	7. 8	7. 9
Albany [5]	39	15. 7	1	20	10. 2	2	13. 9	14. 7
Atlanta	77	14. 5	7	72	16. 5	10	15. 0	15. 7
White	37		5	79		6		
Colored	40	(6)	2	57	(6)	4	(6)	(6)
Baltimore [5]	211	13. 5	26	88	12. 9	21	14. 3	13. 9
White	173		17	74		14		
Colored	38	(6)	9	141	(6)	7	(6)	(6)
Birmingham	67	13. 0	9	91	9. 8	4	13. 4	13. 6
White	34		4	69		0		
Colored	33	(6)	5	122	(6)	4	(6)	(6)
Boston	198	13. 1	26	74	13. 4	28	14. 2	14. 1
Bridgeport	27	9. 6	4	66	9. 2	1	11. 1	11. 0
Buffalo	135	12. 1	11	45	10. 5	10	13. 0	12. 9
Cambridge	27	12. 3	4	80	11. 5	2	12. 1	11. 9

Footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended October 24, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended Oct. 24, 1931				Corresponding week, 1930		Death rate for the first 43 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1931	1930
Camden	24	10.5	4	70	10.1	3	14.1	13.4
Canton	11	5.4	1	23	12.4	3	10.0	10.1
Chicago [5]	689	10.4	48	42	8.7	53	10.7	10.4
Cincinnati	123	14.0	16	96	14.3	16	16.0	15.5
Cleveland	184	10.5	23	67	8.7	17	11.2	11.1
Columbus	77	13.6	2	20	12.2	12	13.5	15.5
Dallas	49	9.4	8		11.7	2	11.1	11.3
White	36		7			1		
Colored	13	(6)	1		(6)	1	(6)	(6)
Dayton	47	11.8	9	126	10.3	4	11.9	10.7
Denver	68	12.2	7	68	13.2	6	13.9	14.8
Des Moines	27	9.7	5	88	10.6	3	11.1	11.7
Detroit	228	7.2	30	48	8.8	43	8.2	9.8
Duluth	14	7.2	1	25	13.4	3	11.2	11.3
El Paso	28	13.9	5		11.1	6	15.5	17.3
Erie	19	8.4	1	19	14.3	2	10.4	11.2
Fall River [5] [7]	17	7.7	3	68	7.2	0	11.1	11.8
Flint	26	8.3	6	77	7.3	4	6.9	9.2
Fort Worth	32	10.0	3		11.4	3	10.8	10.9
White	23		1			3		
Colored	9	(6)	2		(6)	0	(6)	(6)
Grand Rapids	29	8.8	3	44	9.2	5	9.1	10.2
Houston	53	8.9	5		11.1	9	11.0	12.1
White	38		5			5		
Colored	15	(6)	0		(6)	4	(6)	(6)
Indianapolis	97	13.7	8	66	11.3	10	13.8	14.6
White	84		7	66		6		
Colored	13	(6)	1	67	(6)	4	(6)	(6)
Jersey City	60	9.8	8	71	12.8	10	11.4	11.8
Kansas City, Kans	27	11.5	3	62	9.8	4	12.6	11.8
White	19		3	74		4		
Colored	8	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo	91	11.6	8	61	12.7	8	13.1	13.2
Knoxville	18	8.6	1	21	11.3	1	12.3	13.7
White	16		1	24		1		
Colored	2	(6)	0	0	(6)	0	(6)	(6)
Long Beach	24	8.2	1	24	10.5	3	9.8	9.9
Los Angeles	268	10.6	21	61	10.2	18	10.7	11.0
Louisville	49	8.3	2	17	13.7	7	14.1	13.6
White	39		2	20		4		
Colored	10	(6)	0	0	(6)	3	(6)	(6)
Lowell [7]	23	11.9	3	76	14.0	3	12.8	13.4
Lynn	12	6.1	2	52	10.2	2	9.4	10.4
Memphis	84	16.9	12	127	14.4	11	16.6	17.0
White	44		7	117		5		
Colored	40	(6)	5	145	(6)	6	(6)	(6)
Miami	22	10.2	1	25	11.3	2	11.8	11.0
White	14		0	0		2		
Colored	8	(6)	1	88	(6)	0	(6)	(6)
Milwaukee	103	9.1	18	78	10.6	14	9.3	9.7
Minneapolis	96	10.6	12	77	11.7	10	11.2	10.7
Nashville	36	12.1	3	45	12.2	11	16.8	16.6
White	20		1	20		4		
Colored	16	(6)	2	118	(6)	7	(6)	(6)
New Bedford [7]	29	13.4	6	159	9.7	1	12.1	10.9
New Haven	37	11.9	4	76	9.6	3	12.4	12.7
New Orleans	121	13.5	5	27	15.6	13	16.8	17.4
White	74		1	8		5		
Colored	47	(6)	4	65	(6)	8	(6)	(6)
New York	1,294	9.5	86	36	10.3	120	11.1	10.8
Bronx Borough	191	7.5	2	5	6.8	14	8.2	7.9
Brooklyn Borough	442	8.8	35	37	10.0	52	10.3	9.9
Manhattan Borough	495	14.2	42	72	14.9	40	16.8	16.0
Queens Borough	133	6.0	7	19	7.2	11	7.2	7.1
Richmond Borough	33	10.5	0	0	12.8	3	13.7	14.3
Newark, N. J	107	12.5	18	94	11.9	13	11.6	12.0
Oakland	52	9.3	5	64	11.1	2	10.5	10.9
Oklahoma City	29	7.7	4	55	10.6	3	10.8	10.8
Omaha	60	14.4	2	22	13.4	4	13.9	13.5
Paterson	24	9.0	1	17	12.8	3	13.2	12.2

Deaths from all causes in certain large cities of the United States during the week ended October 24, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended Oct. 24, 1931				Corresponding week, 1930		Death rate for the first 43 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1931	1930
Peoria	31	14.9	4	105	10.4	2	12.6	12.2
Philadelphia	413	11.0	39	57	12.1	34	13.0	12.6
Pittsburgh	163	12.6	21	72	12.4	23	14.4	13.8
Portland, Oreg	79	13.4	1	12	13.4	7	11.6	12.1
Providence	44	9.0	5	46	10.1	1	12.7	12.9
Richmond	57	16.1	2	29	12.5	4	15.5	14.7
White	38		2	44		0		
Colored	19	(6)	0	0	(6)	4	(6)	(6)
Rochester	73	11.5	10	91	9.8	8	11.9	11.5
St. Louis	205	12.9	17	57	13.7	16	15.1	14.1
St. Paul	51	9.6	7	72	10.3	4	10.6	10.1
Salt Lake City [4]	37	13.5	5	74	17.0	5	12.2	12.3
San Antonio	57	12.4	9		11.4	7	14.3	16.3
San Diego	31	10.3	3	61	16.4	2	13.4	14.4
San Francisco	156	12.5	3	20	12.4	7	13.0	12.9
Schenectady	25	13.6	6	176	7.6	0	10.6	11.2
Seattle	78	10.9	3	28	10.1	7	11.3	10.8
Somerville	18	8.9	1	37	9.0	4	8.8	9.8
South Bend	13	6.3	1	25	7.9	4	8.0	8.8
Spokane	21	9.4	1	26	15.3	4	12.3	12.4
Springfield, Mass	31	10.6	0	0	10.7	1	11.7	12.2
Syracuse	43	10.5	5	59	13.4	5	11.6	11.6
Tacoma	19	9.2	2	51	17.1	2	12.1	12.5
Toledo	65	11.5	5	46	11.1	6	11.9	12.7
Trenton	32	13.5	4	70	16.0	4	16.4	16.7
Utica	33	16.8	1	26	16.9	2	14.1	14.8
Washington, D. C	172	18.2	17	94	14.4	12	15.8	15.0
White	109		9	74		1		
Colored	63	(6)	8	138	(6)	11	(6)	(6)
Waterbury	17	8.8	2	60	7.3	2	9.7	9.5
Wilmington, Del. [7]	25	12.2	3	65	13.7	2	13.9	14.4
Worcester	54	14.3	1	14	11.2	2	12.1	12.7
Yonkers	16	6.0	1	26	8.5	1	8.4	8.1
Youngstown	28	8.4	2	28	9.5	4	10.0	10.2

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 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 77 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1930 was as follows: Atlanta, 33; Baltimore, 18; Birmingham, 38; Dallas, 15; Fort Worth, 14; Houston, 22; Indianapolis, 12; Kansas City, Kans, 17; Knoxville, 16; Louisville, 15; Memphis, 38; Miami, 23; Nashville, 28; New Orleans, 28; Richmond, 29; and Washington, D. C., 27.
[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 October 31, 1931, and November 1, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 31, 1931, and November 1, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 31, 1931	Week ended Nov. 1, 1930	Week ended Oct. 31, 1931	Week ended Nov. 1, 1930	Week ended Oct. 31, 1931	Week ended Nov. 1, 1930	Week ended Oct. 31, 1931	Week ended Nov. 1, 1930
New England States:								
Maine	2	4	2	6	96	3	0	0
New Hampshire	6	2			1		0	0
Vermont	1	1				6	0	0
Massachusetts	52	76	8	2	59	93	2	0
Rhode Island	7	11			60		0	0
Connecticut	5	17	3	3	9	47	1	0
Middle Atlantic States:								
New York	72	78	[1] 20	[1] 7	87	93	7	11
New Jersey	27	66	8	6	19	48	1	1
Pennsylvania	111	100			126	126	5	5
East North Central States:								
Ohio	142	114	19	18	25	24	3	6
Indiana	109	36		7	20	24	2	2
Illinois	110	175	8	11	26	31	4	6
Michigan	67	68			42	54	3	6
Wisconsin	22	29	11	11	17	320	2	2
West North Central States:								
Minnesota	21	18	1		6	8	1	1
Iowa	27	10	2		3	1	3	0
Missouri	92	47	3		5	153	1	5
North Dakota	6	24				15	0	1
South Dakota	4	5			13		1	0
Nebraska	22	12			1	15	0	0
Kansas	54	1			18	40	1	23
South Atlantic States:								
Delaware	3	2				1	0	0
Maryland [2]	77	34	15	11	11	4	2	1
District of Columbia	11	4			2	3	0	2
West Virginia	91	34	18	29	57	23	0	0
North Carolina	214	167	4	11	96	5	3	0
South Carolina	60	60	322	449	13		0	0
Georgia [3]	51	39	21	68	3	6	1	1
Florida	26	33		3	27	7	0	0
East South Central States:								
Kentucky	170	35				47	2	2
Tennessee	166	45	27	31	6	9	0	1
Alabama [3]	121	114	12	19	6	21	1	4
Mississippi	106	72					0	1
West South Central States:								
Arkansas	62	18	2	44	2	1	0	0
Louisiana	43	26	8	6	6	3	0	1
Oklahoma [4]	147	65	14	31		10	0	1
Texas	35	42	10	14	14	13	0	1
Mountain States:								
Montana	1				18	3	0	0
Idaho	1				1	4	0	0
Wyoming	2			2			1	0
Colorado	1	8			1	29	0	0
New Mexico	22	9		2		8	0	2
Arizona	8	13	4	1		30	0	1
Utah [2]			2	3	3	1	0	2
Pacific States:								
Washington	3	33		3	30	8	0	2
Oregon	4	2	22	29	11	31	0	0
California	105	50	44	30	108	131	6	1

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, 1931, 9 cases: 4 cases in Georgia and 5 cases in Alabama.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 31, 1931, and November 1, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 31, 1931	Week ended Nov. 1, 1930	Week ended Oct. 31, 1931	Week ended Nov. 1, 1930	Week ended Oct. 31, 1931	Week ended Nov. 1, 1930	Week ended Oct. 31, 1931	Week ended Nov. 1, 1930
New England States:								
Maine	7	11	15	19	0	0	5	6
New Hampshire	0	1	5	4	0	0	1	1
Vermont	6	2	6	3	14	0	0	0
Massachusetts	39	33	199	128	0	0	5	5
Rhode Island	3	0	14	7	0	0	0	4
Connecticut	12	4	38	18	0	0	2	2
Middle Atlantic States:								
New York	92	18	242	210	24	0	26	29
New Jersey	26	1	90	107	0	0	2	12
Pennsylvania	27	5	282	261	0	0	76	64
East North Central States:								
Ohio	10	98	445	460	3	15	66	50
Indiana	1	13	88	173	5	14	10	22
Illinois	37	17	214	301	18	27	27	16
Michigan	28	18	141	129	19	13	17	18
Wisconsin	21	13	52	90	4	1	4	15
West North Central States:								
Minnesota	30	45	35	33	4	2	2	5
Iowa	11	12	22	41	13	11	5	8
Missouri	3	9	86	77	3	15	19	17
North Dakota	1	3	13	17	0	25	1	6
South Dakota	1	9	9	5	5	20	1	3
Nebraska	1	12	11	25	4	12	1	5
Kansas	0	79	51	5	3	0	13	3
South Atlantic States:								
Delaware	0	0	14	12	0	0	4	4
Maryland [2]	1	3	90	48	0	0	50	31
District of Columbia	1	0	11	9	0	0	3	3
West Virginia	4	3	84	36	0	16	81	38
North Carolina	4	0	170	148	0	4	20	13
South Carolina	1	3	21	38	7	2	9	28
Georgia [3]	0	0	24	45	0	0	19	14
Florida	1	0	7	5	0	0	4	3
East South Central States:								
Kentucky	2	1	103	90	4	0	42	22
Tennessee	2	1	85	34	5	3	38	24
Alabama [3]	1	8	64	85	0	0	33	17
Mississippi	0	0	41	36	4	0	18	23
West South Central States:								
Arkansas	1	5	53	23	1	2	18	44
Louisiana	0	1	24	12	1	0	36	28
Oklahoma [4]	0	2	52	49	0	12	41	43
Texas	0	4	44	14	0	4	10	9
Mountain States:								
Montana	0	2	7	16	0	1	6	6
Idaho	0	1	5	9	0	0	1	1
Wyoming	0	1	3	2	0	0	0	1
Colorado	1	3	25	38	0	5	9	7
New Mexico	0	0	13	2	0	0	7	10
Arizona	1	0	7	3	1	3	5	7
Utah [2]	0	0	5	3	0	0	0	0
Pacific States:								
Washington	3	2	35	31	3	29	5	16
Oregon	0	1	29	16	11	0	6	1
California	2	61	134	73	8	16	18	13

[2] Week ended Friday.
[3] Typhus fever, 1931, 9 cases: 4 cases in Georgia and 5 cases in Alabama.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

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

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
September, 1931										
Florida		46	1	47		3	5	17	0	23
Nevada			3		1		0	4	0	6
New Mexico	2	15		31	4	3	3	8	0	28
New York	27	227		8	233		1,763	463	1	204
Oklahoma [1]	1	205	39	189	3	30	1	83	18	202
Oregon		8	48	6	25		3	24	17	33
South Carolina		171	512	1,830	24	204	1	46	2	205
South Dakota	1	22	4		15		7	27	11	13
Texas	2	94	4	1,150			3	93		125
Virginia	2	360	635	51	94	21	14	219	5	253
Washington	7	30	17		33		22	126	26	31

[1] Exclusive of Oklahoma City and Tulsa.

September, 1931

Anthrax: Cases
- South Dakota 2

Chicken pox:
- Nevada 2
- New Mexico 2
- New York 163
- Oklahoma [1] 13
- Oregon 30
- South Carolina 15
- South Dakota 39
- Virginia 29
- Washington 78

Conjunctivitis:
- New Mexico 1

Dengue:
- South Carolina 20

Diarrhea:
- South Carolina 571
- Virginia 913

Dysentery:
- New York 24
- Oklahoma [1] 23
- Oregon 18
- Washington 8

German measles:
- New York 34
- Washington 16

Hookworm disease:
- Oklahoma [1] 1
- South Carolina 68

Impetigo contagiosa:
- Oklahoma [1] 1
- Oregon 221
- Washington 2

Lethargic encephalitis:
- New York 10
- South Carolina 3
- Texas 1
- Washington 2

Mumps: Cases
- New York 233
- Oklahoma [1] 1
- Oregon 29
- South Carolina 21
- South Dakota 28
- Washington 20

Ophthalmia neonatorum:
- New York 7
- South Carolina 8

Paratyphoid fever:
- New Mexico 1
- New York 6
- Oregon 1
- South Carolina 6

Puerperal septicemia:
- New York 11
- Washington 2

Rabies in animals:
- New York [2] 3
- South Carolina 14

Scabies:
- Oregon 7
- Washington 1

Septic sore throat:
- New Mexico 1
- New York 14
- Oklahoma [1] 21
- Oregon 3

Tetanus:
- New York 7
- South Carolina 4

Trachoma:
- New Mexico 1
- New York 1
- Oklahoma [1] 9
- Oregon 2
- South Dakota 35
- Washington 2

[1] Exclusive of Oklahoma City and Tulsa.
[2] Exclusive of New York City.

	Cases
Trichinosis:	
New York	5
Tularaemia:	
Nevada	1
New Mexico	1
Oklahoma [1]	2
Virginia	1
Typhus fever:	
New York	1
Virginia	2
Undulant fever:	
New Mexico	1
New York	10
Oklahoma [1]	6
South Dakota	2
Virginia	3
Washington	3
Vincent's angina:	
New York [2]	78
Oklahoma [1]	1
Oregon	14
Washington	1
Whooping cough:	
New Mexico	24
New York	1,562
Oklahoma [1]	19
Oregon	30
South Carolina	52
South Dakota	23
Virginia	415
Washington	181

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 97 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 33,370,000. The estimated population of the 90 cities reporting deaths is more than 31,825,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended October 24, 1931, and October 25, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	2,375	1,664	----------
97 cities	525	484	819
Measles:			
45 States	928	938	----------
97 cities	203	230	----------
Meningococcus meningitis:			
46 States	59	68	----------
97 cities	27	36	----------
Poliomyelitis:			
46 States	548	397	----------
Scarlet fever:			
46 States	2,870	2,495	----------
97 cities	810	756	688
Smallpox:			
46 States	138	249	----------
97 cities	14	15	6
Typhoid fever:			
46 States	885	739	----------
97 cities	143	109	94
Deaths reported			
Influenza and pneumonia:			
90 cities	446	550	----------
Smallpox:			
90 cities	0	0	----------

[1] Exclusive of Oklahoma City and Tulsa.
[2] Exclusive of New York City.

City reports for week ended October 24, 1931

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 1922 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		1	1	0	3
New Hampshire:								
Concord	0	0	0		0	0	0	0
Vermont:								
Barre	0	0	0		0	0	0	0
Burlington	0	1	0		0	2	0	2
Massachusetts:								
Boston	9	21	24	6	0	3	9	4
Fall River	5	4	2		0	0	0	0
Springfield	3	4	1		0	1	3	1
Worcester	3	5	4		0	1	20	1
Rhode Island:								
Pawtucket	0	1	0		0	0	0	0
Providence	0	6	4		0	68	4	6
Connecticut:								
Bridgeport	1	4	1		0	0	0	1
Hartford	0	4	0		0	0	7	2
New Haven	1	0	0	3	0	1	1	3
MIDDLE ATLANTIC								
New York:								
Buffalo	3	11	9		0	1	1	10
New York	37	109	39	7	1	11	18	93
Rochester	1	3	0		0	5	2	5
Syracuse	9	2	0		0	1	0	3
New Jersey:								
Camden	2	6	4		0	0	1	3
Newark	5	13	2	6	2	0	1	3
Trenton	0	2	0		0	0	1	1
Pennsylvania:								
Philadelphia	15	47	8	3	1	7	6	27
Pittsburgh	9	18	9		0	18	14	29
Reading	1	1	1		0	0	0	1
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	1	10	8		0	2	0	8
Cleveland	16	35	4	7	2	4	26	13
Columbus	3	5	14		0	0	0	2
Toledo	17	8	1		0	1	0	6
Indiana:								
Fort Wayne	0	3	6		1	0	0	3
Indianapolis	1	12	2		0	4	8	4
South Bend		1						
Terre Haute	0	2	0		0	0	0	1
Illinois:								
Chicago	26	89	44	9	1	15	3	38
Springfield	0	0	2		0	0	0	0
Michigan:								
Detroit	11	55	32		1	2	3	10
Flint	2	3	4		0	0	2	0
Grand Rapids	1	2	0		0	0	1	0

City reports for week ended October 24, 1931—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			
EAST NORTH CENTRAL—continued								
Wisconsin:								
Kenosha	7	1	0		0	1	7	0
Madison	1	0	1			1	6	
Milwaukee	18	11	5		0	2	11	4
Racine	1	1	1		0	0	9	0
Superior	0	0	0		0	0	10	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	1	2	0		0	0	0	1
Minneapolis	25	27	10		1	1	12	6
St. Paul	11	9	2		0	0	0	3
Iowa:								
Davenport	13	1	4			0	0	
Des Moines	0	2	1			1	0	
Sioux City	0	2	7			0	1	
Waterloo	7	0	0			0	1	
Missouri:								
Kansas City	0	7	9		0	0	0	6
St. Joseph	0	1	10		0	0	0	3
St. Louis	3	36	24			1	0	2
North Dakota:								
Fargo	0	0	0		0	0	0	0
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	20	0	0			40	0	
Nebraska:								
Omaha	5	12	9		0	0	0	6
Kansas:								
Topeka	0	2	1		0	0	2	1
Wichita	0	2	4		0	1	0	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	1	0		0	1	1	3
Maryland:								
Baltimore	3	20	17	3	1	2	14	11
Cumberland	2	0	1		0	0	0	0
Frederick	0	1	0		0	0	0	0
District of Columbia:								
Washington	6	15	15	1	1	1	0	7
Virginia:								
Lynchburg	0	3	4		0	0	0	0
Norfolk	0	3	8		0	0	1	3
Richmond	0	21	20		1	0	0	3
Roanoke	1	4	16		0	0	0	0
West Virginia:								
Charleston	2	2	1	1	1	0	0	0
Wheeling	1	0	1		0	0	0	1
North Carolina:								
Raleigh	0	4	3		0	0	0	0
Wilmington	1	2	1		0	0	0	1
Winston-Salem	0	6	11		0	0	1	0
South Carolina:								
Charleston	0	1	1	10	0	0	0	0
Columbia	0	1	0		0	0	2	2
Georgia:								
Atlanta	2	9	8	11	0	0	1	4
Brunswick	0	0	0		0	0	0	0
Savannah	0	2	3	4	1	0	0	1
Florida:								
Miami	0	1	3		0	65	0	1
Tampa	0	2	11		0	1	0	1
EAST SOUTH CENTRAL								
Kentucky:								
Covington	1	1	0		0	0	0	1
Tennessee:								
Memphis	2	9	8		1	2	0	6
Nashville	0	3	4		0	0	0	3

City reports for week ended October 24, 1931—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			
EAST SOUTH CENTRAL—continued								
Alabama:								
Birmingham	0	6	4		1	0	0	5
Mobile	0	2	1		0	0	0	0
Montgomery	0	3	4			1	3	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	2	3			1	0	
Little Rock	0	1	2		0	0	0	2
Louisiana:								
New Orleans	0	10	13	3	4	1	0	13
Shreveport	0	2	2		0	3	0	3
Texas:								
Dallas	1	17	7		0	1	0	0
Fort Worth	1	4	10		1	0	0	1
Galveston	0	0	0		0	0	0	2
Houston	0	7	13		0	1	0	4
San Antonio	0	3	2		1	0	0	4
MOUNTAIN								
Montana:								
Billings	0	0	0		0	0	0	0
Great Falls	1	1	0		0	1	0	0
Helena	0	0	0		0	1	0	0
Missouli	0	0	0		0	0	0	0
Idaho:								
Boise	0	0	0		0	0	0	0
Colorado:								
Denver	18	8	3		0	0	6	7
Pueblo	3	1	0		0	0	0	0
New Mexico:								
Albuquerque	1	0	4		0	0	0	3
Arizona:								
Phoenix	0	0	3		0	0	0	1
Utah:								
Salt Lake City	13	3	1		1	0	1	2
Nevada:								
Reno	0	0	0		0	0	0	0
PACIFIC								
Washington:								
Seattle	27	5	1			6	10	
Spokane	6	2	0			1	1	
Tacoma	0	4	1		0	0	0	2
Oregon:								
Portland	18	7	1		0	2	7	3
Salem	2	0	1	2	0	0	0	0
California:								
Los Angeles	12	30	35	24	0	5	6	13
Sacramento	2	2	1		1	16	0	2
San Francisco	19	12	1	4	2	7	3	6

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	2	0	0	0	0	0	0	0	0	1	19
New Hampshire:											
Concord	0	0	0	0	0	1	0	0	0	0	14
Vermont:											
Barre	0	1	0	0	0	0	0	0	0	1	1
Burlington	0	0	0	0	0	0	0	0	0	0	14

City reports for week ended October 24, 1931—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		
NEW ENGLAND—continued											
Massachusetts:											
Boston	37	28	0	0	0	9	2	3	0	11	198
Fall River	2	11	0	0	0	1	0	3	0	0	17
Springfield	3	4	0	0	0	1	0	0	0	2	24
Worcester	8	22	0	0	0	1	0	1	0	9	54
Rhode Island:											
Pawtucket	0	0	0	0	0	1	0	0	0	0	11
Providence	4	6	0	0	0	0	0	3	0	1	44
Connecticut:											
Bridgeport	4	2	0	0	0	2	0	0	0	0	27
Hartford	3	4	0	0	0	1	0	0	0	12	40
New Haven	2	3	0	0	0	0	1	2	1	5	37
MIDDLE ATLANTIC											
New York:											
Buffalo	14	31	0	0	0	7	1	0	0	11	130
New York	53	62	0	0	0	91	22	36	3	142	1,294
Rochester	4	16	0	0	0	2	0	0	0	4	68
Syracuse	3	16	0	0	0	1	0	6	0	24	43
New Jersey:											
Camden	2	2	0	0	0	2	0	0	0	6	24
Newark	6	12	0	0	0	9	2	1	0	58	----
Trenton	1	3	0	0	0	1	1	1	0	3	32
Pennsylvania:											
Philadelphia	40	60	0	0	0	22	7	8	0	94	413
Pittsburgh	29	21	0	0	0	9	1	2	0	36	163
Reading	1	0	0	0	0	1	0	0	0	7	24
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	13	32	0	0	0	8	1	0	0	9	122
Cleveland	19	35	0	0	0	16	1	7	1	93	184
Columbus	7	6	0	0	0	2	1	1	0	2	77
Toledo	9	8	0	1	0	5	1	2	0	12	65
Indiana:											
Fort Wayne	1	0	0	0	0	1	0	0	0	0	28
Indianapolis	11	3	0	0	0	11	0	0	1	9	----
South Bend	2	----	1	----	----	----	0	----	----	----	----
Terre Haute	2	1	0	0	0	1	0	0	0	0	19
Illinois:											
Chicago	66	70	0	0	0	46	5	4	1	136	689
Springfield	2	11	0	0	0	0	0	0	0	8	16
Michigan:											
Detroit	54	43	1	0	0	10	3	6	0	65	228
Flint	9	7	0	0	0	0	1	1	0	3	26
Grand Rapids	7	2	0	0	0	0	0	1	0	0	29
Wisconsin:											
Kenosha	1	2	0	0	0	0	0	0	0	2	5
Madison	2	0	0	0	----	----	0	0	----	1	----
Milwaukee	15	16	0	0	0	3	0	0	0	65	108
Racine	2	3	0	0	0	1	0	0	0	5	10
Superior	2	0	0	0	0	0	0	0	0	0	10
WEST NORTH CENTRAL											
Minnesota:											
Duluth	6	0	0	0	0	1	0	0	0	0	14
Minneapolis	29	6	1	0	0	2	1	0	0	15	96
St. Paul	15	8	0	0	0	1	1	0	0	2	55
Iowa:											
Davenport	1	3	0	0	----	----	0	0	----	1	----
Des Moines	6	1	0	0	----	----	0	0	----	0	27
Sioux City	2	2	0	1	----	----	0	0	----	1	----
Waterloo	1	0	0	2	----	----	0	0	----	2	----
Missouri:											
Kansas City	10	15	0	0	0	3	1	0	1	15	91
St. Joseph	2	3	0	0	0	1	0	1	0	0	24
St. Louis	28	16	0	0	0	21	4	7	1	51	205

City reports for week ended October 24, 1931—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		
WEST NORTH CENTRAL—contd.											
North Dakota:											
Fargo	3	1	0	0	0	1	0	1	0	1	6
Grand Forks	0	0	0	0	----	----	0	0	----	3	----
South Dakota:											
Aberdeen	0	1	0	0	----	----	1	0	----	6	----
Nebraska:											
Omaha	4	4	0	2	0	1	0	1	0	3	60
Kansas:											
Topeka	4	3	0	0	0	1	0	0	0	5	13
Wichita	3	4	0	0	0	0	0	0	0	0	27
SOUTH ATLANTIC											
Delaware:											
Wilmington	1	1	0	0	0	2	0	2	0	3	25
Maryland:											
Baltimore	12	17	0	0	0	21	6	3	1	84	211
Cumberland	0	5	0	0	0	1	1	1	0	3	10
Frederick	0	0	0	0	0	0	0	0	0	0	1
District of Col.:											
Washington	13	15	0	0	0	14	2	0	1	10	172
Virginia:											
Lynchburg	3	1	0	0	0	2	0	1	0	2	11
Norfolk	0	9	0	0	0	2	1	0	0	2	----
Richmond	8	15	0	0	0	6	0	0	0	4	59
Roanoke	3	0	0	0	0	1	0	0	0	0	14
West Virginia:											
Charleston	2	1	0	0	0	1	1	1	0	3	12
Wheeling	2	0	0	0	0	0	1	0	0	0	13
North Carolina:											
Raleigh	1	5	0	0	0	0	0	0	0	3	13
Wilmington	1	1	0	0	0	0	0	0	0	0	11
Winston-Salem	3	3	0	0	0	3	0	3	0	12	19
South Carolina:											
Charleston	1	0	0	0	0	1	1	0	0	1	15
Columbia	1	4	0	0	0	0	0	0	1	0	23
Georgia:											
Atlanta	8	10	0	2	0	3	1	2	1	1	77
Brunswick	0	0	0	0	0	0	0	0	0	0	4
Savannah	2	0	0	0	0	3	0	0	1	1	33
Florida:											
Miami	0	0	0	0	0	0	0	0	0	0	22
Tampa	0	1	0	0	0	1	0	0	0	0	24
EAST SOUTH CENTRAL											
Kentucky:											
Covington	3	3	0	0	0	0	0	1	0	0	9
Tennessee:											
Memphis	5	7	0	0	0	6	3	8	1	24	84
Nashville	1	3	0	0	0	4	2	1	0	2	36
Alabama:											
Birmingham	5	7	0	0	0	3	2	3	0	2	67
Mobile	0	2	0	0	0	0	0	4	0	0	15
Montgomery	1	3	0	0	----	----	0	1	----	2	----
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	2	0	0	----	----	0	0	----	1	----
Little Rock	2	0	0	0	0	2	0	0	0	0	4
Louisiana:											
New Orleans	4	7	0	0	0	8	3	8	2	2	121
Shreveport	1	2	0	0	0	1	1	0	0	3	26
Texas:											
Dallas	6	5	0	0	0	5	1	1	0	0	49
Fort Worth	2	4	0	0	0	1	0	0	0	0	32
Galveston	0	0	0	0	0	0	0	0	0	0	15
Houston	2	1	0	1	0	2	0	2	2	5	53
San Antonio	1	0	0	0	0	5	0	0	0	0	57

City reports for week ended October 24, 1931—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											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	0	4
Great Falls	1	0	0	0	0	0	0	0	0	1	----
Helena	1	0	0	0	0	0	0	0	0	0	3
Missoula	0	3	0	0	0	0	1	0	0	0	2
Idaho:											
Boise	0	1	0	0	0	0	0	0	0	0	3
Colorado:											
Denver	9	14	0	0	0	2	0	2	0	5	63
Pueblo	1	1	0	0	0	1	1	0	0	0	7
New Mexico:											
Albuquerque	1	1	0	0	0	5	1	2	0	1	18
Arizona:											
Phoenix	1	1	0	0	0	2	0	0	0	2	----
Utah:											
Salt Lake City	3	1	1	0	0	1	4	0	0	1	37
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	9
PACIFIC											
Washington:											
Seattle	8	8	0	0	----	----	2	0	----	5	----
Spokane	4	0	1	0	----	----	1	0	----	0	----
Tacoma	3	3	1	1	0	1	1	0	0	4	19
Oregon:											
Portland	6	0	3	0	0	4	0	1	0	5	79
Salem	0	0	0	0	0	0	1	0	0	1	----
California:											
Los Angeles	16	55	0	0	0	23	2	0	0	25	268
Sacramento	3	1	0	0	0	4	0	2	0	0	33
San Francisco	10	5	1	5	0	7	1	1	0	4	156

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									
Vermont:									
Burlington	0	0	0	0	0	0	0	0	1
Massachusetts:									
Boston	1	1	0	0	0	0	3	14	1
Fall River	0	0	0	0	0	0	0	1	0
Springfield	0	0	0	0	0	0	1	1	1
Worcester	0	0	0	0	0	1	1	5	0
Rhode Island:									
Providence	0	0	0	0	0	0	1	2	0
Connecticut:									
Bridgeport	0	0	0	0	0	0	0	2	1
Hartford	0	0	0	0	0	0	0	2	2
MIDDLE ATLANTIC									
New York:									
New York	6	3	2	0	0	0	11	62	6
Rochester	0	1	0	0	0	0	0	4	0
New Jersey:									
Newark	0	0	0	0	0	0	0	8	0
Pennsylvania:									
Philadelphia	2	0	0	0	0	0	1	14	1
Reading	0	0	0	0	0	0	0	1	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	2	1	0	0	0	0	1	0	0
Cleveland	1	0	1	0	0	0	1	1	0
Toledo	0	0	0	0	0	0	0	1	0
Indiana:									
Fort Wayne	0	0	0	0	0	0	0	2	0

City reports for week ended October 24, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL—continued									
Illinois:									
Chicago	4	4	0	0	0	0	4	9	1
Springfield	1	0	0	0	0	0	0	0	0
Michigan:									
Detroit	2	0	0	0	0	0	2	10	0
Grand Rapids	0	0	0	0	0	0	0	1	1
Wisconsin:									
Madison	0	0	0	0	0	0	0	1	0
Milwaukee	2	2	0	0	0	0	0	2	0
Superior	0	0	0	0	0	0	0	1	1
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	0	0	0	0	0	0	1	10	0
St. Paul	0	0	0	0	0	0	0	4	1
Iowa:									
Waterloo	1	0	0	0	0	0	0	0	0
Missouri:									
Kansas City	1	0	0	0	0	0	0	0	0
St. Louis	2	2	1	0	0	0	0	1	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	0	0	0	0	0	2	1	1	0
District of Columbia:									
Washington	0	0	0	0	1	0	1	0	0
Virginia:									
Norfolk	0	0	0	0	0	0	0	1	0
West Virginia:									
Charleston	0	0	0	0	0	0	0	0	1
South Carolina:									
Charleston	0	0	0	0	3	0	0	0	0
Columbia	0	0	0	0	0	1	0	0	0
Georgia:									
Savannah [1]	0	0	0	0	1	0	0	0	0
Florida:									
Miami	0	0	0	0	1	1	0	0	0
EAST SOUTH CENTRAL									
Alabama:									
Birmingham	0	0	0	0	1	0	0	0	0
Mobile	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	1	0	0	0	3	2	0	0	0
Shreveport	0	0	0	0	0	1	0	0	0
Texas: [1]									
Galveston	1	1	0	0	0	0	0	0	0
San Antonio [1]	0	1	0	0	0	0	0	0	0
MOUNTAIN									
Montana:									
Great Falls	0	0	0	0	0	0	0	1	0
Missoula	0	0	0	0	0	0	0	1	1
Arizona:									
Phoenix	0	1	0	0	0	0	0	1	0
PACIFIC									
Washington:									
Seattle	0	0	0	0	0	0	1	1	0
Spokane	0	0	0	0	0	0	1	2	0
Tacoma	0	0	0	0	0	0	1	1	0
Oregon:									
Portland	0	0	0	0	0	0	0	1	0
California:									
Los Angeles	0	0	0	0	0	0	0	2	0
San Francisco	0	1	0	0	0	0	1	1	0

[1] Typhus fever, 5 cases: 3 cases at Savannah, Ga.; 1 case at Dallas, Tex.; and 1 case at San Antonio, Tex.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended October 24, 1931, compared with those for a like period ended October 25, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, September 20 to October 24, 1931.—Annual rates per 100,000 population compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Sept. 26, 1931	Sept. 27, 1930	Oct. 3, 1931	Oct. 4, 1930	Oct. 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930
98 cities	45	56	56	60	65	70	70	70	[2] 82	77
New England	38	56	50	53	72	58	46	70	87	106
Middle Atlantic	25	31	25	40	40	40	34	33	32	34
East North Central	42	74	44	79	53	99	61	91	[2] 75	105
West North Central	71	58	90	60	99	68	128	76	145	66
South Atlantic	67	100	150	68	132	116	170	100	223	106
East South Central	128	30	140	102	221	96	233	143	122	179
West South Central	101	136	108	104	74	59	101	118	142	80
Mountain	52	62	78	9	36	44	52	18	35	62
Pacific	41	26	41	51	47	81	47	87	76	101

MEASLES CASE RATES

98 cities	15	18	18	19	29	22	26	35	[2] 32	36
New England	31	46	24	36	137	34	70	48	180	75
Middle Atlantic	9	13	12	12	15	15	20	22	19	29
East North Central	16	13	12	5	13	11	13	14	[2] 18	16
West North Central	4	29	10	70	2	77	10	143	6	143
South Atlantic	8	10	2	22	6	12	14	8	10	14
East South Central	0	66	29	0	0	18	0	6	17	24
West South Central	3	10	17	7	27	0	10	3	24	8
Mountain	44	26	35	70	52	115	78	194	17	141
Pacific	51	16	78	22	106	20	96	57	69	18

SCARLET FEVER CASE RATES

98 cities	57	71	65	71	99	95	101	120	[2] 127	121
New England	53	87	132	80	144	116	137	162	195	157
Middle Atlantic	45	32	51	46	76	51	74	85	100	78
East North Central	62	117	62	106	112	135	139	177	[2] 142	171
West North Central	65	77	94	72	86	93	94	116	119	116
South Atlantic	67	62	59	76	142	126	124	126	156	162
East South Central	93	114	70	66	233	161	70	132	145	149
West South Central	34	52	37	35	61	35	41	73	57	70
Mountain	122	97	96	115	139	291	44	238	174	167
Pacific	71	75	72	73	67	75	110	51	141	89

[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 estimated as of July 1, 1931 and 1930, respectively.
[2] South Bend, Ind., not included.

Summary of weekly reports from cities, September 20 to October 24, 1931.—Annual rates per 100,000 population compared with rates for the corresponding period of 1930.—Continued

SMALLPOX CASE RATES

	Week ended—									
	Sept. 26, 1931	Sept. 27, 1930	Oct. 3, 1931	Oct. 4, 1930	Oct. 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930
98 cities	0	3	0	1	1	2	1	2	[1] 2	2
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	0	2	0	1	0	2	0	4	[1] 0	2
West North Central	6	14	2	0	2	6	6	0	10	0
South Atlantic	0	0	0	2	4	0	0	0	4	0
East South Central	0	0	0	0	0	0	6	0	0	0
West South Central	0	3	0	3	0	3	0	3	3	7
Mountain	0	0	0	0	0	0	9	26	0	0
Pacific	0	16	0	0	10	6	2	0	12	18

TYPHOID FEVER CASE RATES

98 cities	21	17	21	20	20	20	18	16	[1] 22	17
New England	5	12	17	12	19	22	10	10	29	29
Middle Atlantic	16	13	21	14	15	14	16	10	24	12
East North Central	15	9	9	9	5	9	8	7	[1] 12	5
West North Central	36	15	13	14	11	10	33	15	19	8
South Atlantic	43	56	65	42	53	70	49	62	26	40
East South Central	47	18	52	60	64	42	52	42	105	84
West South Central	47	35	24	52	78	49	41	21	37	24
Mountain	26	44	26	115	35	44	9	35	17	79
Pacific	10	12	16	16	10	16	4	22	6	16

INFLUENZA DEATH RATES

91 cities	2	2	3	2	3	5	5	5	[1] 4	5
New England	0	2	2	0	2	5	2	7	2	2
Middle Atlantic	1	2	3	2	4	6	6	4	2	6
East North Central	3	2	2	1	2	3	2	4	[1] 3	3
West North Central	0	0	12	0	0	6	0	3	3	9
South Atlantic	4	4	0	2	0	2	0	6	10	4
East South Central	6	13	6	13	6	0	6	0	13	6
West South Central	0	4	0	11	7	11	14	7	17	7
Mountain	0	0	0	18	17	9	35	9	9	9
Pacific	0	5	0	2	5	0	5	7	7	7

PNEUMONIA DEATH RATES

91 cities	52	57	53	58	55	71	64	72	[1] 69	86
New England	67	39	58	44	77	70	75	87	50	99
Middle Atlantic	55	72	60	59	56	74	63	70	78	102
East North Central	38	47	35	53	35	55	45	50	[1] 51	52
West North Central	44	36	59	69	56	87	100	54	91	60
South Atlantic	51	56	61	52	79	86	87	96	67	136
East South Central	32	65	63	104	69	123	69	162	95	84
West South Central	52	71	66	71	76	110	59	89	97	125
Mountain	70	53	61	132	35	97	87	194	78	79
Pacific	36	40	53	40	55	40	65	65	55	60

[1] South Bend, Ind., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended October 17, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended October 17, 1931, as follows:

Province	Cerebrospinal fever	Dysentery	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia			2	2		
New Brunswick						6
Quebec				101		30
Ontario	4		2	8	9	31
Manitoba						5
Saskatchewan					1	5
Alberta				2		1
British Columbia	1	1				1
Total	5	1	4	113	10	79

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

Quebec Province—Communicable diseases—Week ended October 10, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended October 10, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	2	Paratyphoid fever	1
Chicken pox	46	Poliomyelitis	143
Diphtheria	38	Scarlet fever	45
German measles	30	Tuberculosis	45
Measles	55	Typhoid fever	48
Mumps	3	Whooping cough	29

PANAMA CANAL ZONE

Communicable diseases—September, 1931.—During the month of September, 1931, certain communicable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	17		Meningitis, meningococcus	1	
Diphtheria	3	1	Mumps	2	
Dysentery (amebic)	1		Pneumonia		27
Leprosy	1		Poliomyelitis	1	
Malaria	140	3	Tuberculosis		30
Measles	26	1	Whooping cough	10	

PORTO RICO

San Juan—Communicable diseases—Four weeks ended October 10, 1931.—During the four weeks ended October 10, 1931, cases of certain communicable diseases were reported in San Juan, Porto Rico, as follows:

Disease	Cases	Disease	Cases
Diphtheria	4	Ophthalmia neonatorum	2
Filariasis	3	Pellagra	1
Influenza	1	Tetanus	1
Malaria	66	Tetanus, infantile	1
Measles	15	Whooping cough	16

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		May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	Week ended— August, 1931					September, 1931				October, 1931				
					1	8	15	22	29	5	12	19	26	3	10	17	24	31
Ceylon: Colombo	C	1	1	-------	1	1	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
	D	1	1	-------	1	1	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
China:																		
Canton	C	2	1	-------	-------	-------	-------	-------	1	1	-------	-------	-------	-------	-------	-------	-------	-------
	D	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Shanghai	C	-------	-------	1	-------	1	5	1	1	58	30	36	35	29	17	17		
	D	-------	-------	-------	-------	-------	-------	-------	-------	3	4	2	5	8	-------	-------	-------	-------
Swatow	C	-------	10	7	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Tientsin	C	1	10	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
	D	1	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
India	C	13,604	18,001	22,074	7,357	9,848	9,817	9,492	10,734	-------	-------	-------	-------	-------	-------	-------	-------	-------
	D	7,270	10,337	12,093	4,029	5,584	5,411	5,252	6,044	-------	-------	-------	-------	-------	-------	-------	-------	-------
Bombay	C	-------	-------	23	9	18	6	11	27	5	5	5	1	1	2	-------	-------	-------
	D	-------	-------	16	4	9	7	5	9	5	2	1	-------	1	2	-------	-------	-------
Calcutta	C	265	292	237	42	27	20	21	10	3	15	18	18	23	3	-------	-------	-------
	D	149	168	155	10	7	7	6	4	2	3	6	6	12	-------	-------	-------	-------
Chittagong	C	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	1	-------	-------
Karikal	C	12	-------	-------	-------	-------	1	-------	1	-------	-------	1	1	-------	-------	-------	-------	-------
	D	7	-------	-------	-------	-------	1	-------	1	-------	-------	1	-------	-------	-------	-------	-------	-------
Madras	C	52	9	4	1	-------	2	3	3	1	1	-------	-------	-------	-------	-------	-------	-------
	D	17	4	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Moulmein	C	-------	-------	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
	D	-------	-------	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Negapatam	C	-------	-------	-------	-------	-------	-------	-------	1	-------	-------	-------	-------	-------	-------	-------	-------	-------
Rangoon	C	2	4	4	-------	1	1	-------	-------	-------	-------	-------	1	-------	-------	-------	1	-------
	D	1	2	1	-------	1	1	-------	-------	-------	-------	-------	1	-------	-------	-------	1	-------
Vizagapatam	C	-------	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
India (French):																		
Chandernagor	C	4	3	5	1	4	2	-------	-------	1	1	-------	1	-------	-------	-------	-------	-------
	D	4	3	1	1	4	2	-------	-------	1	1	-------	1	-------	-------	-------	-------	-------
Pondicherry	C	17	3	3	1	1	1	-------	2	-------	-------	2	-------	1	-------	-------	-------	-------
	D	7	3	3	1	-------	1	-------	1	-------	-------	1	-------	-------	-------	-------	-------	-------

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

CHOLERA—Continued

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

Place		May 8–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	Week ended— August, 1931					September, 1931				October, 1931				
					1	8	15	22	29	5	12	19	26	3	10	17	24	31
India (Portuguese)	C		1	2		1		1	1	2	25	6						
	D			1		1		1	1	1	10	6						
Indo-China (see also table below):																		
Cochin-China—Rachgia	C				P													
Pnompenh	C		1	5		1		1			1	1		1				
	D	2	1	2		1					1	1		1				
Saigon and Cholon	C	104	61	14											1			
	D	76	41	7											1			
Iraq:																		
Abulkhasib	C								6									
	D								5									
Amara	C							2	22	35	8	1			2	2	2	
	D							1	21	30	7	1				1	1	
Amara Province	C								6	11	106	73	32	21	15	27	13	7
	D								5	4	67	44	29	24	14	17	10	6
Basra	C				3	9	263	272	148		54	91	77	19	29	32	28	30
	D				2	8	140	137	76		30	48	34	11	13	23	7	15
Basra Province	C							5	14	6	10	23	26	14	1	1	3	7
	D							2	10	3	7	10	9	8	1	1	1	4
Dinwaniyah	C												1					
Dinwaniyah Province	C												15	8	14	24	22	1
	D												11	6	5	22	10	5
Iwaniyah	C												22					
	D												15					
Muntafiq Province	C								10	21	66	128	55	54	45	55	17	19
	D								8	20	42	75	38	57	28	37	10	18
Nasiriyah	C									22	50	16	4	4	18	7	4	7
	D									15	40	20	3	4	18	3	3	6
Suqelshuyukh	C								2									
	D								2									
Persia: [1]																		
Rafsanjan [2]	C	36																
	D	14																

Philippine Islands: [3] Provinces—																			
Capiz	C	17	4							9	9	17	49	21	5	4		7	
	D	15	4							5	6	5	35	16	5	3		5	
Cebu	C					1	1	1											
	D					1	1	1											
Iloilo	C		26	27															
	D		21	25															
Negros, Occidental	C		2																
	D		1																
Pampanga	C	1																	
Siam	C	14	4	3				1	1										
	D	5	2	1					1										
Bangkok	C	3	1	4				1	1										
	D	1	1	2															
On vessel:																			
S. S. Arankola, at Rangoon, from Calcutta	C	1																	
S. S. City of Eastborne, at Calcutta from Cocanada	C		1																
S. S. Tairea, at Penang, from Calcutta	C		1																
S. S. Bandar Shalpour, at Bushire, Persia, from Basra	C			1															
	D			1															
S. S. Kohistan, at Basra, from Bushire, Persia	C			2															
S. S. Cathay, at Kobe, Japan, from Shanghai	C							4											
	D							1											
S. S. Kasagi Maru, at Moji, from Shanghai	C									1									
S. S. Ankoo, at Nagasaki, from Shanghai	C										2								
	D										1								

Place		February, 1931	March, 1931	April, 1931	May, 1931			June, 1931			July, 1931			Aug. 1-10, 1931
					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):														
Cambodia [4]	C	125	100	113	33	44	40	83	96	129	72	82	87	12
	D	80	29	70	20	22	21	45	64				60	2
Cochin-China [4]	C	29	105	107	47	52	75	71	69		66	30	47	39
	D	18	73	74	36	40	57	52	54				42	32

[1] The reports of cholera in Abadan, Ahwaz, and Mohammerah, Persia, published in Public Health Reports for Nov. 6, 1931, were not confirmed upon bacteriological examination.
[2] From May 3 to 25, 1931, 152 cases of cholera with 75 deaths were reported in Rafsanjan and vicinity, Karman district, Persia.
[3] Figures for cholera in the Philippine Islands are subject to correction.
[4] Reports incomplete.

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

PLAGUE

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

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	Week ended— August, 1931					September, 1931				October, 1931				
						1	8	15	22	29	5	12	19	26	3	10	17	24	31
Algeria:																			
Algiers	C					2													
Bone	C			1															
Philippeville	C				1			1	1										
	D				1			1											
Argentina: San Juan Province	C				P														
Belgian Congo	C			1															
	D			1															
British East Africa (see also table below):																			
Tanganyika	C	18	46	17	6			8					4	8					
	D	21	30	10	6			2					4	4					
Uganda	C	35	138	298	418	71	93	69	52	59	59	107							
	D	32	126	286	400	71	93	68	49	61	56	107							
Ceylon: Colombo	C	4	3	2	1	4	1	1			1	1	1		1	2			
	D	3	3	2	1	4	1	1			1	1	1		1	1			
Plague-infected rats		1	5			1	3	4											
China:[1]																			
Amoy	C		1																
	D		1																
Shansi Province[2]	C																		P
Shensi Province	C																		P
Dutch East Indies:																			
Batavia and West Java	C	74	59	116	75	12	11	20	15	19	18	8	20						
	D	71	59	66	75	12	11	20	15	19	18	8	20						
East Java and Madura	C	1	1																
	D	1	1																
Java and Madura	D	243	176	192	212	38	53	67	47	58	68	51	56	77					
Egypt:																			
Alexandria	C			4	13	4	3	1	1	2	2		1	1				1	
	D			4	5	1	2			1	1								
Assiout	C	32	18	11															
	D	17	7	1															
Beni-Suef	C	12	5																
	D	3	3																
Beheira	C					1		1			2								
Dakahlia	C				1		2												

Deirout	C	3	10	3																
	D	1	4	1																
Gharbieh	C			1																
	D			1																
Girga	C	44	7		1															
	D	22	2																	
Kena	C	3	1																	
	D	1	1																	
Minieh	C	1	6	3	12															
	D		3	1	4															
Port Said	C			3	5	2													1	
	D		1	2	1															
Tanta	C							2			1		1							P
France: Rouen-Devilleles	C																			
Hawaii Territory:																				
Hawaii—Hamakua—Plague-infected rats			1					1												
Maui Island—																				
Haliimaile—Plague-infected rats													1							
Kula District	C						1													
	D						1													
Makawao—Plague-infected rats													1							
Paia—Plague-infected rats														1						
India	C	6,142	752	88	221	164	175	130	215	282										
	D	5,199	692	51	128	94	117	92	137	146										
Bassein	C	1	1		4		1		1		1	2	1	1						
	D	1	1		3		1		1		1	2	1	1						
Bombay	C	11	8		12												1			
	D	11	6		6												1			
Plague-infected rats		137	94	37	48	8	13	17	9	23	17	7	10	9	9	12				
Burma	C				16															
	D				10															
Calcutta	C	2																		
	D	2																		
Madras Presidency	C	3	2	6	21					9	75	39					3			
	D	2	1	1	9					4	51	20					1			
Moulmein	C				9					P	5									
	D				1						4	3	2	2						
Rangoon	C	1	2	1	2	1				2	1								5	
	D	1	2	1	1	1				1	1								1	
Plague-infected rats		4	7	3	6	1		1	1	1	1	1	1	1	1	1				
Indo-China (see also table below): Pnompenh	C			3																
	D	4		2																
Iraq:																				
Baghdad	C	23	23	23	3			1			2	1								
	D	8	9	9	2						1									
Maudhan	C		3																	
Madagascar (see also table below): Tamatave	C					1						2		1						
Morocco	C													10						

[1] On July 27, 1931, 1,250 cases of plague were reported in Chiobe and Changchow, China, since April. On September 19, 1931, 18 deaths were reported in Changchuanpu and new cases in Kaitung and Fengtien.

[2] On October 17, 1931, plague epidemic was reported in western Shansi Province, China, with 2,000 deaths at Hsinghsien.

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

PLAGUE—Continued

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

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	June 28–July 25–1931	Week ended— August, 1931					September, 1931				October, 1931				
						1	8	15	22	20	5	12	19	26	3	10	17	24	31
Nigeria: Lagos	C	5																	
	D	5																	
Plague-infected rats		6																	
Peru (see table below).																			
Senegal (see table below).																			
Siam	C	1	2	1					1	1	1				1	1			
	D	1	2	1						1	1				1				
Spain: Hospitalet—Barcelona Province	C								5	1			1	1	1			5	
	D								2				1		1				
Syria: Beirut	C				2			1				1	1	1	2				
Tunisia: Tunis	C	16	16	11								1				1			
	D	8	3	1															
Union of South Africa:																			
Cape Province	C	3																	
	D	3																	
Plague-infected rats								1											
Orange Free State	C	2	2																
	D	2	2																

Place	April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931
British East Africa (see also table above):						
Kenya C	345	245	154	484	224	14
Indo-China (see also table above) C	11		2	1		1
D	2		2	1		1
Madagascar (see also table above):						
Ambositra Province C	30	19	15	1		
D	29	18	15	1		

Place		April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931
Peru	C	8	2	5	3	19	
	D	1		1	2	14	
Senegal:							
Baol [1]	C		4		27	101	13
	D		3		13	58	8
Dakar [1]	C	2	63	64	95	194	38
	D	1	49	56	73	106	24

Antisirabe Province	C	48	7	12	13	-------	-------
	D	47	7	12	12	-------	-------
Miarinarivo Province	C	6	2	-------	8	-------	-------
	D	6	2	-------	7	-------	-------
Moramanga Province	C	-------	2	1	1	-------	-------
	D	-------	2	-------	-------	-------	-------
Tananarive Province	C	41	18	10	5	-------	-------
	D	40	18	9	5	-------	-------

Diourbel [1]	C	-------	-------	-------	-------	-------	9
	D	-------	-------	-------	-------	-------	8
Louga [1]	C	1	5	4	3	2	4
	D	-------	2	2	1	1	1
Rufisque [1]	C	-------	1	2	34	2	1
Thies [1]	C	-------	-------	12	16	26	12
	D	-------	-------	3	7	16	8
Tivaouane [1]	C	4	19	3	3	-------	-------
	D	-------	11	2	2	-------	-------

[1] Reports incomplete.

SMALLPOX

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

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27–1931	June 28–July 25, 1931	Week ended— August, 1931 1	8	15	22	29	September, 1931 5	12	19	26	October, 1931 3	10	17
Algeria:																	
Algiers	C	2	1	8	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Constantine	C	-------	1	-------	1	-------	-------	-------	-------	-------	1	-------	-------	-------	-------	-------	-------
Belgian Congo	C	-------	47	42	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Bolivia.[1]																	
Brazil: Porto Alegre (alastrim)	C	53	19	5	41	11	6	17	-------	7	13	12	16	-------	-------	-------	-------
	D	-------	-------	-------	1	1	-------	-------	-------	2	-------	2	-------	-------	-------	-------	-------
British East Africa: Tanganyika	C	-------	13	7	149	1	18	-------	-------	31	4	6	9	-------	-------	-------	-------
	D	-------	-------	-------	17	-------	-------	-------	-------	-------	-------	1	4	-------	-------	-------	-------
British South Africa:																	
Northern Rhodesia	C	-------	-------	-------	21	-------	-------	26	-------	-------	-------	-------	-------	-------	-------	-------	-------
Southern Rhodesia	C	-------	-------	1	2	-------	-------	-------	-------	-------	1	-------	-------	-------	-------	-------	-------
Canada:																	
Alberta	C	-------	-------	-------	1	-------	1	-------	-------	-------	-------	-------	-------	12	-------	-------	-------
British Columbia	C	-------	-------	-------	2	2	-------	-------	3	-------	1	1	-------	-------	-------	-------	-------
Manitoba	C	-------	-------	4	-------	-------	-------	-------	-------	-------	-------	-------	1	-------	-------	-------	-------
Winnipeg	C	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	1	-------	-------	-------	-------	-------
Nova Scotia	C	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Ontario	C	9	17	32	35	1	-------	2	2	4	-------	2	-------	5	2	1	9
Kingston	C	5	-------	-------	-------	-------	-------	-------	-------	-------	1	-------	-------	-------	-------	-------	-------
Ottawa	C	-------	-------	1	-------	-------	-------	-------	-------	-------	-------	1	-------	5	2	-------	1
Sault Ste. Marie	C	4	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Toronto	C	4	1	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Quebec	C	-------	-------	-------	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Saskatchewan	C	46	48	54	42	-------	10	6	10	8	8	12	5	1	6	3	1
Regina	C	2	2	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	1	-------	-------	-------

[1] An epidemic of smallpox was reported on May 18 with 716 cases and 314 deaths since the middle of April, 1931, in Mendez Province, Bolivia.

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

SMALLPOX—Continued

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

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	Week ended— August, 1931					September, 1931				October, 1931		
						1	8	15	22	29	5	12	19	26	3	10	17
Chile:																	
Antofagasta	C				1												
Chanaral	C		1														
China:										8							
Amoy	C	2	6	4	2	1						1		1			
	D	1	3	3	2	1						1		1			
Canton	C	4	3	1	2					1							
Foochow	C	P	P	P	P		P		P		P		P				
Hankow	C	3	5	4	3	1		1	1					1			
Hong Kong	C	3	1														
	D	1	2														
Manchuria—																	
Harbin (see also table below)	C		3														
Kwantung—Dairen	C	2	2	1													
Nanking	C	P	P				1										
Shanghai—																	
Foreigners only	C	17	7	11	3									35	29	17	17
Including natives	D	18	7	13	6				1	1			1	5	8		
Swatow	D	2															
Tientsin	C		2		3												
Chosen (see table below).																	
Colombia:																	
Cali	D		1														
Santa Marta	D											1					
Dutch East Indies:																	
Batavia and West Java	C		2														
East Java and Madura	C		1														
Eritrea	C		3		2					10							
	D									2							
Finland	C	1															
France (see table below).																	
Great Britain:																	
England and Wales	C	744	570	287	187	26	25	19	21	33		19	45	45	41	34	41
Bradford	C	6	8	5													
Leeds	C	2	2														

London	C	227	183	122	54	6	12	4	4	3	9	5	15	5	17	15	21
London and Great Towns	C	558	403	228	152	22	20	17	10	13	30	11	34	35	31	25	37
	D	2		1	1												
Sheffield	C	7										1	1				
Greece (see table below).																	
Honduras:																	
Puerto Castilla	C														1		
Tegucigalpa	C	1															
Tela	C	1															
India	C	14,265	11,403	7,313	5,359	978	904	645	400	483							
	D	2,923	1,849	1,704	1,352	234	213	179	120	144							
Bassein	C		1														
Bombay	C	8	9	6	6	1		1			1	2	2				
	D	5	4	5	6	1					1						
Calcutta	C	287	89	47	21	4	4		5	2	1	2		1			
	D	224	75	41	18		4		5	2	1	2		1			
Cochin	C	39	3				1	1	1					1	1	2	
Karachi	C	6		2		1											
	D			1													
Madras	C	19	8	2	2	1					1			1	5	6	
	D	5	6	1												2	
Negapatam	C	3		3	1		2			3		1			1		
Rangoon	C	11	13	6	3	2		1	1	1		1			2		
	D	1	5	2	1	1			1			1			1	1	
Vizagapatam	C	10	6	6	5		3		2	3	1	1	1	2	4		
	D	2	1	2	1		3		1	3	1	1	1		1		
India (French)																	
Chandernagor	C	10	7	1	3												
	D	7	5		2												
Karikal	C	4	4	6	4	1	1	3	2		2	5			5		
	D	3	4	6	4	1	1	2	2		2	1			1		
Pondicherry Province	C	6	11	7	28	11	6		3	1	6	1	18				
	D	9	11	7	28	11	6		3	1	6	1	16				
India (Portuguese)	C	21	3														
	D	6	1														
Indo-China (see also table below):																	
Pnompenh	C		1	2													
	D		1														
Saigon and Cholon	C	1	2		3	1	1			1		3	2	1	4	1	
	D	1	1		1	1				1		2		1	2		
Iraq:																	
Baghdad	C	2	3	1								1					
	D		2														
Basra	C		2	1													
Mosul Liwa	C				1				1					5			
Ivory Coast (see table below).																	
Japan: Nagoya	C				1												
Mexico (see also table below).																	
Jalisco (State)—Guadalajara	D	1	2	1	3			2						1	1	2	
Mexico City and surrounding territory	C	43	45	25	22	8	2			2	2	1		2			
	D	14	11	13	8	1	1					1	1	1			
Monterrey	C			1													

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

SMALLPOX—Continued

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

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	Week ended— August, 1931 1	8	15	22	29	September, 1931 5	12	19	26	October, 1931 3	10	17
Mexico—Continued.																	
Torreon	C	1	1	3							1	1			1		
	D	2		2								1					
Vera Cruz	C	2	1														
Morocco (see table below).																	
Poland	C		3	3	18								1				
Portugal: Lisbon	C	56	67	48	45	17	12	8		10	21	18	17	16	11		
Rumania (see table below).																	
Siam	C	1	6	5	1							3					
	D		1	1	1												
Spain	C				7												
Straits Settlements	C	10	2				1										
	D	5	2														
Sudan (Anglo-Egyptian)	C	3	6	1					2			32					
	D		2									6					
Sudan (French) (see table below).																	
Syria (see table below).																	
Turkey (see table below).																	
Union of Socialist Soviet Republics (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P						P			P					
Natal	C																
Orange Free State	C	P	P	P	P			P	P	P	P						
Transvaal	C			P	P												
Upper Volta	C	3	88	12	2												
	D		1														
On vessel:																	
S. S. Clan McTavish at Manila from Chittagong	C	1															
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C	1							1								
S. S. Talodi at Suakin	C		1														

Place		March, 1931	April, 1931	May, 1931			June, 1931			July, 1931			August, 1931			September, 1931		
				1–10	11–20	21–31	1–10	11–20	21–30	1–10	11–20	21–31	1–10	11–20	21–31	1–10	11–20	21–30
Indo-China (see also table above)	C	264	142	-------	17	41	30	16	1	1	-------	7	29	-------	-------	-------	7	27
	D	82	-------	-------	-------	-------	-------	-------	-------	1	-------	4	11	-------	-------	-------	4	8
Ivory Coast	C	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	7	-------	-------	-------
Sudan (French)	C	4	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Syria: Beirut	C	-------	-------	-------	-------	-------	-------	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

Place		January, 1931	February, 1931	March, 1931	April, 1931	May, 1931	June, 1931	July, 1931
China: Harbin (see also table above)	C	-------	-------	7	-------	13	10	-------
Chosen	C	1	-------	11	-------	1	4	2
	D	1	-------	3	-------	-------	-------	1
France	C	4	16	15	6	54	9	20
Greece	C	-------	4	-------	-------	3	1	-------
Mexico (see also table above)	D	-------	3	-------	1	1	2	-------
Morocco	C	-------	4	6	7	49	48	23
Rumania	C	-------	-------	1	-------	1	-------	-------

Place		January, 1931	February, 1931	March, 1931	April, 1931	May, 1931	June, 1931	July, 1931
Turkey	C	63	37	1	-------	9	1	-------
	D	7	6	-------	-------	-------	-------	-------
Union of Socialist Soviet Republics	C	-------	-------	1,903	1,516	1,345	-------	-------
Territories in Asia	C	194	532	-------	-------	-------	-------	-------
Ukraine	C	44	23	-------	-------	-------	-------	-------
Other territories in Europe	C	896	1,577	-------	-------	-------	-------	-------
Railroads, etc	C	43	77	-------	-------	-------	-------	-------

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

TYPHUS FEVER

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

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	Week ended— August, 1931 1	8	15	22	29	September, 1931 5	12	19	26	October, 1931 3	10	17	24
Algeria:																		
Algiers	C	3	7	9	2													
Bone	C							1	1									
Constantine Department	C	9	22	26	3	1							2		1			
Oran	C	1	2	2			1				1							
Australia, Western	C	1	1															
Bulgaria	C	30	16	30						1								
	D	3	4	6														
China:																		
Manchuria—Harbin	C	8		16														
Shanghai	C				3			1										
Tientsin	C	2																
Chosen (see table below).																		
Colombia: Cali	D										1							
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C	1		3								1	1					
Beheira Province	C	4																
	D	2																
Cairo	C									1								
Great Britain: Scotland—Fife County	C		1															
Greece (see table below).																		
Guatemala (see table below).																		
Iraq: Baghdad	C		2															
	D		2															
Irish Free State:																		
Cork County—																		
Schull	C				1													
Skibbereen	C			2	1													
Kerry County—																		
Dingle	C		1															
Listowel	C			1														
Kildare County—Naas	C													1				

Limerick County—																		
Croom	C														1			
Glin	C											2			1			
Limerick	C				2	1												
Michelstown	C				1													
Rathkeale	C														1			
Mayo County—																		
Belmullet	C		1															
Castlebar	C								1									
Westport	C								1									
Japan	C			1														
Lithuania (see table below).																		
Mexico (see also table below):																		
Durango	D				1													
Mexico City, including municipalities in Federal District	C	170	75	46	53	7	6		5	5	1	2	2	4				
	D	56	33	19	12	5	3		2	1	1		2	2				
San Luis Potosi	D	3	2		4				1									
Torreon	C				1											1	1	
	D				1											1	1	
Morocco	C	13	42	101	102		2	1	5						1			
	D	1	4	6	8													
Palestine	C	5	4	5	2	3	3	1	4				4	4	1	1		2
Panama Canal Zone—Balboa	C		2															
Poland	C	538	298	97	53	10	4	10	7	6	2	1	2	2	8	3		
	D	28	18	4	5	1		1							1			
Rumania	C	70	169	80	11	7	9	4	3		4	6	3	1				
	D	8	18	13	5		1		1				1					
Syria	C		4															
Tunisia:																		
Sbeitla, vicinity of	C	12																
Tunis	C	13	29	73	2					1		1	1					
	D		3	4														
Turkey (see table below).																		
Union of Socialist Soviet Republics (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P		P	P	P	P	P	P	P					
Municipality of East London	C			1		1												
Natal	C	P	P	P	P		P					1						
Orange Free State	C	P	P	P	12													
Transvaal	C	P	P	P	P		P	P	P	P	P	P	P					
Yugoslavia (see table below).																		

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

TYPHUS FEVER—Continued

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

Place		March, 1931	April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931
Chosen: Seoul	C	3	4	-------	6	1	-------	-------
	D	-------	1	-------	1	1	-------	-------
Czechoslovakia	C	-------	5	11	2	-------	-------	-------
Greece	C	8	22	6	9	2	13	5
	D	1	3	-------	-------	-------	2	-------
Guatemala	C	-------	-------	-------	33	34	3	-------
	D	-------	-------	-------	15	5	-------	-------
Lithuania	C	99	34	10	13	8	2	-------
	D	3	5	-------	2	-------	-------	-------

Place		March, 1931	April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931
Mexico (see also table above)	D	238	-------	-------	-------	-------	-------	-------
Turkey	C	15	32	13	11	9	-------	-------
Union of Socialist Soviet Republics	C	2,206	1,513	1,324	-------	-------	-------	-------
Yugoslavia	C	10	43	14	2	3	1	-------
	D	1	5	-------	-------	-------	-------	-------

YELLOW FEVER

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

Place		May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	Week ended— August, 1931					September, 1931				October, 1931				
					1	8	15	22	29	5	12	19	26	3	10	17	24	31
Brazil:																		
Alagoas State	C	-------	-------	-------	-------	-------	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
	D	-------	-------	-------	-------	-------	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Ceara State	C	1	1	-------	-------	-------	-------	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
	D	1	-------	-------	-------	-------	-------	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Minas Geraes State	C	2	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
	D	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Rio de Janeiro State	C	2	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Sergipe State	C	-------	1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
British Cameroons: Mamfe	C	3	2	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
	D	2	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Colombia: Magdalena Province—Near Cienaga	C	-------	-------	4	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

Gold Coast:																		
Akuse	C			2														
	D			1														
Dagomba District	C				2	2												
Kete Krachi	C															1		
Kintampo	C			1														
	D			1														
Oda	C											1						
	D											1						
Tamale	C			2									2				1	
	D			2									2					
Wale Wale	C				1													
	D				1													
Ivory Coast:																		
Bobo Dioulasso	C			1														
	D			1														
Grand Bassam	C				4						1							
	D				2						1							
Kong Circle	C			4														
Seguela	C							P										
Nigeria: Abakaliki	C						1											1
	D						1											
Senegal:																		
Podor (Hinterland)	C							1										
	D							1										
St. Louis	C												1					
Thies	C												1					
	D												1					
Sudan (French)	C			4														
Togo: Seva	C											1						
Upper Volta:																		
Banfora	C			2									2					
	D			1									1					
Dedougou	C																	2
Diarabakoko	C												2					
	D												1					
Ouagadougou	C							1					1			1		