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CURRENT WORLD PREVALENCE OF COMMUNICABLE DISEASES[1]

United States, February 12–March 10, 1928

The mortality in large cities during the first 10 weeks of 1928 has been very favorable and has followed very closely that of last year. A slight increase occurred at the end of February as was to be expected, but the seasonal rise in mortality has been unusually slight. The annual rate for 68 cities for the 10 weeks ended March 10 was 13.8 per 1,000, which is the same as for the corresponding period of 1927.

Influenza.—The cases of influenza reported by 31 States increased at the end of February and beginning of March, but not sharply enough to indicate an epidemic situation. The reported cases averaged about 1,600 weekly for the first eight weeks, and the number increased to 2,163 cases in the week ended March 3 and 2,996 cases in the week ended March 10. The incidence has been very similar to that reported a year ago. In 1927 the seasonal maximum was passed in the week ended March 12, and in 1926, when the disease was epidemic, the maximum was passed a week later.

In certain Southern States, notably in Alabama, Arkansas, and Louisiana, the reported incidence of influenza has been somewhat higher than it was a year ago; but the number of cases has shown no tendency to rise continuously for several weeks in a characteristic epidemic curve. The influenza and pneumonia death rate by weeks up to February 18 also indicates a greater prevalence of respiratory conditions in the South Central States this year than a year ago; but in the remainder of the country, the weekly mortality from these causes has varied about the level of that in 1927.

Smallpox.—The prevalence of smallpox showed no further increase in the four weeks ended March 10, when 4,465 cases were reported by 42 States as compared with 4,618 cases in the preceding four-week period; but this is approximately 1,000 more cases than were reported in the corresponding four-week period a year ago. For the most part, the incidence of the cases in different parts of the country in the

[1] From the Office of Statistical Investigations, United States Public Health Service.

four weeks ended March 10 was unchanged as compared with the incidence in the preceding weeks.[1] The outbreak in Connecticut was promptly brought under control and only 10 cases were reported in the four weeks ended March 10, as against 126 in the preceding six weeks. An increase in cases is shown in the Arizona reports; 146 cases were reported in the four weeks ended March 10 as compared with 27 cases from January 1 to February 11.

Scarlet fever.—The number of cases of scarlet fever reported each week by 41 States continued to vary around 5,000 up to the week ended March 10. The disease has been less prevalent in the current year than at the corresponding season of last year, but a little more prevalent than it was two years ago. In none of the States does the incidence suggest any epidemic situation. The period of relatively high seasonal prevalence is rather wide in the case of scarlet fever and the disease may be expected to continue at the present level for several weeks.

Diphtheria.—The number of cases of diphtheria reported weekly by 41 States has been declining since the week ended February 4; in that week 2,250 cases were reported, whereas in the week ended March 10, 1,700 cases were reported. The maximum incidence occurred a little later in the present year than in either 1926 or 1927. The incidence in the current year has not differed significantly from that in 1927, but has been somewhat higher both in January and February than in the corresponding season of 1926.

Measles.—Measles cases continued to increase during February and the first part of March, and some further increase is likely, since the seasonal decline normally does not set in until quite late in the spring. There were 33,520 cases reported by 41 States in the two weeks ended March 10, as compared with 31,775 and 26,386 cases, respectively, in the two weeks ended February 25 and February 11. The incidence is still slightly above that reported last year, as was noted in the review of last month, but the number of cases is now smaller than the total reported by the same States in corresponding weeks of 1926, which was a "measles year." The reported incidence would seem to indicate that the disease is epidemic to some extent in the current year in about one-half the States scattered throughout the country.

Poliomyelitis.—There were fewer new cases of poliomyelitis in the four weeks ended March 10 than in the preceding four weeks, but more than in the corresponding weeks of either of the two preceding years. The 35 different States which reported one or more cases during this four-week period reported a total of 147 cases; California reported the largest number, 27 cases, Massachusetts

[1] Public Health Reports, Mar. 9, 1928.

reported 13 cases, New York reported 15 cases, and Oregon reported 9 cases.

Typhoid fever.—Cases of typhoid fever declined slightly during February; 41 States reported 118 cases in the week ended March 10, as against 215 cases in the week ended February 4. The disease has been less prevalent than in either of the two preceding years in most States.

Foreign Countries [1]

No unusual epidemic situation prevailed during December or January in any of the foreign countries for which the health section of the League of Nations had received reports. As in the United States, the general mortality in European towns reflected only a normal seasonal increase. Full official information on the widespread epidemic of influenza in Japan, which has been reported in the newspapers, is not yet available.[2] The prevalence for certain epidemic diseases is summarized below, chiefly from information taken from the League of Nations' Monthly Epidemiological Report.

Cholera.—Port towns in the Far East which reported any cases of cholera during the five weeks ended February 4 included only Singapore, Bangkok, Saigon and Cholon, Samarang, and five towns in British India. Calcutta, with 123 deaths in these five weeks, and Bangkok, with 55 cases in four weeks of January, are the only towns reporting more than six cases or deaths in January. In Bangkok, a definite increase in the incidence of the disease during January is indicated; only one or two cases were reported weekly during November and December, but in January the number increased gradually, and 28 cases were reported in the week ended January 28.

An increase in cholera incidence in French Indo-China occurred at the end of December. In Annam, 174 cases were reported in the first 20 days of January, as compared with 22 cases in the month of December; in Cochin-China, 165 cases were reported in the same period, as compared with 113 in December. No increase had occurred in Cambodia, Laos, or Tonkin.

In India, the incidence of cholera declined steadily during December; 2,353 deaths were reported in the week ended December 31 as against 4,835 in the week ended November 26, but the deaths were still much above the normal for the season. The late autumn outbreaks in Bengal, Assam, Bihar and Orissa, and in Madras Presidency reached a maximum toward the end of November, and the disease declined rapidly in the succeeding weeks in each of these areas.

Plague.—The outbreak of plague at Aden, which began January 9, continued to spread, and up to February 11 there had been 197 cases

[1] Data from the Monthly Epidemiological Report of the Health Section of the League of Nations' Secretariat, Feb. 15, 1928, supplemented by information published in the Public Health Reports.

[2] See p. 790. —Ed.

and 111 deaths reported. The number of cases increased each week and 89 cases were reported in the week ended February 11. One case occurred on January 19 at Baghdad, where there had been no plague since June. Five cases of plague were reported at Suez in the first five weeks of 1928, and these were the only cases reported in Egypt in this period.

No case of plague was reported in January from any Mediterranean port. Four cases were reported on the island of Teneriffe and three on the island of Las Palmas.

In Nigeria, the plague incidence in January continued lower than for several years past; 15 cases were reported in the five weeks ended February 4 as compared with 12 cases in the preceding five-week period. In the Union of South Africa, only 3 cases of plague were reported in January, all in inland districts, as compared with 6 cases in December and 9 in November.

The plague situation in India as a whole continued good in December, although there was a marked increase in cases about the middle of the month, followed by a drop to the previous level at the end of the month. The increase was due to a rapid spread of the disease in the United Provinces, as shown in the table below.

Plague cases reported in the United Provinces by two-week periods in the years 1924–1927

Year	Oct. 23–Nov. 5	Nov. 6–19	Nov. 20–Dec. 3	Dec. 4–17	Dec. 18–31
1927	67	136	408	837	596
1926	60	200	312	421	285
1925	45	84	336	557	541
1924	280	316	580	783	799

The plague outbreak in the Madura district of the Madras Presidency also continued to increase in December. The plague incidence in most provinces was unusually favorable.

Since May, 1927, deaths from plague in Java have been somewhat more numerous than in 1926; the incidence remains, nevertheless, well below that of 1924 and 1925, when plague reached its greatest extension in Java. The disease continues to be most prevalent in the central part of the island; its incidence decreased in Kedu, which was the province most affected in 1926, but increased markedly in Pekalongan and Cheribon, both provinces on the northern coast.

Deaths in Java during the 20 weeks ended December 3

	1925	1926	1927
Java, total	5,683	2,599	3,342
East Java	141	14	101
Central Java	4,753	2,445	2,712
West Java	789	140	529

Plague was less prevalent in Peru in 1927 than in any year since its introduction in 1903. During the first 11 months of the year there were 188 cases and 62 deaths, as compared with 1,200 cases in 1926 and 418 cases in 1924, the previous low year. There were 14 cases and 4 deaths reported in December.

Plague incidence in Guayaquil has remained practically the same for several years. In January 4 cases were reported, and the number of cases varied from 3 to 9 a month for the preceding six months.

Two cases of plague were reported at Buenos Aires in the week ended February 11 and one each in Rosario and Santiago Province in the following week. Four cases had occurred at Rosario in January.

Yellow fever.—Yellow fever cases and deaths which were officially reported in West Africa in the past three years are shown in the accompanying table.

Yellow fever cases and deaths in West Africa, 1925–1927

Country	1925		1926		1927	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Ivory Coast	3	1	0	0	3	3
Dahomey	0	0	2	1	4	4
Upper Volta	0	0	2	2	0	0
Niger Territory	0	0	0	0	1	1
Senegal	0	0	27	23	116	109
French Sudan	6	4	5	4	0	0
Gold Coast	7	4	23	13	107	41
Nigeria	21	14	11	7	3	2
French Togo	0	0	0	0	8	8

A short summary of the history of yellow fever, of the more important scientific investigations that have been carried out, and of recent epidemics is published in the February Epidemiological Report.

Smallpox.—In England and Wales the seasonal increase in smallpox cases was quite marked during January, but the number of cases reported in the four weeks ended January 28 (1,461 cases) was considerably smaller than that for the corresponding period of 1927 (2,184 cases). The disease is prevalent over a larger area in the current year than was the case a year ago, having spread to a new center in South Wales and to the Midlands and southern counties.

Smallpox cases continued to increase in the French Protectorate of Morocco; 398 cases were reported in December as against 140 in November and 81 in October. In Algeria, where smallpox was widespread during 1927, the number of cases has been declining; only 39 cases were reported in the first three weeks of 1928 as compared with 154 in the preceding three weeks. In Tunis only 3 cases occurred between November 26 and January 21.

Returns for smallpox cases in India for November and December were considerably lower in 1927 than in 1926. Bengal, southern

Assam, Orissa, and eastern Bihar had, as usual in recent years, the highest incidence.

The noteworthy decrease in the smallpox incidence and case fatality rate in Java continued throughout 1927. During the first 48 weeks of that year there were 281 cases and 8 deaths, in comparison with 5,994 cases and 1,301 deaths in 1924, 4,652 cases and 508 deaths in 1925, and 819 cases and 87 deaths in 1926. The case mortality rate was 21.7 per cent in 1924, 10.9 per cent in 1925, 10.6 per cent in 1926, and 2.8 per cent in 1927. An active vaccination campaign has been carried out in recent years.

Typhus.—The number of typhus cases reported in Europe, excluding the Union of Socialist Soviet Republics, was about the same in 1927 as in the preceding two years. In Latvia, Poland, the Kingdom of the Serbs, Croats, and Slovenes, and Greece, the incidence decreased from 1925 to 1927, but it increased at the same time in Lithuania, Rumania, and Bulgaria. Fewer cases, however, were reported in December, 1927, than in the corresponding month of any previous year in all of these countries.

TABLE 1.—*Typhus cases reported in various countries of Europe and North Africa*

Country	1924	1925	1926	1927
Estonia	43	21	24	18
Latvia	290	96	72	30
Lithuania	618	221	325	450
Poland	7,706	4,196	3,568	3,059
Czechoslovakia	44	204	167	199
Hungary	229	33	10	5
Rumania	3,312	1,892	2,355	2,893
Kingdom of the Serbs, Croats, and Slovenes	319	388	199	117
Bulgaria	197	217	238	297
Greece	266	102	68	39
Total	13,024	7,370	7,026	7,107
Egypt	1,683	1,314	966	792
Tunis	209	404	425	413
Algeria	471	540	311	889
Morocco	----------	510	559	1,653

Typhus was less prevalent in the third quarter of 1927 than during the corresponding period of 1926 in the Central Industrial and Black Soil Districts of the Union of Socialist Soviet Republics as well as in the Ukraine; the incidence was slightly higher, on the other hand, in northern and eastern Russia.

There was a marked increase of typhus fever in 1927 in Algeria and Morocco. During the first four weeks of 1928, 813 cases of typhus fever were reported in French Morocco, as compared with 111 in January, 1927.

Influenza.—There is no sign of any serious influenza epidemic in the January statistics of European countries. The number of deaths

attributed to influenza in large towns of England and Wales, which had been slowly increasing in December, began to decrease after the first week of January, an unusual occurrence. The number of deaths from influenza in German towns was low during the first two weeks of January. There was a slight increase in Paris, where 23 deaths were ascribed to influenza in December and 74 deaths in January.

There were 12 deaths from influenza in December at Madrid, 13 at Milan, 7 at Lyons, 6 at Prague, and 2 at Vienna, which shows a relatively low incidence for the season.

Measles.—Measles was moderately epidemic in most European countries during the last quarter of 1927, but the incidence was nowhere higher than is normally the case during the increases which usually occur every two or three years. The incidence in the third quarter of 1927 was lower than it was during the corresponding period of 1926 only in the Union of Socialist Soviet Republics, Estonia, Poland, Bulgaria, Greece, Albania, Malta, and Spain. The indications are that in many countries the maximum of the present winter will be passed earlier than usual.

Whooping cough.—Whooping cough shows no unusual prevalence in any of the countries for which information is available. The incidence was well below the normal during the fourth quarter of 1927 in England and in Denmark.

CURRENT STATE MORTALITY STATISTICS

For the information of public health officials and others interested, the data in the following tables have been taken from the monthly mortality reports of State health departments for the latest month for which published records are available. Statistics of most communicable diseases are not included, since they are available in other tabulations in the Public Health Reports. Statistics of deaths from other causes are limited for the most part to those causes which appear in the State reports. In the case of States which publish detailed mortality reports each month, the record of only the principal groups of causes and certain important specific causes have been used.

For purposes of comparison, the mortality records for the corresponding month in a few preceding years have been compiled. The rates have been computed upon the populations as estimated for July 1 of each year represented.

These tabulations will be enlarged as the current data on mortality from additional States become available.

Alabama

Death classification, by cause or age	December			
	1927	1926	1927	1926
	White		Colored	
	Annual rate per 1,000			
All causes	11.3	9.9	17.0	15.1
	Rate per 1,000 live births			
Infant mortality	65.3	(1)	91.8	(1)
	Annual rate per 100,000			
Influenza	43.7	24.4	67.1	38.1
Tuberculosis, all forms	48.8	36.2	147.4	172.2
Cancer, all forms	59.8	57.6	56.6	40.7
Diabetes mellitus	16.8	8.9	9.2	5.3
Cerebral hemorrhage, apoplexy	62.7	61.3	80.3	71.0
Diseases of heart	115.1	95.3	144.7	134.1
Pneumonia, all forms	136.3	85.7	155.3	107.8
Diarrhea and enteritis (under 2 years)	19.7	10.3	17.1	10.5
Chronic nephritis	79.4	76.1	123.7	97.3
Puerperal state	18.9	14.0	18.4	23.7
Congenital malformation and other diseases of early infancy	80.9	76.1	85.5	81.5
Automobile accidents	24.0	20.0	9.2	18.4
	Number of deaths			
Under 1 year	269	203	205	151
1–4 years	104	105	58	57
5–14 years	73	47	56	56
15–44 years	271	257	399	406
45–64 years	277	259	317	250
65 years and over	545	459	247	218
Age not stated	12	9	11	10

Connecticut

Death classification, by cause or age	December					
	1927	1926	1925	1924	1923	1922
	Annual rate per 1,000					
All causes	10.9	12.1	11.9	11.4	11.1	13.1
	Rate per 1,000 live births					
Infant mortality	66.6	66.6	72.4	60.2	68.2	81.9
	Annual rate per 100,000					
Influenza	21.5	26.4	26.9	33.7	16.8	22.0
Tuberculosis, all forms	57.9	82.3	69.3	76.0	89.4	90.3
Cancer	103.9	115.6	108.5	101.1	99.0	99.2
Diseases of the heart	186.3	216.8	205.5	166.9	145.3	(1)
Pneumonia, all forms	100.9	121.6	136.2	107.4	118.1	160.2
Diarrhea and enteritis (under 2 years)	7.4	7.6	16.2	8.6	12.8	13.8
Puerperal diseases	6.7	13.6	6.9	7.1	12.0	8.1
	Number of deaths					
Under 1 year	158	160	178	158	168	211
1–4 years	44	52	62	49	72	97
5–64 years	679	780	689	660	679	737
65 years and over	594	609	623	584	466	566

[1] Not available.

Indiana

Death classification, by cause or age	December					
	1927	1926	1925	1924	1923	1922
	Annual rate per 1,000					
All causes	11.9	12.1	12.4	11.8	11.6	12.2
	Rate per 1,000 live births					
Infant mortality	61.4	75.7	69.9	63.4	72.4	84.6
	Annual rate per 100,000					
Influenza	23.9	36.2	36.5	31.9	22.1	25.5
Tuberculosis, all forms	69.2	66.0	73.4	74.1	71.1	72.6
Cancer	102.0	96.5	105.8	94.5	98.9	95.9
Apoplexy	123.3	113.1	108.5	111.4	(1)	(1)
Organic heart disease	183.2	179.0	165.5	161.3	(1)	(1)
Pneumonia, lobar and broncho	117.0	120.6	139.6	117.9	92.8	140.1
Diarrhea and enteritis (under 2 years)	4.5	7.2	10.3	11.1	12.4	15.7
Bright's disease	74.8	75.4	72.3	99.5	(1)	(1)
Puerperal causes	9.7	10.6	9.1	5.0	[2] 5.0	[2] 3.5
	Number of deaths					
Under 1 year	294	350	332	324	355	417
1-4 years	96	124	114	96	123	227
5-14 years	70	75	103	80	119	115
15-64 years	1,289	1,253	1,269	1,233	1,212	1,117
65 years and over	1,423	1,396	1,433	1,340	1,172	1,235

New York State (exclusive of New York City)

	Death classification, by cause or age	December				
		1927	1926	1925	1924	1923
		Annual rate per 1,000				
1-205	All causes	12.8	13.3	15.0	14.7	13.4
		Rate per 1,000 live births				
	Infant mortality	72	72	73	77	80
		Annual rate per 100,000				
11	Influenza	13.3	13.5	16.7	22.6	9.3
31-37	Tuberculosis, all forms	62.3	73.1	95.3	80.1	85.6
43-49	Cancer and other malignant tumors	122.6	117.6	127.8	129.7	114.6
57	Diabetes mellitus	24.2	24.2	29.5	25.7	22.9
70-86	Diseases of the nervous system and of the organs of special sense	151.9	172.0	191.9	203.3	188.5
74	Cerebral hemorrhage, apoplexy	118.5	133.1	149.5	154.0	144.6
87-96	Diseases of the circulatory system	354.6	358.2	364.7	360.2	299.4
90	Other diseases of the heart	276.8	273.5	289.2	281.8	223.8
97-107	Diseases of the respiratory system	117.8	137.9	161.6	141.6	119.9
100, 101	Pneumonia, broncho and lobar	99.2	117.8	138.5	122.2	99.5
108-127	Diseases of the digestive system	68.6	74.4	81.3	81.4	87.5
113	Diarrhea and enteritis (under 2 years)	11.8	12.9	17.7	19.7	23.2
128-142	Nonvenereal diseases of the genito-urinary system	125.3	131.2	142.0	141.4	123.1
128, 129	Nephritis, all forms	115.1	121.3	129.2	128.5	109.2
143-150	The puerperal state	9.0	8.3	12.3	9.7	11.9
151-158	Diseases of the skin and of the bones and organs of locomotion	3.4	5.2	4.6	4.6	4.4
159-163	Malformations and diseases of early infancy	67.3	59.4	76.2	86.2	82.9
165-203	External causes	92.8	84.0	101.6	95.2	105.8
188c	Automobile accidents	19.7	12.7	20.6	16.8	21.1
		Number of deaths				
	Under 1 year	540	518	565	625	618
	1-4 years	147	155	195	174	174
	5-64 years	2,639	2,687	2,686	2,704	2,484
	65 years and over	2,649	2,739	2,738	2,535	2,234

[1] Not available. [2] Puerperal septicemia.

Tennessee

	Death classification by cause	December— 1927	December— 1926
		Annual rate per 1,000	
1–205	All causes	13.6	12.7
		Annual rate per 100,000	
11	Influenza	52.1	(1)
31–37	Tuberculosis, all forms	145.0	131.2
43–49	Cancer	64.4	(1)
100–101	Pneumonia, all forms	163.0	116.9
113	Diarrhea and enteritis (under 2 years)	14.2	14.8
146	Puerperal septicemia	5.2	(1)
188c	Automobile accidents	17.5	11.0

Michigan

Death classification by cause	November— 1927	1926	1925	1924	1923
	Annual death rate per 1,000				
All causes	11.6	12.6	11.6	10.7	[2] 12.4
	Rate per 1,000 live births				
Infant mortality	62.1	68.1	69.0	67.2	[2] 80

Pennsylvania

	Death classification by cause	November 1927	1926	1925	1924	1923
		Annual rate per 1,000				
1–205	All causes	11.5	11.7	12.0	12.0	11.8
		Rate per 1,000 live births				
	Infant mortality	64.2	72.1	74.1	(3)	(3)
		Annual rate per 100,000 [4]				
11	Influenza	19.5	19.8	21.6	19.8	14.0
31–37	Tuberculosis, all forms	63.4	65.3	68.7	72.3	71.0
43–49	Cancer	99.3	99.7	87.8	95.9	92.0
57	Diabetes	19.4	19.3	18.4	16.4	(3)
74–83	Apoplexy, softening of brain	88.1	91.2	63.9	(3)	(3)
87–90	Heart disease	225.0	214.0	199.0	(3)	(3)
100–101	Pneumonia, all forms	92.2	120.0	140.0	131.0	125.0
113	Enteritis (under 2 years)	22.4	22.9	25.4	31.4	29.0
128–129	Nephritis, all forms	97.8	106.0	105.0	108.0	(3)
143–150	The puerperal state [5]	4.7	5.9	6.3	(3)	(3)
159–163	Congenital malformations and diseases of early infancy [6]	34.7	36.2	35.7	(3)	(3)
188c	Automobile accidents	23.2	22.4	18.8	20.0	24.0

[1] Not available.
[2] United States mortality statistics.
[3] Not ascertainable.
[4] Except the puerperal state and diseases of early infancy.
[5] Rate per 1,000 total births.
[6] Rate per 1,000 live births.

New Jersey

Death classification by cause, or age	October					
	1927	1926	1925	1924	1923	1922
	Annual rate per 1,000					
All causes	10.5	10.2	11.3	10.5	11.0	10.8
	Annual rate per 100,000					
Influenza	5.0	5.4	5.2	4.3	5.8	4.6
Tuberculosis, all forms	70.7	66.2	68.4	74.5	80.7	85.2
Cancer	106.2	108.8	106.6	82.2	107.2	98.3
Diseases of the nervous system	99.9	119.7	125.3	120.0	111.3	123.5
Diseases of the circulatory system	229.9	211.6	224.4	199.2	197.9	174.2
Diseases of the respiratory system (pneumonia and tuberculosis excepted)	31.1	38.7	43.8	50.8	46.0	46.1
Pneumonia	32.0	33.3	54.9	45.8	33.7	37.3
Diseases of the digestive system	66.9	55.7	60.8	[1] 61.5	[1] 61.5	[1] 56.0
Infantile diarrhea	7.3	23.7	32.1	30.8	39.5	54.2
Bright's disease	90.8	94.7	101.1	92.9	98.9	92.9
Automobile accidents	29.5	23.7	(2)	24.7	28.5	(2)
	Number of deaths					
Under 1 year	332	335	419	409	435	480
1-4 years	107	113	143	139	143	186
5-39 years	1,559	1,427	1,526	1,381	1,444	1,348
40 years and over	1,338	1,304	1,374	1,223	1,195	1,054

[1] Infantile diarrhea excepted. [2] Not available.

New York State, 1927 and 1926

The following statistics are taken from the Health News of February 13, 1928, published by the New York State Department of Health:

Mortality in New York State in 1927 and 1926

Death classification by cause	1927	1926	Average 1922-1926
	Rate per 1,000		
Births	19.9	19.8	20.0
Deaths, all causes	12.3	13.4	12.9
	Rate per 1,000 live births		
Infant mortality	59	70	71
	Rate per 1,000 total births		
Stillbirths	40	42	42

Mortality in New York State in 1927 and 1926—Continued

Death classification by cause	1927	1926	Average 1922–1926
	Annual rate per 100,000		
Typhoid	1.7	2.6	
Measles	1.6	8.4	
Whooping cough	4.2	5.4	
Diphtheria	8.6	6.4	
Tuberculosis, all forms	81.9	89.1	
Cancer, all forms	124.3	119.8	
Diabetes	24.4	24.5	
Alcoholism	8.1	8.1	
Diseases of the heart	276.9	289.6	
Bronchitis	5.0	7.0	
Pneumonia, all forms	107.2	148.8	
Diarrhea and enteritis (under 2 years)	13.1	17.4	
Nephritis, acute and chronic	82.7	96.2	
Suicide	16.0	14.3	
Automobile accidents	21.2	19.7	
Homicide	5.0	4.4	
Accidents	80.7	82.5	

Commenting upon these statistics, the Health News said:

The health of the people of the State of New York in 1927 was exceptionally good. The total number of deaths was less than a year ago by more than 10,000, mainly because of a lessened volume of mortality from tuberculosis, pneumonia, and diseases of the heart and kidneys. The death rate (12.3 per 1,000 population) was never lower and was equaled but once in 43 years. Infant mortality (59 deaths under one year per 1,000 live births) was the lowest recorded since 1904, when these deaths were first compiled separately. Mortality from most of the diseases of childhood, with the exception of diphtheria, also showed a gratifying decrease.

With reference to the decrease in deaths from diseases of the heart, the further comment is made:

We must not, however, ascribe too much significance to this decline because the high death rate in 1926 was directly influenced by an extraneous factor—the abnormally severe weather during the first months of the year. The present death rate from diseases of the heart, with the single exception of the preceding year, is still greater than ever before.

With respect to other causes, the Health News continues:

The death rate from pneumonia declined 28 per cent and the proportion of deaths due to this cause was only 8.7 as compared with 11.1 in 100 deaths last year. Here, too, we recall the very high mortality in February, March, and April, 1926. But, unlike diseases of the heart, the death rate from pneumonia in 1927 was, with one exception, the lowest ever recorded.

Cancer, with the highest mortality on record, is now second among the causes of death. A year ago it was third, in 1917 it was fifth, and 20 years ago it was eighth—being preceded in order by pneumonia, tuberculosis, diseases of the heart, acute and chronic nephritis, diarrhea and enteritis (under 2 years), accidents and cerebral hemorrhage and apoplexy.

The death rates from nephritis, acute and chronic, and from tuberculosis, all forms, have never been lower. The decline in the tuberculosis death rate was the greatest recorded in any one year since 1921 and the 1927 rate was one-half of the rate recorded only 10 years ago. The reduction in the death rate from

accidents was less than that which occurred in the mortality from all causes and the relative importance of this group has increased somewhat, from 6.2 to 6.6 per cent.

Ohio, 1927 and 1926

The following statistics are taken from the Ohio Health News of February 15, 1928, published by the Ohio State Department of Health:

Mortality in Ohio in 1927 and 1926

Death classification by cause	1927	1926
	Annual rate per 1,000	
All causes	11.2	12.2
	Rate per 1,000 live births	
Infant mortality	63	76
	Annual rate per 100,000	
Typhoid fever	2.70	4.49
Smallpox	.15	.01
Measles	.. 55	12.51
Scarlet fever	2.36	2.92
Whooping cough	4.03	10.11
Diphtheria	7.78	7.51
Influenza	22.41	39.67
Acute poliomyelitis	2.56	.68
Meningococcus meningitis	.67	.51
Rabies	.17	.09
Tuberculosis, all forms	70.82	79.09
Other epidemic, endemic, infectious diseases	16.58	19.18
Cancer, all forms	98.53	100.31
Cerebral hemorrhage	101.60	110.15
Heart diseases, all forms	203.56	201.47
Broncho pneumonia	36.42	48.08
Lobar pneumonia	44.17	51.87
Diarrhea and enteritis (under 2 years)	13.42	22.91
Diarrhea and enteritis (over 2 years)	5.04	6.36
Nephritis	87.98	87.68
The puerperal state	10.36	13.06
Congenital malformation, deaths peculiar to early infancy	68.47	72.74
Suicides	13.13	13.50
Railroad accidents	9.56	9.63
Street-car accidents	1.93	2.42
Automobile accidents	22.05	20.63
Homicides	7.81	8.40
All others	265.79	277.97

The Ohio Health News, after pointing to the decreases in the general death rate and in the infant mortality rates, comments as follows:

Marked decreases in numbers of deaths were reported in the following diseases: Typhoid fever, measles, scarlet fever, whooping cough, influenza, tuberculosis (all forms), cancer, diarrhea and enteritis, and causes peculiar to early infancy. Causes of deaths showing increases were: Smallpox, diphtheria, acute anterior poliomyelitis, rabies, diseases of the heart, Bright's disease, and automobile accidents.

Only 40 of the 88 counties did not report deaths from poliomyelitis during the epidemic of last summer and fall. Eight counties reported deaths from smallpox and nine from rabies.

THE PROBLEM OF AUTOMOBILE EXHAUST GAS IN STREETS AND REPAIR SHOPS OF LARGE CITIES

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Nature of Problem

That automobile exhaust gas is highly poisonous has been established beyond question. Perhaps no other toxic substance has received so much attention of late, as indicated by the ever increasing literature on the subject. Scarcely a day passes without mention in the newspapers of a serious accident from automobile exhaust-gas poisoning occurring in garages. It is also well known that among garage workers chronic poisoning, or, perhaps, more correctly, continuous acute poisoning, is common. The seriousness of this hazard in public and private garages and repair shops has been recognized by health authorities throughout the country and is beginning to receive the serious consideration it justly deserves.

Due to the increasing number of automobiles, the problem of the pollution of the air of city streets has come to the fore and many hygienists express deep concern over this problem. Certain types of automobiles of large gasoline consumption, such as trucks and omnibuses, are becoming almost as numerous in the streets of large cities as pleasure cars; and with the new systems of traffic control in vogue in the cities, much starting, stopping, and idling of engines has become necessary. All these factors are conducive to the greater production of exhaust gas, so that at times a haze of blue smoke may actually be seen hanging over the streets of some of our cities. The smoke and its accompanying smell of burnt oil are not, however, an index of the toxicity of exhaust gas. It is generally agreed that the most dangerous substance issuing from the exhaust of an automobile is carbon monoxide, a very subtle poison, in that it is colorless and practically odorless, although usually present in automobile exhaust gas in high concentrations. Carbon monoxide is highly poisonous, because it displaces the oxygen from the hemoglobin molecule, causing asphyxia of the tissues. Most authorities on the physiology of carbon-monoxide poisoning believe that all of the clinical manifestations arising from the breathing of carbon monoxide may be explained on the basis of oxygen privation.

The amount of carbon monoxide produced depends chiefly upon the adjustment of the carburetor, as shown by the investigators of the United States Bureau of Mines (1). In connection with the problems involved in the ventilation of the vehicular tunnel now operating under the Hudson River between New York City and New Jersey, it was necessary to determine the amount and composition of exhaust gas from automobiles. The workers of the

Bureau of Mines undertook this problem and made road tests on 101 automobiles and trucks operated under all sorts of conditions, which showed that the carbon monoxide varied from 0.5 to 14 per cent of the total exhaust gases, averaging about 7 per cent and, under certain conditions, reaching even higher concentrations. This is true when a car is idling. For example, while waiting for the traffic control to change, drivers often use the accelerator several times, presumably to prevent their engines from stalling. This practice yields relatively high amounts of carbon monoxide and smoke.

The air we breathe is a remarkable diluent of the toxic gases that are constantly being emitted from various sources associated with our industrial life. Whether or not there is sufficient air to dilute the vast quantities of toxic automobile exhaust gas at certain congested areas in our large cities where stalled traffic is a common occurrence, is a problem that concerns us at the present time. That the amount of visible smoke and smell emanating from automobile exhausts is at times disagreeable is a fact not to be disputed; but whether or not the amount of exhaust gas in the air of our congested cities is such as to be inherently unhealthful is a question still to be decided.

In order to evaluate the extent of the hazard involved it is essential to determine the amount of carbon-monoxide gas present in the air of the most congested traffic areas of our cities. Such determinations made under traffic and atmospheric conditions should yield a fair index of the amount of toxic gas to which individuals are daily exposed in our streets, and an analysis of such data viewed in the light of our present day knowledge concerning the toxicity of carbon monoxide should go a long way toward answering the question as to whether or not a hazardous condition now prevails in our city streets. It is with such a study of the amount of carbon monoxide present in the atmosphere of our large cities that this paper is mainly concerned. Tests for carbon monoxide in automobile repair shops were also conducted and yielded some interesting results.

Previous Studies

Numerous tests have been conducted in recent years by various investigators in connection with the amount of carbon-monoxide gas existing in the atmosphere of garages and automobile repair shops. One of the most recent and extensive investigations of this sort was the one made by workers of the Bureau of Industrial Hygiene of the New York State Department of Labor (2). However, very few studies have been made concerning the amount of carbon-monoxide gas present in the outside air of our cities. In 1923 Henderson and Haggard (3) reported the conditions in the streets of New York and New Haven as regards atmospheric pollution by automobile exhaust

gas. These investigators made numerous tests under a great variety of atmospheric and traffic conditions. They concluded that a definite hazard existed in the congested areas of our large cities, and they recommended the vertical exhaust pipe discharging above the breathing level as a means of amelioration.

It appeared from this study that traffic patrolmen would be the persons most likely to be affected by exhaust gases in streets; and in 1926 Wilson, Gates, Owen, and Dawson (4) reported blood tests made on traffic patrolmen in Philadelphia. These workers examined the blood of traffic patrolmen after an ordinary eight-hour day's work, and found it to contain from 0 to 30 per cent carbon-monoxide hemoglobin, enough to be associated in some cases with mild subjective symptoms.

The only other study of carbon monoxide in city streets with which we are familiar is that made by workers of the Bureau of Sanitary Engineering of the Department of Health of the city of Chicago (5). In a report issued in 1926 these investigators presented results of tests made of the air in various parts of the city of Chicago. The highest amount of carbon monoxide reported by these workers was 0.36 part per 10,000 parts of air. From this study it was concluded that no hazard from carbon monoxide existed in the streets of Chicago.

Scope of Study

Early in 1927 one of the authors of this paper was engaged in certain work which necessitated visiting some of the large cities in this country, from Boston to San Francisco. It was thought that this trip, embracing all of the largest cities, offered a spendid opportunity to study the amount of carbon monoxide present in the most congested areas of these cities. Such a study would take in variations in traffic control and atmospheric changes which exist in our municipalities, and would yield an excellent index of the extent of atmospheric pollution by automobile exhaust gas.

Since the desideratum of these tests was to study conditions when the hazard was at a maximum, it was decided to include also automobile repair shops for indoor tests. In each city two repair shops, considered as representative of such establishments in the community, were selected for the tests. In addition to obtaining samples of air for the determination of carbon monoxide, a detailed study was made in each place concerning such influencing factors as artificial and natural ventilation, floor space and cubic content of each shop, number of automobiles handled in a day, number of workers exposed, and any other data bearing on this problem. In certain instances the blood of workers was examined in order to determine the degree of carbon-monoxide-hemoglobin saturation.

Likewise, for the street tests, it was desired to study the extreme existing conditions. Hence, with the aid of the police department of each city, two or three of the most congested traffic intersections were selected and tests made at the time when traffic was at a maximum, usually between the hours of 4 and 6 in the afternoon. Most of the street samples were taken at a time when traffic was stalled and cars were idling. These samples were taken as a rule at the breathing level of the pedestrian standing at the curb, and were obtained some 20 or 30 feet from the street intersection, in order to be where idling cars were numerous and also to avoid the open area at the street crossing. Where there was a police officer in the roadway of the intersection, samples were taken beside him in order to determine his exposure to the gas. In connection with the street tests, such factors as the distance between building lines, height of buildings, volume of automobile traffic, wind velocity, temperature, and relative humidity were also recorded. A few tests were made in tunnels used by vehicles and pedestrains, at taxicab stations, and (in one city) inside of auto busses and in offices and residential apartments opening on congested thoroughfares.

All samples were of the so-called "snap" or "grab" instantaneous type, and were taken by breaking the sealed tip of an evacuated 500-cubic-centimeter glass bulb. After obtaining the sample in this manner the broken capillary tip was temporarily sealed with sculptor's clay ("plasticine"), and upon arrival at the laboratory the bulb was sealed in a flame and stored away for subsequent analysis. It was felt that practically no loss of gas was possible in using this technique. Such instantaneous samples taken under congested traffic conditions necessarily yield higher results than would the slower continuous samples taken by other methods; but, since it was desired to study conditions when the exhaust gas in the air was at a maximum, this method of sampling appeared to us to be the most practicable. Our survey commenced in February and continued until late in June of the year 1927, so that all sorts of atmospheric conditions were encountered, thus yielding a fair test of atmospheric pollution by automobile exhaust gas.

Method of Analysis

The iodine pentoxide method was used for the analysis of our samples. This consists essentially in absorbing the other interfering substances in the air sample, oxidizing the carbon monoxide with iodine pentoxide, and determining the amount of iodine liberated. The apparatus used was similar to that of Seidell and Meserve (6), and differs only in the addition of a liquid-air condenser. In 1920

Teague (7), in working out a method for the determination of carbon monoxide in air contaminated with automobile exhaust gas, showed that the only effective means of removing unburned gasoline (which he found to be the only substance vitiating the result of the analysis of carbon monoxide by the iodine-pentoxide method) was in the use of liquid air (−190° C.), which freezes out not only gasoline vapors but also water, carbon dioxide, and probably all of the unsaturated hydrocarbons.

Essentially the method is as follows: Suction is applied at one end of the absorption train in such a manner as to displace (by water) the sample of gas to be analyzed. The carbon monoxide, after passing through the various absorption bulbs and the liquid-air tube, is oxidized by iodine pentoxide at 150° C., and the liberated iodine is absorbed in a solution of potassium iodide. After the absorption train has been swept out by means of carbon-monoxide-free air, the total iodine obtained is titrated with N/500 sodium thiosulphate. The method is rather exacting, but under carefully controlled conditions it yields an accuracy of 0.1 part of carbon monoxide in 10,000 parts of air.

A number of analyses were made of artificial mixtures of air with known amounts of carbon monoxide or gasoline vapor, or both, in order to check the method. The mixtures of carbon monoxide were made by introducing a known amount of carbon monoxide from a gas burette into a known quantity of air. The carbon monoxide was prepared by the action of concentrated sulphuric acid on sodium formate, was purified by bubbling through a barium-hydroxide solution, and was subsequently stored over water. A saturated mixture of gasoline vapor with air was made by shaking 50 cubic centimeters of gasoline in a 2-liter bottle for five minutes. Definite volumes of this were taken with a gas burette after the air-gasoline mixture had stood for half an hour at room temperature. A series of analyses was made in order to test the efficiency and the necessity of using the liquid-air tube to remove unburnt gasoline vapor. Known mixtures of air, gasoline vapor, and carbon monoxide were analyzed, both with and without the liquid-air cooling tube in the train. The results of this series of tests are shown in Table 1.

This experiment demonstrated that it was necessary to remove any gasoline vapor in the determination, and that this removal was accomplished satisfactorily by the use of a liquid-air cooling tube. The determinations of carbon monoxide presented in Table 1 were lower than the theoretical in all cases except in the experiment where the gasoline vapor was not removed by the use of the liquid-air tube. These low results are probably due in part to the fact that the carbon monoxide was not strictly pure. The values which were obtained

on gasoline and carbon-monoxide-air mixtures when liquid air was used are in accord with those obtained in the absence of gasoline vapor.

TABLE 1.—*Showing effect of using the liquid-air condenser tube when determining carbon monoxide in air contaminated with gasoline vapor*

Type of absorption train used	Cubic centimeters of air saturated with gasoline	Cubic centimeters of CO in air mixture calculated	Cubic centimeters of CO found	Difference in per cent
Without liquid air tube	0	1.0	0.95	−5
	0	1.0	.93	−7
	100	1.0	24.30	+2,430
With liquid air tube	0	1.0	.92	−8
	0	1.0	.83	−17
	100	0.0	.00	0
	10	1.0	.91	−9
	10	1.0	.81	−19

CO-free air was used to make the mixtures in all cases.

A series of determinations was also made upon dilute mixtures of carbon monoxide and air. The deviations were less than 3 per cent in mixtures containing 1 to 6 parts CO per 10,000, and less than 10 per cent in those containing about 0.5 part per 10,000.

In all, 250 tests were made for carbon-monoxide gas in the air of streets, repair shops, and auto busses. Of this number, 141 were made in city streets, 102 in repair shops, and 7 in auto busses. In certain instances in which the analysis of a sample showed a relatively small amount of liberated iodine (corresponding to a low CO content), the contents of two or more sample tubes were combined for analysis in order to yield a higher relative degree of accuracy in the subsequent titration. In general, sampling tubes were "pooled" only in those cases in which the samples were obtained at the same location, and where the total amount found was low.

Street Tests

Table 2 summarizes all the tests for carbon monoxide made in the streets of 14 large cities. As has been stated, these tests were usually made at the most congested traffic intersections and at the time of day when traffic was at a maximum. Nearly all samples were taken at the breathing level of a pedestrian and at various points in the street where it may be necessary for a person to walk, such as at the curb near automobiles waiting for the signal to start, in the middle of the road, and near the traffic officer's position. It is felt that these samples represent high average exposures for pedestrians to automobile exhaust gas.

TABLE 2.—*Summary of carbon-monoxide tests made in the streets of 14 cities*

City	Sampling location	Number of tests made	Average CO in parts pe 10,000 of air	Distance in feet between building lines	Average number of stories of buildings affecting air currents	Volume of automobile traffic, cars per hour	Wind velocity in miles per hour	Per cent relative humidity	Remarks
A	6	5	0.3	90			0.6	40	
	8	4	.9	90			1.1	71	
B	10	6	1.2	150		1,400	.2	67	
	13	6	.3	70		2,400	.3	78	
C	17	4	.8	84		1,720	.4	68	
	19	4	.6	80		5,400		71	
	20	4	1.7	32					Fan-ventilated tunnel 1,040 feet long by 33 feet wide by 20 feet high.
D	21	4	.9	50		700	2.5	46	Naturally ventilated tunnel 911 feet by 50 feet by 19 feet.
	24	4	.7	64		1,500	.7	48	
	25	4	.4	64		900	1.1	78	
E	29	4	.3	60		1,500	.4	62	
	31	5	.5	74		1,700	.6	53	
F	39	4	1.7	84		3,000	.8	39	
	42	6	.5	70		1,320		57	
G	46	4	.2	150		2,020	.6	26	
	48	4	.6	125		1,960		42	
H	53	3	.7	58	12	1,250	8.0	55	
	56	3	.4	60	3	1,300	0	55	
	57	2	2.9	82		800	0	42	Taxicab station, tunnellike inclosure.
I	60	5	.3	125	6	2,480	4.0	51	
	61	6	1.5	130	10	2,610	1.5	42	
	Misc.	3	1.1						Taxicab station and office.
J	65	6	.2	82	10	3,990	15.0	69	
	66	3	.8	115	2	1,370	5.0	61	
K	72	5	.6	112	8	1,576	2.0	40	
	73	4	1.1	106	8	2,202	3.8	30	
L	76	5	1.2	95	8	2,210	3.3	59	
	77	5	.5	73	5	1,720	1.7	40	
M	82	4	.7	105	3	1,990	4.2	26	
	83	3	.2	92	3	1,810	7.0	48	
N	90	3	.3	72	2	3,470	6.0	55	
	93	5	.3	110	2	2,780	2.0	51	
	Misc.	4	.6						Samples taken from rear of truck while in motion through city streets.
Totals	33	141	25.0	754	82	57,078	72.8	1,570	
Average	2.4	4.3	.8	85	5.9	2,038	2.7	52.3	

Table 2 presents the number of tests made at each sampling location and the average amount of carbon monoxide, in parts per 10,000 parts of air, found at each sampling spot, the distance between building lines, height of neighboring buildings, the volume of traffic, wind velocity, temperature, and relative humidity. It is to be noted that attempts to find a relation between carbon-monoxide concentration and such factors as wind velocity and traffic volume proved fruitless, though the lowest concentration was found at the point of highest wind velocity, and another low result was obtained in the widest thoroughfare. Possibly a larger body of data might reveal more definite correlations; but, apparently, one or two poorly adjusted carburetors are likely to produce high contamination in spite of the benefits derived from a strong breeze and a clear day.

The average carbon-monoxide concentration at 30 open street locations in 14 cities was found to be 0.65 parts per 10,000. The minimum average amount at any location was 0.2 and the maximum was 1.7 parts per 10,000. A result as high as the maximum for street air was obtained in a vehicular tunnel ventilated by fans, the average amount of carbon monoxide here being 1.7 parts per 10,000. This condition is partly due to the fact that at one of the tunnel exits there is a traffic signal which delays some of the cars for a period as long as 30 seconds; this results in a long line of halted automobiles half the length of the tunnel. This condition could be considerably minimized by providing for freer exit from the tunnel or by controlling the idling of engines in the tunnel during the period when cars are not in motion. At another location we obtained a still higher concentration of carbon monoxide. Our analyses showed that in this location, which is an inclosed tunnellike taxicab stand at a railway station, there existed 2.9 parts of carbon monoxide per 10,000 parts of air. Taxicabs are usually not provided with self-starters, so that once the motors are started it is customary in some instances not to shut them off during the entire working day. This practice obviously increases the amount of carbon-monoxide gas in the air of such places as cab stands at our large railway terminals.

In one city samples were taken in a narrow residential street where cars are continually passing, and on one floor above the sidewalk in an apartment opening on this street, and in an office located on the fourth floor of a building overlooking the congested traffic area. The sample taken in the narrow street showed 0.2 parts per 10,000 of carbon monoxide and the sample taken in the room one story above showed 0.4 parts per 10,000. In the office room on the fourth floor of a building located in the business area of the city 0.3 parts per 10,000 of carbon monoxide was found.

Repair Shop Tests

In Table 3 is presented a summary of the tests made in 27 automobile repair shops in 14 cities. In all, 102 determinations were made in these shops. The average amount of carbon monoxide found was 2.1 parts per 10,000 parts of air. Additional data included such information as area of available openings in the room that might serve as a means of natural ventilation, area of ventilating space actually open at the time the tests were conducted, number of automobiles entering and leaving in a day, number of workers exposed, and the presence of artificial ventilation in the workroom.

The data presented in Table 3 show that the highest average amount of carbon-monoxide gas found in any repair shop was 11 parts per 10,000, while the minimum average was only 0.1 part per 10,000. The ratio of available openings to floor space averaged 0.07, and about 43

per cent of the available openings were in use at the time these tests were made. The average number of cars handled was 80 and the average number of persons exposed was 23. Practically all the shops visited depended on natural ventilation to remove the toxic gases produced by automobiles.

TABLE 3.—*Summary of carbon-monoxide tests made in automobile repair shops of 14 cities*

City	Repair shop	Number of tests made	Average CO in parts per 10,000 of air	Ratio of available openings to floor space	Ratio of actual openings to floor space	Number of automobiles handled per day	Number of workers exposed	Principal ventilation	Remarks
A	5	4	0.1	0.11	0.04	25	7	Natural	
	7	4	1.2	.08	.01	120	4	do	
B	9	4	.8	.05	.03	100	23	do	
	11	3	.1	.15	.11	12	5	do	
C	15	4	2.3	.07	.03	15	12	do	
	16	4	.6	.04	.03	40	30	Mechanical	Duct system of exhaust ventilation.
D	23	4	1.2	.04	.02	150	5	Natural	
E	28	4	3.3	.22	.03	50	15	do	Low-pressure exhaust fan.
	30	4	11.0	.10	.012	35	10	do	
F	40	5	4.1	.03	.02	115	330	do	
	41	4	1.8	.21	.00	15	8	do	Flexible pipes (leaking) attached to muffler outlets.
G	43	3	1.0	.04	.014	130	35	do	
	45	3	1.9	.05	.02	50	18	do	
H	52	4	2.7	.06	.02	35	37	do	
	55	4	.7	.07	.05	80	15	do	
I	58	4	.6	.01	.004	30	52	do	
	59	2	.7	.02	.006	40	30	do	Low-pressure exhaust fan.
J	63	4	.9	.03	.03	45	75	do	
	68	2	.2	.05	.04	7	46	do	
K	70	4	.6	.01	.009	100	50	do	
	71	6	2.6	-------	-------	600	200	Mechanical	Ducts exhausting only 100 cubic feet per minute, near the muffler outlets. Ozonator in use.
L	78	5	8.3	.04	.03	25	5	Natural	
	79	5	4.3	.07	.05	20	10	do	
M	86	3	1.0	.18	.13	35	15	do	
	87	4	.5	.01	.013	100	4	do	
N	91	3	.7	.04	.03	100	30	do	Flexible pipes attached to muffler outlets.
	92	2	2.4	.06	.05	90	50	do	
Totals	27	102	55.6	1.84	.80	2,144	617		
Average	2	3.8	2.1	.07	.03	80	23		

All attempts to obtain a correlation between the amount of carbon monoxide and the ventilation factors, such as area of openings, method of ventilation, and number of cars handled, failed to give any decisive results. We are convinced that the idling of a car at the time of sampling produces such a large amount of carbon monoxide as to destroy all the relationships which might be assumed to exist between ventilation and gas content of the garage or repair shop. In fact, from our observations during this study it is felt that no matter what type of ventilation is in use in a repair shop, the carbon-monoxide concentration will be excessive so long as motors are allowed to discharge their exhaust indoors for any considerable

length of time. It is a practice in most shops to test carburetors indoors, a practice that is obviously productive of much exhaust gas. It seems that this gas could be eliminated effectively by relatively simple means. One such simple system was found in use in a repair shop in one of the cities visited. Cars entering the shop were obliged to shut off the motor within 30 seconds after admission. Whenever any carburetor adjusting was to be done, a flexible hose was firmly attached to the exhaust pipe. This hose extended up to the ceiling and was connected to a pipe leading to a ventilator on the roof. With such an arrangement the hot gases pass out through the ventilator.

To test the efficiency of such a system, air samples were taken as follows: An automobile had been placed on the testing block for carburetor test, with its exhaust pipe attached to the flexible hose connection which led to the ventilator in the roof. Three samples taken at the breathing level of the observer immediately after the testing of the engine averaged 0.7 parts of CO in 10,000 parts of air. Five minutes after this test the same automobile engine was allowed to idle without the hose connection to the exhaust pipe, the gases coming out into the shop in a horizontal stream. Samples taken under these conditions averaged 2.0 parts of CO in 10,000 parts of air for periods of engine operation corresponding to those of the first test. This difference in CO content of 1.3 parts per 10,000 is an indication of the efficiency of the simple and inexpensive system of exhaust gas removal described above. It is often argued that such a system would not be practicable in shops where most of the gas comes from cars in motion. This fact may be true in commercial garages and storage places, but was not found to be so in repair shops. In nearly all instances an automobile once brought into the shop remains in one location until repairs have been completed. It is our belief that most of the gas is produced during carburetor testing when the car is not in motion, and at such a time the flexible pipe connection attached to the exhaust should serve to conduct all noxious gases outside the repair room.

In several cities, information was requested by repair-shop proprietors concerning the advisability of the use of an ozone apparatus for eliminating carbon-monoxide gas. Such an apparatus has been investigated by the Bureau of Industrial Hygiene of New York (8), and the conclusion reached by the investigators of that bureau is that ozone does not oxidize carbon-monoxide gas to any appreciable extent. The effects of the ozonator on carbon monoxide were first tested by the New York Bureau of Industrial Hygiene in a gas-tight chamber, and, later, further tests were made in service stations where all determinations showed carbon monoxide to the extent of 3 or 4 parts in 10,000. In an automobile plant visited by us an ozonator was in use in a portion of a large one-story building devoted to

the final assembling and testing of automobiles. As many as 10 machines were tested at one time. An attempt was made to remove some of the exhaust gases by means of local ducts placed within a few inches of the exhaust pipe of each machine and connected with a low-capacity exhaust fan. These ducts were rectangular, about one-third of a square foot in cross-sectional area and removed only about 100 cubic feet of air per minute. The design and location of the exhaust ducts were such as to allow most of the gas to escape into the air of the room. Six tests for carbon-monoxide gas made in the vicinity of the ozonator and test racks showed an average of 2.6 parts per 10,000 parts of air. Blood tests, using the Sayers-Yant pyrotannic acid method (9) were made on five men employed in this room. Three of the men had been working at the test racks for about three hours, and an analysis of their blood taken while at work showed 20, 25, and 20 per cent carbon-monoxide-hemoglobin saturation. A test on the blood of one man working 100 yards away from the test rack showed 15 per cent carbon-monoxide hemoglobin, and the blood of another person employed on final assembly work 50 feet away from the test rack showed 25 per cent carbon-monoxide hemoglobin. This amount of carbon-monoxide hemoglobin is associated with mild subjective symptoms. Possibly the only effect of the use of the ozonator is a psychological one.

Autobus Tests

In two cities, tests were made inside autobusses. Nearly all such conveyances are heated during cold weather by allowing the hot exhaust gases to pass through pipes located on the floor alongside the walls of the car. In case there are leaks in these pipes some exhaust gas will find its way into the bus. The several busses in which tests were made by us showed the presence of exhaust gas by their odor, which in an overheated bus is at times disagreeable. Practically all these busses depend on small openings in the roof or sides of the car for natural ventilation. In seven tests made in six different autobusses, the maximum amount found was 1.0 part of carbon monoxide per 10,000 parts of air, the minimum was 0.1 part, and the average of the seven tests was 0.5 part in 10,000. It was noted that some of the busses at the time these tests were made were overheated, a condition which does not promote comfort and which may increase the symptoms of mild carbon-monoxide poisoning.

Discussion of Results

In Table 4 the results of all our tests for carbon monoxide in streets, repair shops, and autobusses of 14 large cities are summarized in such a manner as to show the percentage distribution of samples according to the concentration of carbon monoxide found. It is apparent that

only 24 per cent of the street samples showed as much as 1 part of carbon monoxide per 10,000 parts of air, whereas 59 per cent of the repair shop samples fall into that group. Of the seven autobus samples only one contained as much as 1 part of carbon monoxide in 10,000 (1.0). Of the 34 street samples (24 per cent of the total street samples) which contained 1 part or more of carbon monoxide in 10,000, 32 (23 per cent of total) had less than 2 parts and 2 (about 1 per cent) contained 2 parts or more of carbon monoxide in 10,000 parts of air. These highest concentrations, however, were obtained in a taxicab station at a railway terminal, and present an unusual condition. It must be noted also, that our street samples tend to represent the worst conditions in streets as regards carbon-monoxide content, since they were obtained in nearly all instances at the most congested traffic centers and at the busiest hours of the day, when the volume of traffic was at its height. The samples were, it should also be noted, of the instantaneous type and taken, as a rule, when traffic was halted and engines were idling, a condition associated with the maximum production of exhaust gas. The autobus samples show a still more favorable result in that practically all of them contained less than 0.01 per cent of carbon monoxide.

On the other hand, the samples taken in the 27 repair shops of the 14 cities show a condition far from favorable. More than half of the samples (59 per cent) contained more than 1 part of carbon monoxide in 10,000, and 18 per cent were over 4 parts in 10,000, an amount considered as decidedly inimical to health. In fact, several determinations in repair shops showed 10 or more parts of carbon monoxide in 10,000. These high results were usually obtained in those repair shops of small floor space, low ceilings, and very small openings to the outdoor air.

TABLE 4.—*Distribution of carbon-monoxide samples obtained in city streets, repair shops, and autobusses*

Carbon monoxide in parts per 10,000	Street samples		Repair shop samples		Autobus samples	
	Number of samples	Per cent of samples	Number of samples	Per cent of samples	Number of samples	Per cent of samples
0.1–0.9	107	76	42	41	6	86
1.0–1.9	32	23	21	21	1	14
2.0–3.9	2	1	20	20	0	0
4.0+	0	0	19	18	0	0
Total	141	100	102	100	7	100

At the present time the accepted criterion concerning the safe limits of carbon-monoxide concentration in air is that advanced by Henderson and his colleagues (10) in 1921 as a result of their work on the physiological effects of automobile exhaust gas for the New York

and New Jersey State Bridge and Tunnel Commission. These workers stated that for the tunnel itself a standard allowing a maximum of 4 parts of carbon monoxide in 10,000 of air would be permissible provided the transit through the tunnel would take less than one hour. In summarizing their findings, Doctor Henderson and his collaborators formulated the following general rule: When the time is measured in hours and the concentration of carbon monoxide is expressed in parts per 10,000 parts of air, the physiologic effects may be defined by the equations:

Time × concentration = 3, no perceptible effect.
Time × concentration = 6, a just perceptible effect.
Time × concentration = 9, headache and nausea.
Time × concentration = 15, dangerous.

This work of Henderson's was subsequently confirmed by Sayers, Meriwether, and Yant in 1922 (11). These workers studied the effect of long exposure to low concentrations of carbon monoxide, the effect of strenuous exercise, and the effect of high temperature and humidity in low concentrations. Sayers and his colleagues showed that when a subject exercised strenuously for one hour in an atmosphere containing 2½ parts of carbon monoxide in 10,000 the immediate symptoms of carbon-monoxide poisoning were moderate and the after effects mild to moderate. None of the subjects showed any permanent effects after repeated exposures to carbon monoxide.

From the foregoing discussion of the amount of carbon monoxide that may be tolerated with impunity it is quite obvious that our findings concerning the conditions in the streets of large cities do not reveal a serious condition. Under ordinary circumstances a pedestrian would be exposed to the maximum condition only for a brief period, and even then the concentration of carbon-monoxide gas he would be forced to inhale would be rather low, our findings showing an average carbon-monoxide content of 0.8 part in 10,000 for 141 samples taken when the possible hazard was at a maximum. The same criterion applied to autobus samples shows that there ordinarily exists no hazard due to the contamination of the atmosphere inside such conveyances. It is conceivable, however, that the air of busses may be subject to an even greater range in carbon-monoxide content than that of streets or large garages, since a single badly leaking exhaust pipe discharging continuously into the interior of a bus could produce relatively high concentration. The only person who may be considered on the border-line in connection with outdoor poisoning from automobile exhaust gas is the traffic officer, who is obliged to remain at his post for about eight hours, during two hours of which period the exposure reaches a maximum. That there is a possibility of some grounds for the belief that traffic officers are affected is brought out by Wilson and others (4) who tested the blood of patrolmen after

an eight-hour day's work and found that the maximum carbon-monoxide-hemoglobin content was 30 per cent, a condition associated with mild subjective symptoms. It would be interesting to make a further study into the physiological effects experienced by traffic officers at congested intersections, and, in case the findings warranted action, the time of duty at points of continual congestion might be diminished in order to minimize the hazard.

Applying the same standards to repair shops it is apparent that a real hazard exists in such establishments, as revealed by the results of 102 samples obtained in our study. Only 41 per cent of these samples showed a carbon-monoxide content less than 1 part in 10,000. Workers of the United States Bureau of Mines (13) recently reported carbon-monoxide tests made with a recording instrument in two garages. This carbon-monoxide recorder showed that the average concentration in any one day in one garage never exceeded 1 part per 10,000 and the maximum average in another garage for one day reached 1.6 parts per 10,000. However, at times the carbon-monoxide content in these garages exceeded 8.9 parts per 10,000, and the maximum average for any one hour was found to be 4.3 parts per 10,000. Had these tests been made during cold weather, no doubt the carbon monoxide would have reached higher concentrations. Similar conditions were found by the workers of the Bureau of Industrial Hygiene of New York in some of their tests in garages and repair shops (2), (12). Although the average conditions found by these workers did not show as high an amount of carbon monoxide in the atmosphere of the repair shops visited by them as that obtained in the present investigation, yet as a result of their research the investigators of the New York Bureau of Industrial Hygiene concluded that the only safe method is ventilation, and that the carbon monoxide should not exceed 0.5 part in 10,000 volumes of air. In connection with regulations governing ventilation of public garages the municipal code (section 2196) of the city of Chicago requires that the carbon-monoxide content should not exceed 2 parts per 10,000 parts of air.

The average of 102 determinations of the carbon monoxide in the atmosphere of 27 repair shops investigated in the present survey showed 2.1 parts of this gas in 10,000 volumes of air. The possibility of such an amount of carbon monoxide being inhaled by an active worker over a period of eight hours reveals a serious condition in automobile repair shops. Our experience has been that even with a well-designed system of ventilation in use the atmosphere of a repair shop will show as much as 0.6 part of carbon monoxide in 10,000 parts of air. It is our belief that no automobile motor should be permitted to run longer than 30 seconds in any inclosed garage except when being driven in or out of the garage. Testing of car-

buretors and any other operation of an engine indoors should be done only when some means has been taken to remove the exhaust gas directly to the outer atmosphere, possibly by means of a flexible hose connection to the exhaust pipe, as described earlier in this paper.

Summary

This survey was undertaken to ascertain whether or not a health hazard from carbon monoxide existed in the streets of our large cities, inside of autobusses, and in repair shops. Fourteen of the largest cities in the country were visited, having a combined population of over 19,000,000, and 250 samples of air were obtained for carbon-monoxide analysis. These samples were analyzed by the iodine-pentoxide method, using a liquid-air cooling tube which was shown to be necessary in order to eliminate gasoline vapor, a substance which tends to vitiate the results of the analysis. Our street samples were taken in such a manner as to approach the most congested conditions that may exist at a busy traffic intersection. Hence, it is felt that these results indicate the maximum hazard from automobile exhaust gas that may exist to-day in our metropolitan thoroughfares. The average of 141 tests made in city streets at peak hours of traffic showed a contamination of 0.8 part of carbon monoxide per 10,000 parts of air. Only 24 per cent of all the street samples had more than 1 part of carbon monoxide in 10,000 of air, and in only one location, a covered passageway, was there as much as 2 parts per 10,000. Samples taken inside of autobusses yielded even lower concentrations of carbon-monoxide gas. The figures for street air, when viewed in the light of present day standards of exposure to carbon monoxide, do not reveal the existence of a health hazard from this source in our city streets. The only individual who may possibly be exposed to a health hazard from inhaling street air containing automobile exhaust gas is the traffic officer. This potential hazard may be minimized by diminishing the duration of exposure at the most congested traffic stations.

Of the 102 tests made in 27 garages in the 14 cities visited, the average carbon-monoxide content was found to be 2.1 parts in 10,000. More than half of the samples (59 per cent) contained over 1 part of carbon monoxide, and 18 per cent of all the samples contained over 4 parts of this gas in 10,000 parts of air. These results for repair shops show a dangerous condition that demands the serious consideration of those concerned. This hazard in repair shops may be reduced to a minimum by not allowing the motors of automobiles to run longer than 30 seconds unless the car is in necessary motion or the exhaust is connected to the outside air by a direct air-tight outlet

of ample caliber. Without such outlet no automobile engine should be allowed to run indoors, except to reach its berth or to leave by the shortest route. All of these samples were taken in garages of considerable size. The great danger to life is unquestionably in the small private garage containing one or two cars. Under any circumstances the discharge of an automobile exhaust into a roofed inclosure should be regarded as a hazardous act.

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COURT DECISIONS RELATING TO PUBLIC HEALTH

Nuisance from overflow of town septic tank enjoined.—(Oklahoma Supreme Court; Town of Jennings *v.* Pappenfuss, 263 P. 456; decided January 24, 1928.) An action was brought to enjoin a town from maintaining a nuisance and to compel it to abate the same. The plaintiff alleged that the overflow upon her land from a septic tank of the town sewer constituted a nuisance, the odor and stench being of such extent that it was practically impossible to live upon her farm. The trial court found that the town had been maintaining a nuisance by permitting the overflow from the septic tank to flow into a ditch and over and upon the plaintiff's land, and adjudged that a permanent injunction be granted the plaintiff, enjoining the defendant from maintaining the nuisance, and that defendant proceed at once to abate the nuisance. On appeal the judgment of the lower court was affirmed by the supreme court.

Revocation of license for manufacture and bottling of soft drinks upheld.—(Maine Supreme Judicial Court; Appeal of Bornstein, 140 A. 194; decided January 26, 1928.) Chapter 155, Laws of 1925, provided for the licensing, by the commissioner of agriculture, of any person, firm, or corporation manufacturing or bottling for sale at wholesale any drink product or other nonalcoholic beverage within the State, and also empowered the commissioner to revoke or suspend any license whenever any provisions of the act had been violated. The act also provided that "Whenever artificial colors or flavors are used in the manufacture of drink products or other nonalcoholic beverages, the bottle or other container shall be distinctly labeled or crowned 'Artificially colored and flavored.' " The appellant had been licensed under the act and, after notice and hearing, the commissioner revoked such license on the ground that the appellant had bottled a beverage, containing artificial color, in bottles or containers not labeled or crowned "Artificially colored and flavored." On appeal before the supreme court it was urged that there was a violation of the appellant's constitutional guaranties in that he was deprived of a property right without due process of law, but the court in upholding the revocation said:

> The constitutional questions argued are not open to the appellant in this proceeding. The single issue here is revocation of the license granted by the commissioner. In accepting the license and acting under it, the appellant consented to all conditions imposed thereby. He took it subject to such conditions as the legislature had seen fit to impose. Such license is in no sense a contract or property, immunity, or privilege. State *v.* Cote, 122 Me. 450, 120 A. 538; Burgess *v.* Brockton, 235 Mass., 95, 126 N. E. 456; Com. *v.* Kinsley, 133 Mass. 578; 17 R. C. L. 554. The requirements of the act as to labeling or crowning bottles and containers must be read into the license as a condition to which the appellant consented. State *v.* Cote, supra. If the validity of the act in its branding requirements is to be tested, it must be in another and different proceeding.

PUBLIC HEALTH ENGINEERING ABSTRACTS

Garbage Disposal at Highlands, N. J. Anon. *The American City*, vol. 38, No. 1, January, 1928, pp. 147–148. (Abstract by C. R. Cox.)

The population of Highlands varies from 2,000 in winter to about 10,000 in summer. A United States standard incinerator was installed in June, 1927, with a guaranteed capacity per 24 hours of 24 tons of refuse consisting of 65 per cent garbage, with moisture content less than 70 per cent, and 35 per cent rubbish without added fuel. Tests indicated the capacity to be 72 tons per 24 hours and that the temperature in the combustion chamber was 2,000° F. Three charging openings are used, one for rubbish onto the firing hearth, one for wet garbage onto the drying grates, and one for the carcasses of animals, which are placed in the bottom of the combustion chamber. Collections from August 1 to September 10 amounted to 503 tons of refuse, which was incinerated at the following costs: Labor, $318.35; wood, $30; coal, $42; electric power, $14, or a total of $404.35, or $0.803 per ton. The cost of collection was as follows: Labor, $891, and gas and oil, $86.40, or an average of $1.90 per ton. About $270 was saved during the 36-day period over former cost of disposal on a sanitary dump where lime and earth cover was used to prevent odors.

A New Diluent for Paris Green. P. A. Dalal and E. E. Madon. *Indian Medical Gazette*, vol. 62, No. 10, October, 1927, pp. 554–555. (Abstract by W. A. Hardenberg.)

One of the problems in anopheline control in Bombay has been "sprinkler tanks," which are elevated tanks provided for automatic gravity fire service. These tanks mostly contain clean water, are generally 30 to 60 feet in width and length and 6 feet deep, and even when covered are not mosquito-proof. There are also other cisterns, usually containing clean water, which are used for a variety of purposes. Pyrethrum-base powders were not effective. No satisfactory diluent for Paris green was available. Cork powder is effective but too expensive; sawdust sinks after a short time; fine road dust sinks too quickly and does not withstand agitation or wind action; flue dust from boiler flues was quite satisfactory; but French chalk, which is finely powdered magnesium silicate, proved best. This is readily obtainable in India in smooth hard pieces, which can be ground in a mortar. To treat a tank 32 by 16 by 6 feet deep, 40 grains of Paris green and 8 ounces of French chalk were used. Though a strong wind was blowing, a satisfactory film was maintained and the treatment proved effective. This mixture is considered ideal for use on small cisterns.

Malaria and Malaria Control in Turkey (Malaria und Malariabekampfung in der Tuerkei). E. Martini. Leaflet of 2 pages, Hamburg, Germany. (Abstract by A. L. Dopmeyer.)

Malaria is a disease of very great importance in Turkey. Although there is very little malaria in Constantinople, there is a great deal of it in the district of Anatolia. All sections, however, are said to suffer heavily from the disease, and in the warm lowlands of the west and south the severe forms of the disease are found.

The climate of the country is variable. The elevated plateaus are dry, cold in winter and very warm in summer. The northern part has a damp, cold climate and the south has extremely warm summers and mild winters. In contrast to the usual three species of *Anopheles* mosquitoes found in Europe north of the Alps, there are eight distinct species here. In the mountainous sections the *Anopheles superpictus* is abundant, and in other sections where water is plentiful, the streams serve as breeding places for *Anopheles elutus* and *maculipennis*.

In 1925 the new government took an active interest in malaria control and formed so-called malaria missions consisting of a chief medical officer and subordi-

nate medical and other personnel. Malaria stations were established for the treatment of cases in order to check the spread of infection. The first mission was started in Angora and later ones were established at other points; and it is significant to note that, according to statistics compiled, the malaria reduction depends in large degree on the length of time the mission has been operating.

The success of the work at Angora is evidenced by the fact that a few years ago it was thought that it might be necessary to move the capital from that city on account of malaria, whereas the disease in that city to-day is practically non-existent.

The total cost of malaria control work in Angora for 1926, with a population of 30,000, was $35,700 or $1.19 per capita.

Report of an Investigation of a Malaria Epidemic in Solo, 1926. S. L. Brug and Dr. E. W. Walch. *Mededeelingen Dienst d. Volksgezondheid in Nederlandsch-Indie*, Foreign Edition, 1927. Part 3, pp. 531–579. (Abstract by H. R. Crohurst.)

This article contains a description of conditions in Solo, the third largest town of the Netherland Indies, during the malarial epidemic of 1926. There are presented data covering the hydrographic conditions of the town, history of malaria at Solo, area involved, and the center of the 1926 epidemic, progress of the epidemic, the examination of *Anopheles*, the distribution of quinine, the probable cause of the epidemic, and future control measures.

On the evidence of indirect data it was supposed that the vectors of the epidemic came chiefly from the bed of a storm-water canal, which in the dry season shows numerous isolated pools. Owing to the rains setting in so late in 1925 this canal had not been flushed during an abnormally long time. With this opinion corresponded the fact that the heaviest affected native villages lay precisely where the bed of the canal showed the greatest number of pools.

The direct proof regarding the storm-water canal could not be given, as it was only once dry during a sufficient number of days during the investigation to be examined for the presence of larvæ. At that time it contained almost exclusively larvæ of *M. vaga*, which does not exclude the fact that before this time other species may have bred there.

Only one *Anopheles* was found infected, namely, an *M. rossi*. The larvæ of this species were found only in the northern part of the town, but there, in small numbers, and in breeding places of a very different nature. Other potential carriers found during the investigation were somewhat larger numbers of *M. aconita* and *N. fuliginosus*.

The Government distributed without charge, during the epidemic, 420,000 tabloids of 0.2 gram of bisulphate of quinine. Prophylaxis was applied especially in the schools.

It is recommended that the condition of the storm-water canal be observed in the future, as it is believed that the river Pepe carries too little water in the dry season to effect a proper flushing of the canal precisely at the time that it is most necessary.

Report of Some Experiments on the Efficiency as Insecticides of "Flit," "Rids," and Some Other Preparations Made at the Medical Laboratory at Weltevreden. S. L. Brug and Dr. J. Van Slooten. *Mededeelingen Dienst d. Volksgezondheid in Nederlandsch-Indie*, Foreign Edition, 1927. Part 3, pp. 524–530. (Abstract by H. R. Crohurst.)

The authors describe the effects on mosquitoes, flies, cockroaches, and bedbugs, by spraying with various insecticides, "flit," commercial "rids," and "rids" prepared in the laboratory with kerosene, carbon tetrachloride, methyl salicylate, and various mixtures of each.

The authors conclude: "Flit kills such insects as flies and mosquitoes very readily. With commercial 'Rids,' and with 'Rids' prepared in the medical

laboratory nearly the same results were obtained. Pure kerosene is certainly considered somewhat inferior to these. There is no objection to omitting the methyl salicylate from the 'Rids' formula, the addition of a quantity of carbon tetrachloride of 2 parts to 100 parts of kerosene being sufficient to guarantee a good effect. One gets thereby a simpler and cheaper preparation with the same effects. On account of its irritating effects on the skin, conjuctiva, and nasal mucosa, and on account of producing stains, 'Flit' is less recommendable. Unless one can spray the insects repeatedly, the effect on cockroaches is doubtful. Since the penetrating power of an insecticide fluid applied by means of a spray is not sufficient to reach bedbugs in all their hiding places, all these preparations are of little importance in the destruction of such vermin."

Italy's Campaign Against Malaria. Arturo Castiglioni. *British Medical Journal*, No. 3475, August 13, 1927, pp. 278–289. (Abstract by R. E. Tarbett.)

From ancient times malaria has been a grave problem in the area now comprising the Kingdom of Italy. Archaeologists have shown that the Etruscans attempted to drain the swamps and marsh land and later the Romans actually eradicated these areas in the Campagna Romana. After the fall of the Roman Empire this area again became malarious.

Grassi, Celli, Marchiafara, and Bignami collaborated with Ross in the study of the malaria parasite and mode of transmission of malaria. They also inaugurated the legislation on the supply of quinine to the malarious regions. Quinine is prepared by the State laboratories and sold to certain public retailers. All profits are placed in a special fund for carrying on malaria control work. Malaria is classified as an occupational disease and carries the right to indemnity.

The usual methods employed in malaria control are carried on. The author places considerable stress on the raising of cattle in the malarious regions and the development of nonhuman-stinging *Anopheles*.

From 1887–1902 there was an average of 15,000 deaths per annum; 1903–5, 8,000 deaths per annum; and a decline to 2,000 in 1914. An increase reaching 11,487 in 1918 occurred during the war period. Since that time a rapid decrease has occurred, the deaths in 1923 being 3,000.

The Water Supply Project of the Mahoning Valley Sanitary District. W. H. Dittoe. *Journal American Water Works Association*, vol. 18, No. 6, December, 1927, pp. 655–663. (Abstract by M. F. Trice.)

"The purpose of this paper is to explain briefly the conditions leading to the establishment of the sanitary district, the provisions of the sanitary district act controlling the procedures followed, and the general features of the recommended plan." The Mahoning River, draining an area of approximately 1,000 square miles, is grossly polluted by sewage and industrial wastes, and yet serves as a source of public water supply for Warren, Niles, and Youngstown, the three principal cities of the valley, each of which operates a filtration plant. In spite of resourceful control these plants deliver to consumers a highly unsatisfactory water. Upon action by the city councils of Niles and Youngstown, and application to the court of common pleas of Mahoning County, which, after due hearing of the court on February 2, 1926, "ordered the formation of a district for the purpose of providing a satisfactory public water supply for the two municipalities."

Provisions of law.—The sanitary district act of Ohio permits two or more political subdivisions to organize for the following purposes: (*a*) Improved water supply, and (*b*) improved sewage disposal. This district was organized solely for improving the water supply, and therefore sewage disposal is not discussed. The court appoints a board of directors which supervises the work. The Ohio law requires the board to prepare plans for the improvements. The board allows hear-

ings relative to the plans, estimates costs, assesses the political units benefited proportionately, issues bonds for the execution of the plan, is empowered to proceed with construction either directly or by contract, and after completion of the project supervises maintenance and operation.

The plan for the district water supply.—The essential features of the plan include (1) the Meander Creek Reservoir, formed by the construction of the Mineral Ridge Dam; (2) purification and pumping works located immediately below dam; (3) pipe lines for delivery of the purified supply to the two cities; (4) a covered distributing reservoir in Youngstown and a steel standpipe in Niles, for reserve storage of water on the distributing systems.

The cost of execution of this plan is estimated at $9,150,000, made up of the following principal elements:

Dam and reservoir	$3, 781, 960
Purification and pumping works	2, 310, 030
Pipe lines and distributing reservoir for Youngstown	2, 661, 600
Pipe lines and standpipe for Niles	396, 410

The principal features of the above elements are discussed broadly, as, for instance, the dimensions and size of the dam, capacity and yield of the reservoir and the opportunity for future increase of the supply, the highway changes and resulting bridge construction involved, the design and provisions of the purification plant (number of units, their dimensions and capacity), pumping equipment (steam-turbine-driven), delivery mains from purification plant to above cities, and the improvements to be made at these municipalities. Advantages of district procedure are also discussed.

Recent Advances in Controlling Chloro-Tastes and Algæ Development. L. H. Enslow. *Journal American Water Works Association*, vol. 18, No. 5, November, 1927, pp. 621–640. (Abstract by C. R. Cox.)

This paper reviews the experiences of various plants on this continent where taste problems, due to the chlorination of water, existed. Superchlorination at one plant in Dallas, Tex., followed by subsequent chlorination of the filtered effluent, was effective in destroying tastes due to vegetable matter and algæ in the raw lake water when the dose was sufficient to produce a residual of 0.3 p. p. m. or more. Experience at the Turtle Creek plant at Dallas, where iron sulphate and lime are employed to coagulate and soften the supply, indicated that the filtered water delivered to the consumer had a noticeable chlorine taste, although that in the open clear-water basin did not. It was found that these tastes were due to formation of stable hypochlorites by the reaction of chlorine and the alkaline salts in the water. This action was prevented by lowering the pH value of the filtered water prior to chlorination. The destruction of chloro-phenol tastes by the practice of superchlorination and dechlorination at Toronto, Canada, is reviewed. Importance of having sufficient reaction time between the application of the chlorine dose and the addition of the dechlorinating agent was emphasized. The prevention of formation of chlorophenol tastes by the addition of ammonia before chlorine is then reviewed and special mention is made of satisfactory results secured at Greeneville, Tenn. where 0.25 p. p. m. ammonia were added to the raw water previous to the addition of chlorine to the water passing through the mixing basin. The cost of this treatment was about 60 cents per million gallons of water treatment. Ammonia solutions are made by the addition of 6.25 pounds of ammonia gas to 100 gallons of water, which solution was fed through an ordinary orifice box. It is significant to note that ammonia prevents the formation of chloro-phenol tastes, but does not destroy such tastes once they are formed, so that the ammonia has to be added prior to the chlorine. The suppression of algal growth in outdoor swimming pools and coagulation basins in the South by the use of chlorine is

briefly reviewed. The discussion of this paper reviewed the method of treating phenolic waste at a coke plant in Troy, N. Y., and in the destruction of chlorophenol tastes at a filtration plant in Rochester, N. Y., by the use of permanganate of potash. The doses of permanganate varied from 1.0 to 1.6 pounds per million gallons of water treated. It was also pointed out in the discussion that organic growths on sand grains can be effectively prevented by moderate doses of chlorine applied to the raw water or to the wash water. The advantages of prechlorination in the treatment of grossly polluted waters were emphasized.

Small Iron Removal Plant for Red Bank Water Works. Wellington Donaldson. *Engineering News-Record*, vol. 100, No. 3, January 19, 1928, pp. 112–114. (Abstract by W. M. Olson.)

This article gives the history, design considerations, and operating data concerning the new 1.5 m. g. d. plant for treating the ground water supply of Red Bank, N. J. Three photographs and an excellent cross section make clear the essential features of the plant designed to eliminate objectionable staining properties of the raw water. Raw water is pumped to a simple cascade-type aerator, flows downward through three pressure filters, and thence up to the wash-water tank, from which it spills over a weir into the distributing reservoir. Standard horizontal pressure filters were adopted in order to have the plant operate as nearly automatically as possible. Results of tests are included to show the superiority of sand to coarse contact filters.

Excessive algal growths developing in the reservoir after the installation of the new plant were combated successfully by chlorinating the effluent. The operation of the plant requires the attention of one man for less than an hour each day. The treatment works, costing $52,881, are a good example of careful design to fit local conditions.

DEATHS DURING WEEK ENDED MARCH 17, 1928

Summary of information received by telegraph from industrial insurance companies for the week ended March 17, 1928, and corresponding week of 1927. (From the Weekly Health Index, March 21, 1928, issued by the Bureau of the Census, Department of Commerce)

	Week ended Mar. 17, 1928	Corresponding week, 1927
Policies in force	70, 602, 861	67, 030, 693
Number of death claims	14, 679	13, 711
Death claims per 1,000 policies in force, annual rate	10. 9	10. 7

Deaths from all causes in certain large cities of the United States during the week ended March 17, 1928, infant mortality, annual death rate, and comparison with corresponding week of 1927. (From the Weekly Health Index, March 21, 1928, issued by the Bureau of the Census, Department of Commerce)

City	Week ended Mar. 17, 1928		Annual death rate per 1,000 corresponding week 1927	Deaths under 1 year		Infant mortality rate, week ended Mar. 17, 1928 [3]
	Total deaths	Death rate [1]		Week ended Mar. 17, 1928	Corresponding week 1927	
Total (66 cities)	8, 482	14. 9	14. 1	881	935	[3] 74
Akron	67			13	4	141
Albany [4]	42	18. 2	18. 3	6	5	123
Atlanta	83	17. 1	20. 9	7	12	
White	45		15. 8	2	6	
Colored	38	(5)	33. 2	5	6	

Footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended March 17, 1928, infant mortality, annual death rate, and comparison with corresponding week of 1927—Continued

City	Week ended Mar. 17, 1928		Annual death rate per 1,000 corresponding week 1927	Deaths under 1 year		Infant mortality rate, week ended Mar. 17, 1928 [2]
	Total deaths	Death rate [1]		Week ended Mar. 17, 1928	Corresponding week 1927	
Baltimore [4]	276	17.4	19.2	37	31	117
White	209		16.4	26	21	104
Colored	67	(3)	35.5	11	10	172
Birmingham	62	14.6	17.5	8	9	68
White	21		8.2	5	3	69
Colored	41	(3)	32.0	3	6	68
Boston	271	17.7	17.2	29	33	80
Bridgeport	46			5	2	92
Buffalo	159	15.0	17.9	24	29	163
Cambridge	35	14.5	14.3	2	3	36
Camden	42	16.2	17.2	8	6	128
Canton	19	8.5	14.7	2	11	45
Chicago [4]	880	14.6	12.3	66	75	57
Cincinnati	158	20.0	17.0	13	10	70
Cleveland	211	10.9	10.2	23	23	62
Columbus	68	12.0	12.9	3	5	28
Dallas	56	13.5	9.9	5	1	
White	42		8.2	3	1	
Colored	14	(3)	20.9	2	0	
Dayton	34	9.6	13.6	3	3	50
Denver	83	14.8	15.5	6	8	
Des Moines	33	11.4	12.6	0	2	0
Detroit	355	13.5	13.1	62	58	96
Duluth	25	11.2	11.8	1	3	23
El Paso	54	24.0	15.2	11	4	
Erie	31			4	4	82
Fall River [4]	20	7.8	15.7	3	6	51
Flint	28	9.8	12.1	8	7	102
Fort Worth	40	12.4	12.7	2	2	
White	36		11.9	1	2	
Colored	4	(3)	18.6	1	0	
Grand Rapids	33	10.5	6.4	0	1	0
Houston	63			3	5	
White	49			2	5	
Colored	14	(3)		1	0	
Indianapolis	112	15.3	14.2	8	7	61
White	93		13.9	8	6	70
Colored	19	(3)	16.3	0	1	0
Jersey City	91	14.7	13.1	12	7	90
Kansas City, Kans	31	13.7	15.1	5	5	106
White	22		11.9	4	4	99
Colored	9	(3)	29.5	1	1	145
Knoxville	32	15.9	8.7	3	3	65
White	23		6.4	2	3	48
Colored	9	(3)	25.6	1	0	213
Los Angeles	269			21	18	60
Lowell	23	10.9	12.3	3	4	63
Lynn	29	9.9	13.9	5	1	126
Memphis	62	17.0	25.6	6	6	70
White	32		21.2	2	3	37
Colored	30	(3)	33.7	4	3	125
Milwaukee	121	11.6	12.2	11	13	49
Minneapolis	101	11.6	10.4	5	7	30
Nashville	53	20.0	10.6	9	2	142
White	37		7.9	6	1	128
Colored	16	(3)	17.4	3	1	180
New Bedford	30	13.1	12.2	2	1	43
New Haven	61	17.0	10.2	3	5	42
New Orleans	168	20.5	23.1	11	16	53
White	102		19.9	7	11	51
Colored	66	(3)	32.1	4	5	58
New York	1,723	15.0	14.2	206	258	83
Bronx Borough	189	10.4	10.5	18	23	54
Brooklyn Borough	594	13.5	12.3	78	104	78
Manhattan Borough	731	21.8	19.7	92	107	109
Queens Borough	150	9.2	10.6	15	16	60
Richmond Borough	59	20.5	18.1	3	8	54
Newark, N. J	146	16.1	13.0	17	13	88
Oakland	60	11.4	10.9	6	4	65
Oklahoma City	26			3	0	

Footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended March 17, 1928, infant mortality, annual death rate, and comparison with corresponding week of 1927—Continued

City	Week ended Mar. 17, 1928		Annual death rate per 1,000 corresponding week 1927	Deaths under 1 year		Infant mortality rate, week ended Mar. 17, 1928 [2]
	Total deaths	Death rate [1]		Week ended Mar. 17, 1928	Corresponding week 1927	
Omaha	61	14.3	12.1	1	4	12
Paterson	45	16.2	15.6	4	6	69
Philadelphia	627	15.9	16.9	73	58	98
Pittsburgh	188	14.6	14.4	21	23	69
Portland, Oreg	67			3	2	32
Providence	82	15.0	13.0	6	9	52
Richmond	62	16.7	16.6	7	8	91
White	35		16.1	4	3	81
Colored	27	(5)	17.8	3	5	110
Rochester	94	15.0	12.9	5	6	41
St. Louis	308	19.0	14.4	20	16	67
St. Paul	69	14.3	13.8	2	7	19
Salt Lake City [4]	32	12.1	16.9	3	5	49
San Antonio	107	25.7	13.8	20	7	
San Diego	46	20.1	14.9	3	2	57
San Francisco	137	12.2	12.0	10	9	63
Schenectady	18	10.1	13.4	2	0	63
Seattle	96	13.1	11.0	5	5	51
Somerville	33	16.8	12.8	5	3	173
Spokane	44	21.1	8.6	4	3	103
Springfield, Mass	35	12.2	12.0	4	5	63
Syracuse	50	13.1	9.5	6	2	73
Toledo	85	14.2	13.0	9	14	86
Trenton	38	14.3	12.6	3	4	51
Washington, D. C	174	16.5	16.1	13	15	74
White	110		13.4	4	10	33
Colored	64	(6)	24.1	9	5	166
Waterbury	19			1	5	29
Wilmington, Del	35	14.2	11.6	2	8	53
Worcester	57	15.1	14.1	3	4	36
Yonkers	27	11.6	12.7	3	3	68
Youngstown	31	9.3	11.7	6	10	80

[1] Annual rate per 1,000 population.
[2] Deaths under 1 year per 1,000 births. Cities left blank are not in the registration area for births.
[3] Data for 66 cities.
[4] Deaths for week ended Friday, Mar. 16, 1928.
[5] In the cities for which deaths are shown by color, the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

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 March 26, 1927, and March 24, 1928

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended March 26, 1927, and March 24, 1928

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Mar. 26, 1927	Week ended Mar. 24, 1928	Week ended Mar. 26, 1927	Week ended Mar. 24, 1928	Week ended Mar. 26, 1927	Week ended Mar. 24, 1928	Week ended Mar. 26, 1927	Week ended Mar. 24, 1928
New England States:								
Maine		5	34	7	131	33	0	0
New Hampshire		2				16		0
Vermont	1				17	98	0	0
Massachusetts	89	86	11	11	241	1,869	2	2
Rhode Island	11	7				91	0	0
Connecticut	20	23	21	7	115	301	0	1
Middle Atlantic States:								
New York	387	390	[1] 94	[1] 57	767	2,548	7	33
New Jersey	109	149	20	41	68	1,307	1	3
Pennsylvania	181	197			691	1,345	1	4
East North Central States:								
Ohio		68		22		1,071		5
Indiana	25	25	39	65	282	280	0	0
Illinois	114	192	31	251	2,399	232	6	17
Michigan	114	51			305	1,536	0	3
Wisconsin	38	23	123	78	735	106	6	6
West North Central States:								
Minnesota	25	27	1	5	285	82	8	2
Iowa [2]	22	11			602	36	2	2
Missouri	50	52	21	169	201	339	2	9
North Dakota	8	3			189		0	3
South Dakota	4		7		216		0	
Nebraska	4	6	3	90	323	69	0	0
Kansas	9	8	2	50	1,114	87	0	1
South Atlantic States:								
Delaware		1			22	21	1	0
Maryland [2]	40	22	151	50	46	1,163	0	0
District of Columbia	25	21	5	11	9	182	1	1
Virginia								
West Virginia	10	23	81	50	197	120	0	2
North Carolina	29	111			564	3,290	0	0
South Carolina	19	21	1,893	859	76	950	0	0
Georgia	21	12	504	154	86	105	0	0
Florida	41	10	13	1	157	70	1	0
East South Central States:								
Kentucky				16		240		0
Tennessee	11	3	196	211	131	281	4	0
Alabama	25	31	170	254	238	586	1	3
Mississippi	6	15						1

[1] New York City only.

[2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended March 26, 1927, and March 24, 1928—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Mar. 26, 1927	Week ended Mar. 24, 1928	Week ended Mar. 26, 1927	Week ended Mar. 24, 1928	Week ended Mar. 26, 1927	Week ended Mar. 24, 1928	Week ended Mar. 26, 1927	Week ended Mar. 24, 1928
West South Central States:								
Arkansas	3	2	102	377	104	506	0	3
Louisiana	27	11	11	157	140	374	1	1
Oklahoma [1]	16	17	134	489	179	287	2	3
Texas	53	42	25	52	211	491	0	6
Mountain States:								
Montana	2	2	1		53	1	4	5
Idaho	3				29		0	1
Wyoming					50	45	0	2
Colorado	5	26	1	4	349	25	0	14
New Mexico	23	6		9	76	142	1	0
Arizona		8	6		31	27	0	5
Utah [2]	4	4	8	7	172	11	0	7
Pacific States:								
Washington	25	7	12		392	278	4	2
Oregon	16	8	97	49	180	125	1	7
California	128	102	74	32	3,490	234	4	4

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Mar. 26, 1927	Week ended Mar. 24, 1928	Week ended Mar. 26, 1927	Week ended Mar. 24, 1928	Week ended Mar. 26, 1927	Week ended Mar. 24, 1928	Week ended Mar. 26, 1927	Week ended Mar. 24, 1928
New England States:								
Maine	0	0	53	26	0	0	2	0
New Hampshire		0		9		0		0
Vermont	0	0	8	17	0	0	0	0
Massachusetts	0	1	540	317	0	0	14	2
Rhode Island	0	0	20	46	0	0	0	0
Connecticut	0	0	136	55	0	0	1	1
Middle Atlantic States:								
New York	0	9	1,215	943	13	5	22	16
New Jersey	0	1	401	317	0	1	3	6
Pennsylvania	1	3	589	603	0	0	15	12
East North Central States:								
Ohio		2		232		57		4
Indiana	0	0	226	150	152	238	0	1
Illinois	2	2	381	345	51	88	10	13
Michigan	0	1	367	277	44	36	6	4
Wisconsin	1	2	188	209	7	12	2	1
West North Central States:								
Minnesota	0	0	256	145	1	0	4	3
Iowa [2]	0	0	49	79	30	33	20	0
Missouri	0	2	148	105	247	71	1	1
North Dakota	1	0	44	79	1	0	0	2
South Dakota	0		73		21		0	
Nebraska	0	0	72	100	32	53	0	0
Kansas	1	1	149	196	32	84	1	0
South Atlantic States:								
Delaware	0	0	31	3	0	0	0	0
Maryland [2]	0	0	66	72	0	0	7	5
District of Columbia	0	1	26	44	0	2	1	1
Virginia					1			
West Virginia	0	1		54	25	67	10	3
North Carolina	0	0	27	23	88	121	4	3
South Carolina	0	0	2	4	16	7	7	2
Georgia	0	0	13	27	111	0	8	3
Florida	0	0	8	6	53	2	10	7
East South Central States:								
Kentucky		3		34		19		3
Tennessee	1	0	21	17	16	20	15	5
Alabama	1	1	13	19	51	10	23	13
Mississippi	0	0	7	16	5	3	5	3

[1] Exclusive of Tulsa.

[2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended March 26, 1927, and March 24, 1928—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Mar. 26, 1927	Week ended Mar. 24, 1928	Week ended Mar. 26, 1927	Week ended Mar. 24, 1928	Week ended Mar. 26, 1927	Week ended Mar. 24, 1928	Week ended Mar. 26, 1927	Week ended Mar. 24, 1928
West South Central States:								
Arkansas	0	0	22	26	9	11	5	4
Louisiana	0	0	5	15	5	34	11	4
Oklahoma [3]	0	1	62	68	38	245	14	3
Texas	0	0	26	144	29	48	22	4
Mountain States:								
Montana	0	0	54	6	7	16	0	0
Idaho	0	0	14	10	8	1	0	0
Wyoming	0	0	19	14	3	3	0	0
Colorado	0	0	193	81	8	2	0	0
New Mexico	0	0	14	31	1	1	0	1
Arizona	0	0	9	5	0	20	1	0
Utah [2]	0	0	36	6	3	14	0	0
Pacific States:								
Washington	0	0	92	37	64	49	2	2
Oregon	0	1	43	17	0	77	1	1
California	2	2	231	153	15	29	8	5

[2] Week ended Friday. [3] Exclusive of Tulsa.

Report for Week Ended March 17, 1928

DISTRICT OF COLUMBIA

	Cases
Diphtheria	25
Measles	198
Scarlet fever	45
Smallpox	9

Report for Week Ended March 10, 1928

MONTANA

	Cases
Diphtheria	14
Measles	2
Meningococcus meningitis	5
Scarlet fever	40
Smallpox	22

SUMMARY OF MONTHLY REPORTS FROM STATES

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

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
January, 1928										
Hawaii Territory	6	63	15	----	7	----	0	2	0	4
February, 1928										
Indiana	2	141	143	----	533	----	0	577	471	11
Iowa	10	66	16	----	193	----	0	416	295	9
Louisiana	1	86	345	100	874	10	3	44	99	43
Maryland	2	164	202	----	2,921	1	1	293	1	15
Minnesota	13	123	10	----	42	----	1	708	12	9
New Jersey	7	595	90	----	2,415	----	1	1,197	1	13
Ohio	16	587	119	----	3,715	----	10	1,512	122	30
Wyoming	9	7	----	----	173	----	----	100	16	1

January, 1928	Cases
Hawaii Territory:	
Chicken pox	29
Conjunctivitis	252
Hookworm disease	1
Leprosy	4
Mumps	48
Tetanus	3
Trachoma	47
Whooping cough	34
February, 1928	
Actinomycosis:	
Minnesota	1
Anthrax:	
New Jersey	3
Chicken pox:	
Indiana	273
Iowa	310
Louisiana	38
Maryland	565
Minnesota	416
New Jersey	896
Ohio	1,500
Wyoming	26
Dysentery:	
Minnesota	4
German measles:	
Iowa	8
Maryland	15
New Jersey	173
Ohio	50
Wyoming	3
Hookworm disease:	
Louisiana	20
Impetigo contagiosa:	
Iowa	6
Maryland	5
Lead poisoning:	
New Jersey	2
Ohio	19
Leprosy:	
Louisiana	4
Lethargic encephalitis:	
Louisiana	2
Maryland	6
Minnesota	1
Ohio	4
Malta fever:	
Minnesota	1
Mumps:	
Indiana	215
Iowa	218
Louisiana	19
Maryland	133
Ohio	1,843
Wyoming	17
Ophthalmia neonatorum:	
New Jersey	6
Ohio	102
Puerperal fever:	
Ohio	1
Rabies in animals:	
Maryland	3
Scabies:	
Iowa	23
Maryland	2
Septic sore throat:	
Indiana	2
Iowa	1
Louisiana	3
Maryland	12
Ohio	82
Tetanus:	
Louisiana	2
Maryland	4
Trachoma:	
Louisiana	1
Maryland	1
Minnesota	1
New Jersey	2
Ohio	4
Trench mouth:	
Maryland	1
Trichinosis:	
New Jersey	14
Tularaemia:	
Louisiana	1
Maryland	3
Vincent's angina:	
Maryland	13
Whooping cough:	
Indiana	82
Iowa	40
Louisiana	30
Maryland	192
Minnesota	101
New Jersey	631
Ohio	726
Wyoming	37

RECIPROCAL NOTIFICATIONS

Notifications regarding communicable diseases sent during the month of February, 1928, by departments of health of certain States to other State health departments

Referred by—	Actinomycosis	Chicken pox	Diphtheria	Amebic dysentery	Malta fever	Scarlet fever	Smallpox	Tuberculosis	Typhoid fever	Whooping cough
California					1			2	1	
Connecticut			1			1				
Illinois							1		2	
Minnesota	1	1		3				61	1	
New York						2				2

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 nearly 31,196,000. The estimated population of the 92 cities reporting deaths is more than 30,580,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended March 10, 1928, and March 12, 1927

	1928	1927	Estimated expectancy
Cases reported			
Diphtheria:			
42 States	1,707	1,719	
97 cities	1,034	1,083	923
Measles:			
41 States	17,401	15,788	
97 cities	6,754	5,540	
Poliomyelitis:			
42 States	31	12	
Scarlet fever:			
42 States	5,102	6,277	
97 cities	1,800	2,644	1,158
Smallpox:			
42 States	1,241	945	
97 cities	135	174	134
Typhoid fever:			
42 States	122	227	
97 cities	22	45	39
Deaths reported			
Influenza and pneumonia:			
92 cities	1,249	1,252	
Smallpox:			
92 cities	0	0	

City reports for week ended March 10, 1928

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 week 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 non-epidemic years.

If reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1919 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviations 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	Population July 1, 1926, estimated	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	76,400	13	2	1	1	0	0	12	2
New Hampshire:									
Concord	[1] 22,546	0	0	0	0	0	0	0	0
Manchester	84,000	0	2	0	0	1	9	0	4

[1] Estimated July 1, 1925.

City reports for week ended March 10, 1928—Continued

Division, State, and city	Population July 1, 1926, estimated	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—continued									
Vermont:									
Barre	[1] 10,008	0	0	0	0	0	0	0	0
Burlington	[1] 24,089	0	0	0	0	0	0	0	1
Massachusetts:									
Boston	787,000	55	47	31	1	3	455	11	38
Fall River	131,000	4	4	4	0	2	2	0	3
Springfield	145,000	9	3	3	0	0	2	48	1
Worcester	193,000	28	4	1	0	0	14	116	3
Rhode Island:									
Pawtucket	71,000	5	1	0	0	0	6	20	1
Providence	275,000	3	8	9	0	2	49	6	9
Connecticut:									
Bridgeport	(?)	5	7	11	1	1	0	0	10
Hartford	164,000	10	8	3	2	1	5	7	10
New Haven	182,000	6	2	0	0	0	188	128	12
MIDDLE ATLANTIC									
New York:									
Buffalo	544,000	10	11	16	-------	1	398	39	19
New York	5,924,000	212	215	277	49	29	741	43	260
Rochester	321,000	11	10	8	-------	1	12	21	6
Syracuse	185,000	41	4	3	-------	0	80	10	9
New Jersey:									
Camden	131,000	3	6	4	1	1	8	6	4
Newark	459,000	36	13	20	10	0	321	20	24
Trenton	134,000	1	3	4	0	0	3	1	4
Pennsylvania:									
Philadelphia	2,008,000	0	74	70	-------	13	235	0	89
Pittsburgh	637,000	21	20	33	-------	3	212	131	36
Reading	114,000	7	3	4	-------	1	2	2	2
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	411,000	18	8	22	0	0	202	2	14
Cleveland	960,000	60	27	65	26	6	34	247	32
Columbus	285,000	8	4	1	0	0	13	7	1
Toledo	295,000	53	6	6	0	0	368	22	4
Indiana:									
Fort Wayne	99,900	1	2	1	0	0	0	0	1
Indianapolis	367,000	30	8	4	0	2	53	122	9
South Bend	81,700	1	1	0	0	0	0	0	1
Terre Haute	71,900	1	1	0	0	1	0	0	2
Illinois:									
Chicago	3,048,000	122	79	103	20	8	36	60	110
Springfield	64,700	11	0	0	2	2	0	11	1
Michigan:									
Detroit	1,290,000	65	59	45	7	3	880	76	46
Flint	136,000	17	4	2	0	0	23	244	8
Grand Rapids	156,000	4	2	0	0	2	14	17	5
Wisconsin:									
Kenosha	52,700	21	2	0	0	0	2	1	0
Milwaukee	517,000	63	17	18	1	1	4	51	6
Racine	69,400	5	2	0	0	0	1	2	1
Superior	[1] 39,671	1	0	1	0	0	0	6	1
WEST NORTH CENTRAL									
Minnesota:									
Duluth	113,000	4	1	0	0	0	1	5	1
Minneapolis	434,000	107	15	7	0	2	37	175	11
St. Paul	248,000	19	13	3	0	0	0	67	7
Iowa:									
Davenport	[1] 52,469	4	1	0	0	-------	0	0	-------
Des Moines	146,000	0	2	0	0	-------	0	0	-------
Sioux City	78,000	-------	2	-------	-------	-------	-------	-------	-------
Waterloo	36,900	4	0	0	0	-------	2	9	-------
Missouri:									
Kansas City	375,000	36	7	3	0	3	46	206	13
St. Joseph	78,400	2	1	0	1	0	0	12	3
St. Louis	830,000	19	42	45	2	0	158	15	-------

[1] Estimated, July 1, 1925.

[2] No estimate made.

City reports for week ended March 10, 1928—Continued

Division, State, and city	Population July 1, 1926, estimated	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
			Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST NORTH CENTRAL—continued									
North Dakota:									
Fargo	[1] 26,403	-------	1	-------	-------	-------	-------	-------	-------
Grand Forks	[1] 14,811	0	0	0	0	-------	1	0	-------
South Dakota:									
Aberdeen	[1] 15,036	6	0	0	0	-------	0	0	-------
Sioux Falls	[1] 30,127	0	1	0	0	-------	1	0	-------
Nebraska:									
Lincoln	62,000	23	1	1	0	0	1	36	0
Omaha	216,000	20	3	6	0	0	0	2	7
Kansas:									
Topeka	56,500	32	1	1	2	1	0	8	2
Wichita	92,500	13	2	2	0	0	1	2	3
SOUTH ATLANTIC									
Delaware:									
Wilmington	124,000	1	2	2	0	0	2	11	5
Maryland:									
Baltimore	808,000	105	29	27	31	2	791	20	43
Cumberland	[1] 33,741	1	1	0	0	0	0	0	1
Frederick	[1] 12,035	0	0	0	0	0	1	0	0
District of Columbia:									
Washington	528,000	23	13	15	4	3	102	0	19
Virginia:									
Lynchburg	30,500	1	1	6	0	1	26	1	2
Norfolk	174,000	35	1	2	0	0	96	0	8
Richmond	189,000	3	2	3	0	0	159	2	9
Roanoke	61,900	7	0	3	0	0	19	0	2
West Virginia:									
Charleston	50,700	0	0	0	0	0	0	0	1
Wheeling	[1] 56,208	3	1	1	0	0	8	0	2
North Carolina:									
Raleigh	[1] 30,371	8	0	3	0	0	87	0	2
Wilmington	37,700	6	0	0	0	0	11	0	3
Winston-Salem	71,800	5	1	0	0	0	190	17	3
South Carolina:									
Charleston	74,100	2	0	0	17	0	5	1	4
Columbia	41,800	15	1	0	0	0	48	33	3
Greenville	[1] 27,311	1	0	0	0	0	13	3	3
Georgia:									
Atlanta	(2)	9	3	9	25	4	5	12	9
Brunswick	[1] 16,809	0	0	0	0	0	15	0	1
Savannah	94,900	1	0	0	9	3	10	2	2
Florida:									
Miami	[1] 69,754	2	6	2	0	0	0	1	3
St. Petersburg	[1] 26,847	-------	0	-------	-------	0	-------	-------	2
Tampa	102,000	5	2	0	0	1	0	2	0
EAST SOUTH CENTRAL									
Kentucky:									
Covington	58,500	1	1	0	0	0	23	0	3
Louisville	311,000	-------	4	-------	-------	-------	-------	-------	-------
Tennessee:									
Memphis	177,000	12	4	3	0	0	60	21	11
Nashville	137,000	7	1	5	0	0	23	1	8
Alabama:									
Birmingham	211,000	14	2	2	15	6	50	10	15
Mobile	66,800	0	0	1	5	1	0	0	3
Montgomery	47,000	15	1	1	0	-------	19	0	-------
WEST SOUTH CENTRAL									
Arkansas:									
Fort Smith	[1] 31,643	1	1	0	0	-------	0	2	-------
Little Rock	75,900	1	0	0	3	0	81	6	6
Louisiana:									
New Orleans	419,000	3	10	24	22	9	1	0	23
Shreveport	59,500	10	0	0	0	3	156	1	3
Oklahoma:									
Oklahoma City	(2)	4	1	2	12	3	15	14	7
Tulsa	133,000	37	1	0	0	-------	2	39	-------

[1] Estimated, July 1, 1925.

[2] No estimate made.

City reports for week ended March 10, 1926—Continued

Division, State, and city	Population, July 1, 1926, estimated	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
			Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST SOUTH CENTRAL—continued									
Texas:									
Dallas	203,000	31	5	5	0	0	1	1	2
Galveston	49,100	0	1	1	0	0	0	0	2
Houston	[1] 164,054	6	3	12	0	1	39	0	7
San Antonio	205,000	3	2	2	0	5	45	0	19
MOUNTAIN									
Montana:									
Billings	[1] 17,971	0	1	0	0	0	0	1	2
Great Falls	[1] 29,883	6	0	0	0	0	1	0	0
Helena	[1] 12,037	0	0	0	0	0	0	0	2
Missoula	[1] 12,668	0	0	0	0	0	0	0	0
Idaho:									
Boise	[1] 23,042	----	0	----	----	----	----	----	----
Colorado:									
Denver	285,000	49	10	8	0	5	27	105	17
Pueblo	43,900	3	1	0	0	0	1	0	1
New Mexico:									
Albuquerque	[1] 21,000	6	1	1	0	0	39	0	0
Utah:									
Salt Lake City	133,000	13	3	3	0	2	3	6	6
Nevada:									
Reno	[1] 12,665	0	1	0	0	0	0	0	0
PACIFIC									
Washington:									
Seattle	(2)	24	6	13	0	----	217	12	----
Spokane	109,000	14	3	1	0	----	0	0	----
Tacoma	106,000	9	2	0	0	0	7	27	1
Oregon:									
Portland	[1] 282,383	31	7	2	2	0	14	4	3
California:									
Los Angeles	(2)	115	39	42	27	4	76	48	24
Sacramento	73,400	5	1	0	1	1	14	0	4
San Francisco	567,000	121	21	11	1	1	40	53	7

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	4	10	0	0	0	0	0	0	0	5	----
New Hampshire:											
Concord	0	0	0	0	0	2	0	0	0	0	11
Manchester	2	3	0	0	0	1	0	0	0	0	23
Vermont:											
Barre	0	0	0	0	0	1	0	0	0	0	4
Burlington	1	0	1	0	0	0	0	0	0	0	11
Massachusetts:											
Boston	77	73	0	0	0	13	2	0	0	57	286
Fall River	4	10	0	0	0	4	1	1	0	1	32
Springfield	7	23	0	0	0	1	0	0	0	2	----
Worcester	10	4	0	0	0	3	0	0	0	24	43
Rhode Island:											
Pawtucket	1	0	0	0	0	1	0	0	0	0	23
Providence	9	32	0	0	0	6	0	0	0	9	72
Connecticut:											
Bridgeport	12	3	0	0	0	3	0	0	0	1	46
Hartford	7	7	0	0	0	3	0	0	0	7	49
New Haven	11	2	0	0	0	1	0	0	0	27	49

[1] Estimated, July 1, 1925.

[2] No estimate made.

City reports for week ended March 10, 1928—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
MIDDLE ATLANTIC											
New York:											
Buffalo	23	35	0	0	0	13	0	0	0	50	177
New York	30	466	0	0	0	94	7	3	1	145	1,622
Rochester	15	4	0	0	0	3	0	0	0	3	76
Syracuse	13	19	0	0	0	3	1	0	0	50	70
New Jersey:											
Camden	6	0	0	0	0	3	0	0	0	0	35
Newark	34	53	0	0	0	9	0	0	0	30	146
Trenton	5	4	0	0	0	0	1	0	0	2	49
Pennsylvania:											
Philadelphia	87	94	1	0	0	32	2	1	0	99	502
Pittsburgh	31	27	0	0	0	12	0	2	0	14	227
Reading	4	32	0	0	0	0	0	0	0	1	30
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	19	30	1	0	0	11	0	0	0	12	161
Cleveland	52	34	1	0	0	18	1	1	0	78	193
Columbus	11	12	1	0	0	2	0	1	0	4	68
Toledo	14	6	2	0	0	8	1	0	1	11	74
Indiana:											
Fort Wayne	5	4	1	0	0	3	0	0	0	1	32
Indianapolis	11	14	12	6	0	7	0	4	0	11	100
South Bend	4	1	1	0	0	0	0	0	0	2	20
Terre Haute	3	0	0	5	0	1	0	0	0	0	16
Illinois:											
Chicago	133	137	2	7	0	55	2	0	0	132	830
Springfield	2	18	0	2	0	4	0	0	0	2	22
Michigan:											
Detroit	97	117	2	0	0	29	1	0	0	96	324
Flint	8	16	1	2	0	1	0	0	0	12	36
Grand Rapids	11	5	1	0	0	0	0	0	0	3	37
Wisconsin:											
Kenosha	3	2	1	0	0	0	0	0	0	4	6
Milwaukee	28	49	2	0	0	9	0	0	0	19	118
Racine	5	8	1	0	0	2	0	0	0	4	15
Superior	3	0	1	0	0	0	1	0	0	0	10
WEST NORTH CENTRAL											
Minnesota:											
Duluth	9	10	1	0	0	1	0	0	0	0	20
Minneapolis	60	29	5	0	0	3	1	0	0	14	94
St. Paul	34	13	6	0	0	8	1	0	0	13	77
Iowa:											
Davenport	2	3	3	0			0	0		0	
Des Moines	6	17	1	14			0	0		0	30
Sioux City	2		1				0				
Waterloo	2	3	1	1			0	0		2	
Missouri:											
Kansas City	12	32	4	2	0	7	0	0	0	17	115
St. Joseph	3	5	0	11	0	0	1	0	0	0	32
St. Louis	35	42	5	2	0	14	1	1	0	26	285
North Dakota:											
Fargo	3		0				0				
Grand Forks	0	3	0	0			0	0		0	
South Dakota:											
Aberdeen	4	0	0	0			0	0		4	
Sioux Falls	3	0	0	0			0	0		0	8
Nebraska:											
Lincoln	2	3	0	4	0	0	0	0	0	6	6
Omaha	3	7	10	7	0	2	0	0	0	0	57
Kansas:											
Topeka	3	3	1	5	0	1	0	0	0	2	23
Wichita	3	4	1	19	0	1	0	0	0	1	39

City reports for week ended March 10, 1928—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
SOUTH ATLANTIC											
Delaware:											
Wilmington	5	2	0	0	0	0	0	0	0	0	33
Maryland:											
Baltimore	41	30	0	1	0	20	2	0	0	41	241
Cumberland	0	1	0	0	0	2	0	0	0	0	13
Frederick	1	2	0	0	0	0	0	0	0	0	5
Dist. of Columbia:											
Washington	27	58	1	1	0	9	1	0	0	12	144
Virginia:											
Lynchburg	0	2	0	0	0	0	0	0	0	6	9
Norfolk	2	25	0	1	0	1	0	0	0	5	
Richmond	3	9	0	0	0	5	0	1	0	0	57
Roanoke	0	2	1	0	0	1	0	0	0	1	18
West Virginia:											
Charleston	1	4	0	0	0	0	0	0	0	0	9
Wheeling	1	1	0	0	0	1	0	1	0	0	17
North Carolina:											
Raleigh	0	2	0	0	0	1	0	0	0	0	13
Wilmington	0	1	0	0	0	0	0	0	0	2	8
Winston-Salem	1	1	4	0	0	1	0	0	0	0	18
South Carolina:											
Charleston	0	3	1	1	0	0	0	0	0	1	19
Columbia	0	0	0	0	0	0	0	0	0	4	12
Greenville	0	0	1	0	0	1	0	0	0	1	11
Georgia:											
Atlanta	4	7	7	2	0	6	1	0	0	0	80
Brunswick	0	0	1	0	0	1	0	1	1	0	6
Savannah	1	1	1	7	0	3	0	2	1	0	36
Florida:											
Miami	1	0		0	0	1	1	0	0	0	36
St. Petersburg	0		0		0	0	0		0		12
Tampa	0	2	0	1	0	2	2	0	0	2	32
EAST SOUTH CENTRAL											
Kentucky:											
Covington	3	4	0	1	0	2	0	0	0	0	25
Louisville	6		1				0				
Tennessee:											
Memphis	4	12	3	0	0	4	0	0	0	2	80
Nashville	4	2	1	0	0	4	0	0	0	0	54
Alabama:											
Birmingham	3	2	7	1	0	3	1	0	0	2	81
Mobile	0	5	0	1	0	3	0	1	2	0	26
Montgomery	1	0	0	0			0	0		1	
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	2	1	0			0	0		2	
Little Rock	2	4	0	0	0	1	0	0	0	0	
Louisiana:											
New Orleans	7	10	0	0	0	14	2	1	0	4	174
Shreveport	0	5	1	0	0	2	0	0	0	4	38
Oklahoma:											
Oklahoma City	2	3	3	22	0	1	0	0	0	0	33
Tulsa	1	19	2	8			0	0		5	
Texas:											
Dallas	3	4	6	5	0	6	0	0	0	5	42
Galveston	0	1	1	0	0	0	0	0	0	0	8
Houston	1	2	2	4	0	1	0	0	0	0	56
San Antonio	1	4	0	0	0	13	0	0	0	0	87
MOUNTAIN											
Montana:											
Billings	1	0	0	0	0	0	0	0	0	1	11
Great Falls	1	2	1	5	0	0	0	0	0	1	4
Helena	0	1	0	0	0	0	0	0	0	0	7
Missoula	1	0	0	0	0	0	0	0	0	0	6

City reports for the week ended March 10, 1928—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
MOUNTAIN—con.											
Idaho:											
Boise	0	----	1	----	----	----	0	----	----	----	----
Colorado:											
Denver	15	12	2	0	0	11	1	0	0	9	100
Pueblo	3	2	0	0	0	0	1	0	0	6	9
New Mexico:											
Albuquerque	2	2	0	0	0	5	0	0	0	0	12
Utah:											
Salt Lake City	3	5	1	8	0	0	0	0	0	14	31
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	4
PACIFIC											
Washington:											
Seattle	11	1	5	1	----	----	1	0	----	6	----
Spokane	6	7	6	26	----	----	0	0	----	0	----
Tacoma	3	4	4	0	0	1	1	1	0	7	21
Oregon:											
Portland	6	7	10	44	0	3	1	1	0	0	69
California:											
Los Angeles	31	20	7	0	0	29	2	0	0	10	293
Sacramento	2	5	1	0	0	1	0	0	0	0	24
San Francisco	16	38	5	0	0	17	1	0	0	13	176

Division, State, and city	Cerebrospinal meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Massachusetts:									
Boston	1	0	0	0	1	0	0	1	0
Worcester	1	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
Buffalo	1	1	0	0	0	0	0	0	0
New York	17	6	3	2	0	0	1	0	0
New Jersey:									
Newark	0	0	1	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	2	3	0	0	0	0	0	0	0
Pittsburgh	3	2	0	0	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	1	0	1	0	1	0	0	0
Cleveland	2	0	0	0	0	0	0	0	0
Columbus	0	0	0	0	0	0	0	1	1
Toledo	0	1	0	0	0	0	0	0	0
Indiana:									
Indianapolis	1	4	0	0	0	0	0	0	0
Illinois:									
Chicago	9	7	1	0	0	0	1	1	1
Michigan:									
Detroit	1	0	1	0	0	0	1	0	0
Wisconsin:									
Milwaukee	3	2	0	0	0	0	0	0	0

City reports for the week ended March 10, 1928—Continued

Division, State, and city	Cerebrospinal meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	0	0	1	0	0	0	0	0
Minneapolis	0	0	1	1	0	0	0	0	0
Missouri:									
Kansas City	0	1	0	0	0	0	0	1	0
St. Louis	4	1	0	0	0	0	1	0	0
SOUTH ATLANTIC									
Virginia:									
Norfolk	1	0	0	0	0	0	0	0	0
Roanoke	0	0	0	0	0	1	0	0	0
North Carolina:									
Raleigh	0	0	0	0	0	0	0	0	1
Wilmington	0	1	0	0	0	0	0	0	0
South Carolina:									
Columbia	0	0	0	0	0	2	0	0	0
Georgia:									
Atlanta	0	0	0	0	1	2	0	0	0
Savannah	0	0	0	0	1	0	0	0	0
EAST SOUTH CENTRAL									
Alabama:									
Birmingham	0	0	0	0	2	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	1	1	0	0	2	1	0	0	0
Oklahoma:									
Tulsa	1	-------	0	-------	0	-------	0	0	-------
Texas:									
Houston	1	1	0	0	0	0	0	0	0
MOUNTAIN									
Colorado:									
Denver	6	2	0	0	0	0	0	0	0
Pueblo	0	1	0	0	0	0	0	0	0
New Mexico:									
Albuquerque	1	1	0	0	0	0	0	0	0
Utah:									
Salt Lake City	1	0	0	0	0	0	0	0	0
Nevada:									
Reno	1	0	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Spokane	3	-------	0	-------	0	-------	0	0	-------
Oregon:									
Portland	1	0	0	0	0	0	0	1	0
California:									
Los Angeles	1	0	0	0	0	0	1	2	0
Sacramento	0	0	0	0	0	0	0	1	0
San Francisco	3	1	0	0	0	0	0	0	0

The following table gives the rates per 100,000 population for 101 cities for the five-week period ended March 10, 1928, compared with those for a like period ended March 12, 1927. The population figures used in computing the rates are approximate estimates as of July 1, 1927 and 1928, respectively, authoritative figures for many of the cities not being available. The 101 cities reporting cases had estimated aggregate populations of approximately 31,050,000 in 1927

and 31,657,000 in 1928. The 95 cities reporting deaths had nearly 30,370,000 estimated population in 1927 and nearly 30,961,000 in 1928. The number of cities included in each group and the estimated aggregate populations are shown in a separate table below:

Summary of weekly reports from cities, February 5 to March 10, 1928—Annual rates per 100,000 population compared with rates for the corresponding period of 1927 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Feb. 12, 1927	Feb. 11, 1928	Feb. 19, 1927	Feb. 18, 1928	Feb. 26, 1927	Feb. 25, 1928	Mar. 5, 1927	Mar. 3, 1928	Mar. 12, 1927	Mar. 10, 1928
101 cities	177	167	203	175	179	174	182	[2] 173	183	[2] 173
New England	174	136	133	172	149	138	163	140	128	145
Middle Atlantic	188	230	277	234	199	224	223	233	230	214
East North Central	179	175	168	169	198	169	176	164	165	171
West North Central	154	99	164	125	109	125	115	113	133	[4] 136
South Atlantic	222	112	191	149	191	156	195	130	155	124
East South Central	61	55	86	55	117	35	81	[3] 102	112	[3] 87
West South Central	149	128	170	124	194	188	149	92	190	168
Mountain	152	44	161	186	72	71	233	186	197	[5] 101
Pacific	167	133	188	82	151	161	133	141	198	171

MEASLES CASE RATES

101 cities	652	791	810	892	862	998	880	[2] 1,123	952	[3] 1,132
New England	339	1,614	181	1,657	228	1,908	172	1,979	198	1,657
Middle Atlantic	45	647	68	700	74	877	67	1,000	80	970
East North Central	786	440	1,009	531	1,015	565	1,173	761	1,169	865
West North Central	683	216	564	240	960	255	952	341	1,241	[4] 498
South Atlantic	359	1,959	792	2,246	651	2,406	794	2,576	783	2,784
East South Central	451	1,132	467	1,347	461	1,202	538	[2] 1,600	314	[3] 1,272
West South Central	451	1,304	562	1,899	591	1,959	720	1,695	1,187	1,300
Mountain	7,845	186	9,665	97	10,624	168	8,132	142	9,091	[5] 295
Pacific	2,220	718	2,774	692	2,865	749	3,030	892	3,252	904

SCARLET FEVER CASE RATES

101 cities	390	300	438	291	424	295	418	[2] 293	446	[3] 302
New England	537	432	470	441	542	414	423	347	591	377
Middle Atlantic	423	333	581	330	531	335	532	345	583	358
East North Central	325	310	322	280	366	285	399	309	369	292
West North Central	499	290	540	265	445	275	443	261	471	[4] 301
South Atlantic	258	231	249	228	218	282	180	254	193	268
East South Central	223	135	243	190	183	185	218	[3] 116	279	[3] 182
West South Central	74	100	66	116	116	120	66	96	120	128
Mountain	1,246	540	1,246	345	1,192	208	1,076	257	1,112	[5] 203
Pacific	389	192	340	230	313	233	329	194	285	192

SMALLPOX CASE RATES

101 cities	26	21	33	20	25	24	21	[2] 17	30	[3] 23
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	15	14	28	12	15	13	21	18	34	14
West North Central	71	109	81	101	63	92	53	62	53	[4] 95
South Atlantic	63	21	60	26	45	26	52	19	54	25
East South Central	81	15	132	25	71	40	122	[2] 0	81	[3] 22
West South Central	66	16	62	20	50	8	50	20	70	36
Mountain	18	44	27	168	0	62	0	53	0	[5] 120
Pacific	76	69	94	18	104	125	13	49	94	69

[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, 1927 and 1928, respectively.
[2] Louisville, Ky., not included.
[3] Sioux City, Iowa; Fargo, N. Dak.; Louisville, Ky.; and Boise, Idaho, not included.
[4] Sioux City, Iowa, and Fargo, N. Dak., not included.
[5] Boise, Idaho, not included.

Summary of weekly reports from cities, February 5 to March 10, 1928—Annual rates per 100,000 population compared with rates for the corresponding period of 1927—Continued.

TYPHOID FEVER CASE RATES

	Week ended—									
	Feb. 12, 1927	Feb. 11, 1928	Feb. 19, 1927	Feb. 18, 1928	Feb. 26, 1927	Feb. 25, 1928	Mar. 5, 1927	Mar. 3, 1928	Mar. 12, 1927	Mar. 10, 1928
101 cities	7	7	9	5	8	5	9	[2] 10	8	[3] 4
New England	5	9	2	5	9	7	2	0	12	2
Middle Atlantic	5	6	10	3	1	5	5	8	8	3
East North Central	3	6	4	3	6	1	6	7	1	4
West North Central	6	6	10	4	8	4	10	6	4	[4] 2
South Atlantic	18	9	23	7	29	9	23	12	11	9
East South Central	10	5	30	15	25	20	41	[2] 73	30	[2] 7
West South Central	12	40	8	12	4	16	8	32	17	4
Mountain	0	0	0	0	18	0	9	9	0	[5] 0
Pacific	18	0	3	8	8	5	8	8	10	3

INFLUENZA DEATH RATES

95 cities	24	17	23	22	22	21	25	[2] 24	27	[6] 23
New England	2	7	9	11	12	7	9	7	12	21
Middle Atlantic	28	15	25	18	22	24	24	16	25	19
East North Central	22	10	19	12	17	14	23	17	16	16
West North Central	14	4	23	6	10	2	17	10	14	[7] 12
South Atlantic	23	30	31	35	41	28	47	32	70	25
East South Central	37	42	43	37	43	31	21	[3] 125	80	[3] 55
West South Central	38	57	38	99	25	74	38	103	47	74
Mountain	72	53	27	71	54	35	54	88	54	[5] 64
Pacific	21	20	17	27	17	20	17	24	7	20

PNEUMONIA DEATH RATES

95 cities	147	168	146	174	163	161	171	[2] 188	138	[6] 191
New England	165	149	102	170	184	147	202	193	188	205
Middle Atlantic	173	200	148	195	176	155	193	217	222	221
East North Central	128	114	121	137	145	156	132	148	157	156
West North Central	95	106	91	94	91	71	104	106	81	[7] 97
South Atlantic	168	224	234	216	253	228	229	217	272	214
East South Central	117	235	175	204	122	220	271	[3] 249	186	[3] 312
West South Central	144	201	204	279	161	271	183	263	161	254
Mountain	143	150	188	168	134	248	126	265	170	[5] 276
Pacific	114	182	176	172	131	115	121	155	148	122

[2] Louisville, Ky., not included.
[3] Sioux City, Iowa; Fargo, N. Dak.; Louisville, Ky.; and Boise, Idaho, not included.
[4] Sioux City, Iowa, and Fargo, N. Dak., not included.
[5] Boise, Idaho, not included.
[6] Fargo, N. Dak., Louisville, Ky., and Boise, Idaho, not included.
[7] Fargo, N. Dak., not included.

Number of cities included in summary of weekly reports, and aggregate population of cities in each group, approximated as of July 1, 1927 and 1928, respectively

Group of cities	Number of cities reporting cases	Number of cities reporting deaths	Aggregate population of cities reporting cases		Aggregate population of cities reporting deaths	
			1927	1928	1927	1928
Total	101	95	31,050,300	31,657,000	30,369,500	30,960,700
New England	12	12	2,242,700	2,274,400	2,242,700	2,274,400
Middle Atlantic	10	10	10,594,700	10,732,400	10,594,700	10,732,400
East North Central	16	16	7,820,700	7,991,400	7,820,700	7,991,400
West North Central	12	10	2,634,500	2,683,500	2,518,500	2,566,400
South Atlantic	21	21	2,890,700	2,981,900	2,890,700	2,981,900
East South Central	7	6	1,028,300	1,048,300	980,700	1,000,100
West South Central	8	7	1,260,700	1,307,600	1,227,800	1,274,100
Mountain	9	9	581,600	591,100	581,600	591,100
Pacific	6	4	1,996,400	2,046,400	1,512,100	1,548,900

FOREIGN AND INSULAR

THE FAR EAST

Report for the week ended February 25, 1928.—The following report for the week ended February 25, 1928, was transmitted by the eastern bureau of the health section of the secretariat of the League of Nations, located at Singapore, to the headquarters at Geneva:

Plague, cholera, or smallpox was reported present in the following ports:

PLAGUE

Egypt.—Suez.
Aden Protectorate.—Aden.
India.—Bassein, Bombay, Rangoon.
Ceylon.—Colombo.
Straits Settlements.—Singapore.
Dutch East Indies.—Makassar.

CHOLERA

India.—Bassein, Calcutta, Madras, Negapatam, Rangoon.
Siam.—Bangkok.
French Indo-China.—Saigon.

SMALLPOX

Egypt.—Alexandria.
Ceylon.—Colombo.
India.—Bombay, Calcutta, Cochin, Madras, Moulmein, Rangoon, Vizagapatam.
French India.—Pondicherry.
French Indo-China.—Saigon.
Dutch East Indies.—Belawan-Deli, Pontianak.
China.—Shanghai, Hong Kong.

Returns for the week ended February 25 were not received from the following ports:

Dutch East Indies.—Banjermassin, Samarinda.
Kwantung.—Port Arthur, Dairen, towns of the South Manchurian Railway zone.
Union of Socialist Soviet Republics.—Vladivostok.

ARABIA

Aden—Plague—January 9-February 22, 1928.—A total of 303 cases of plague with 188 deaths has been reported at Aden for the period January 9 to February 22, 1928.

BELGIAN CONGO

Matadi—Yellow fever—January 26-February 19, 1928.—During the period January 26 to February 6, 1928, 8 cases of yellow fever with 6 deaths were reported at Matadi, Belgian Congo. Of these, three cases with two deaths were in Europeans.

A suspect case of yellow fever was reported at the quarantine station of Ango Ango, below Matadi, February 9, 1928. The patient died February 10.

Quarantine was lifted at Matadi on February 19, 1928.

CANADA

Provinces—Communicable diseases—Week ended March 10, 1928.—The Canadian Ministry of Health reports cases of certain communicable diseases from seven Provinces of Canada for the week ended March 10, 1928, as follows:

Disease	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	Total
Cerebrospinal fever				1				1
Influenza	12			13		3		28
Smallpox				20		7	7	34
Typhoid fever		2	7	8			1	18

Quebec Province—Communicable diseases—Week ended March 10, 1928.—The Bureau of Health of the Province of Quebec reports cases of certain communicable diseases for the week ended March 10, 1928, as follows:

Disease	Cases	Disease	Cases
Chicken pox	50	Scarlet fever	80
Diphtheria	53	Smallpox	18
German measles	21	Tuberculosis	59
Influenza	4	Typhoid fever	7
Measles	293	Whooping cough	29

CUBA

Santiago de Cuba—Malaria—March 17, 1928.—Under date of March 17, 1928, 136 cases of malaria were reported at Santiago de Cuba.

CZECHOSLOVAKIA

Communicable diseases—January, 1928.—During the month of January, 1928, communicable diseases were reported in Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	4		Paratyphoid fever	6	1
Cerebrospinal meningitis	25	3	Puerperal fever	55	21
Diphtheria	937	71	Scarlet fever	1,372	36
Dysentery	10		Trachoma	226	
Malaria	1		Typhoid fever	455	34

EGYPT

Suez—Plague—February 19-March 1, 1928.—During the week ended February 25, 1928, four cases of plague were reported at Suez, Egypt. On March 1, 1928, a fatal septicemic case was reported.

From January 1 to February 25, 1928, 17 cases of plague were reported at Suez, as compared with 13 cases during the corresponding period of 1927.

ESTONIA

Communicable diseases—January, 1928.—During the month of January, 1928, communicable diseases were reported in the Republic of Estonia as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	7	Scarlet fever	402
Diphtheria	48	Tuberculosis	181
Measles	50	Typhoid fever	49

Population, estimated, 1,114,630.

GREAT BRITAIN

Leeds, England—Smallpox.—Under date of March 5, 1928, two outbreaks of smallpox were reported in the Leeds consular district, with 11 cases. Both outbreaks were stated to be mild. The first outbreak occurred in the small mining village of Swillington, with 8 cases. At Leeds, three cases were reported March 1, 1928.

JAPAN

Influenza—January 1–February 10, 1928.—The Home Office of Japan, at Tokyo, has published a statement that there were 27,411 cases of influenza with 395 deaths in Japan from January 1 to February 10, 1928. On March 17, 1928, conditions were said to have greatly improved.

PERU

Arequipa—Mortality from communicable diseases—December, 1927—January, 1928.—Mortality from communicable diseases was reported at Arequipa, Peru, during the months of December, 1927, and January, 1928, as follows:

Disease	Deaths		Disease	Deaths	
	December, 1927	January, 1928		December, 1927	January, 1928
Gastroenteritis	15	11	Scarlet fever	1	----------
Influenza	----------	2	Tuberculosis	11	28
Measles	----------	1	Typhus fever	1	2

Population: 44,300 in January, 1928.

General mortality.—The total number of deaths from all causes reported at Arequipa for the months of December, 1927, and January, 1928, was 61 and 92, respectively.

Prevailing diseases.—Diseases prevalent at Arequipa were stated to be bronchitis, pneumonia and broncho-pneumonia, enteritis and gastroenteritis in children; a few cases of smallpox, tuberculosis, typhoid fever, and typhus fever.

SENEGAL

Plague—January, 1928.—During the month of January, 1928, five cases of plague were reported in Senegal, occurring in the interior.

SYRIA

Beirut—Smallpox outbreak—January-February, 1928.—Under date of February 23, 1928, an outbreak of epidemic smallpox was reported at Beirut, Syria, with 46 cases reported from January 26 to February 19, 1928.

URUGUAY

Montevideo—Communicable diseases—November, 1927.—During the month of November, 1927, communicable diseases were reported at Montevideo, Uruguay, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	28	3	Tuberculosis	145	95
Measles	59	6	Typhoid fever	4	3
Scarlet fever	14				

Population, estimated, 439,129.

VENEZUELA

Tacata and Cua, State of Miranda—Plague—March 11, 1928.—Under date of March 14, 1928, plague was reported at Tacata and Cua, in the State of Miranda, Venezuela, about 100 kilometers from Caracas, near the State of Aragua. The last case was said to have been reported March 11. Precautions against the spread of the disease were taken.

VIRGIN ISLANDS

Communicable diseases—February, 1928.—During the month of February, 1928, communicable diseases were reported in the Virgin Islands of the United States as follows:

Island and disease	Cases	Remarks
St. Thomas and St. John:		
Chancroid	2	
Gonorrhea	5	
Leprosy	2	Secondary, 2.
Pellagra	1	
Syphilis	3	Secondary, 2.
Whooping cough	1	
St. Croix:		
Syphilis	3	Secondary.
Uncinariasis	7	Necator americanus.

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

From medical officers of the Public Health Service, American consuls, 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		July 3-30, 1927	July 31-Aug. 27, 1927	Aug. 28-Sept. 24, 1927	Sept. 25-Oct. 22, 1927	Oct. 23-Nov. 19, 1927	Week ended— Nov. 26, 1927	December, 1927					January, 1928				February, 1928			
								3	10	17	24	31	7	14	21	28	4	11	18	25
China:																				
Amoy	C	2	28	72	16															
	D		7	3																
Canton	C	8	31	86	14	12		1												
	D	5	16	25	14	11		1												
Foochow	C	P	P	P	P															
Hong Kong	C	2	P	1	P															
	D	1																		
Shanghai (settlement and concession)—																				
Foreigners only	C		1	6	3															
Including natives	D		20	74	7															
Swatow	C	72	42	P	P	P														
	D	1		P	P	P														
Tientsin	C	P	P	15	2	P			1											
Dutch East Indies: Java—Batavia	C					28	2	1												
	D					18	2	1												
India	C	46,137	45,163	31,390	20,160	23,047	8,102	5,997	5,766	5,274	4,624	3,960	3,550	3,243	3,267					
	D	24,081	22,051	15,895	10,371	12,863	4,835	3,672	3,355	3,164	2,617	2,353	2,046	1,847	1,765					
Bassein	D	16																1		1
Bombay	C	75	42	3		2										1				
	D	35	30	2		2														
Calcutta	C	95	87	76	101	199	156	119	87	66	69	42	43	22	39	36	70	56		
	D	48	40	39	64	138	106	77	55	43	48	34	27	16	18	24	38	32	35	42
Madras	C	424	547	59	14	13			1					1	1			1	2	
	D	204	278	48	8	7	1		1					1		3		1		
Madras Presidency	C	11,491	7,660	3,056	2,050	3,073	1,484	861	878	479	503	382	482		1,163					
	D	4,807	3,513	1,581	1,055	1,736	802	528	491	283	241	209	254		623					
Negapatam	C														4					
	D														4	1		1	2	2
Rangoon	C	2	1	2	6	2	3	1	2	2	1	2		1	4		1	1		
	D	2	1	2	5	5	2	1	2	1	1	1		1			1	1	8	4
Tuticorin	C				1			6		2										
	D				1	37		6	6	2										

Place		July, 1927	August, 1927	September, 1927	October, 1927	November, 1927			December, 1927			January, 1928			February, 1928	
						1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20
India (French):																
Chandernagor	C	1	1	1		6	2	2	2	2	6	3	4	1	1	
	D	1	1			6	2	2	2	2	4	2	2	1		
Karikal	C	56	18	1		1				1			6	2	9	7
	D	45	12	1		1				1			4		5	4
Pondicherry	C	37	12	15		1		5	3	17	4	1	2	4	2	3
	D	24	11	15		1		5	1	15	6	1	2	3	2	3
Indo-China: Saigon	C			1	1								2	1	1	1
	D												1			
Iraq [1]																
Japan: Yokohama	C	1														
	D	1														
Philippine Islands: Manila	C	1	1													
Siam	C	81	77	40	18	110	19	29	18	32	24	24	13	49	50	33
	D	59	53	24	11	76	11	19	13	21	18	21	5	36	34	21
Bangkok	C	6	2	3	5	4		1	1	1	2	3	7	9	11	28
	D	1	1	1	3	2		1		1	2	1	3	5	7	16
Straits Settlements: Singapore	C					7	1	2		2	3	15	3	2	2	
	D					5	2			2	1	4	5	2	1	
On vessel:																
S. S. Adrastus: At Yokohama, Japan	C		1													
	D		1													
S. S. Tabaristan: At Basra, Iraq	C				1											

Place		July, 1927	August, 1927	September, 1927	October, 1927	November, 1927			December, 1927			January, 1928			February, 1928	
						1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20
Indo-China (French):																
Annam	C	911	1,628	640	226	13	75	38	16	2		79	95	93	23	36
Cambodia	C	87	89	75	180	56	1	28	21	12	39	30	9	15	38	22
Cochin-China	C	257	68	144	178	21	27	52	17	38	58	46	119	130	178	113
Laos	C	20	190	36	67	10										
Tonkin	C	1,093	180	24	1			1			2	1				
Kwangchow-wan	C		1	15												

[1] From July 19 to Dec. 26, 1927, 1,479 cases of cholera were reported in Iraq, with 1,063 deaths, as follows: Amarah Liwa, 261 cases, 205 deaths; Baghdad Liwa, 80 cases, 60 deaths; Basra Liwa, 421 cases, 330 deaths; Diwaniah Liwa, 122 cases, 72 deaths; Diyalah Liwa, 1 case, 1 death; Dulaim Liwa, 100 cases, 69 deaths; Hillah Liwa, 105 cases, 71 deaths; Kerbalah Liwa, 79 cases, 60 deaths; Kut Liwa, 66 cases, 44 deaths; Muntafiq Liwa, 244 cases, 151 deaths.

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

PLAGUE

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

Place		July 31–Aug. 27, 1927	Aug. 28–Sept. 24, 1927	Sept. 25–Oct. 22, 1927	Oct. 23–Nov. 19, 1927	Week ended— Nov. 26, 1927	December, 1927 3	10	17	24	31	January, 1928 7	14	21	28	February, 1928 4	11	18	25	March, 1928 3	10
Algeria: Oran	C	4	1		2																
	D	3	1																		
Arabia: Aden	C												19	13	22	54	89	63	45	77	
	D												7	8	8	33	55	50	31	26	
Argentina:																					
Bahia Blanca district	C					1	1	1													
Buenos Aires	C																2				
Cordoba Province	C	2		P	P	10				1	1										
Entre Rios	C	5																			
Firmat	C								1												
Quilino	C					1	1	1													
Rosario	C					1	1	1	1	2	3				4			1			
Santiago Province	C																	1			
Ucacha	C								1												
Azores: St. Michaels Island	C	2	2	3	3	1	1	1		1		1		3	1	2	2				
	D		1	1				1					1	1	1	1	1				
Brazil:																					
Porto Alegre																				2	
Rio de Janeiro	C													1		1	2	3			
	D																1				
British East Africa:																					
Tanganyiki	C	P		P	P	P	P	P	P	P											
Uganda	C	456	226	99	99	24	27	16													
	D	345	158	88	96	21	25	15													
Canary Islands:																					
Las Palmas	C			9		1			2			2	1	1			1				
	D												1	1			1				
Teneriffe	C													1	3	3	3				
	D													1		3					
Ceylon: Colombo	C	1	3	1		1	1		4	3	2	1	1	1	1	1		3	3	4	
	D		3					2	4	3	1	1	1	1	1			1	3	1	
China:																					
Tientsin	C	2																			
Tungliao	D			200																	

Dutch East Indies:																						
Balik-Papan	C										1											
	D										1											
Celebes—Makassar	C				6	1		1		2	1		3	2	1	1	1		1			
	D				6	1		1		2	1		2	2	1	1	1		1			
Java	D		432	779	829	291	275	251	200	209	179											
Batavia and West Java	C	71	68	130	132	45	43	32	34	32	36	24	36	46	37	27						
	D	71	68	129	132	44	43	32	33	32	36	24	36	44	37	27						
Cheribon	C						1															
	D						1															
East Java and Madura	C	28	18	17	10	5	3			3	2	1	1	5	2							
	D	27	18	17	10	5	3			3	2	1	1	5	2							
Pasoeroean Residency	C					P	P	P														
Surabaya Residency	C						P															
Surakarta Residency	C				P	P	P															
Egypt:																						
Alexandria	C	2	1			5	3	2	2	3	2					1		1				
	D					5	2			1	1					1		1				
Suez	C		1										1	1		3		3	4			
	D												1	1		1		3	3	2		
Greece:																						
Athens and Piræus	C	1	3	1							2	1										
	D			1							1											
Mitylene	C	1	5	1	3	1	1	1														
Patras	C	2	2	1	1																	
	D			1	1																	
Hawaii Territory: Hawaii	D	1																1				
India	C	1,391	2,710	3,246	3,600	1,193	1,228	1,348	1,749	1,085	1,197	2,596	2,219	2,544								
	D	836	1,428	1,792	2,065	668	742	773	1,085	733	899	1,804	1,498	1,653								
Bassein	D	12	14	8	4	3			1	2	13	2		3	3		2	1	2	4		
Bombay	C	14	7	4							1		2	5	4	2						
	D	11	5	3							1		1	2	2	3	2	6	14	7		
Calcutta	C		18												1							
	D		10												1							
Madras Presidency	C	620	465	583	470	190	158	220	223	174	167	56	153	107	132							
	D	321	230	298	282	111	61	108	79	69	27	38	72	63	64							
Rangoon	C	15	6	11	11	5	2	6	2	2	4	4	7	8	9	7	11					
	D	14	6	11	11	5	2	5	3	2	3	4	7	7	7	6	10	12	15	6		
Indo-China: Saigon	C		2		1																	
Iraq:																						
Baghdad	C													1	1		2					
	D													1			1					
Dulaim Liwa	C															1						
Nigeria: Lagos	C				17	4	3	4	2	2	1	1	6	2	3	3	2	2	3			
	D				17	4	3	3	3	1	1	1	5	3	3	3	2	2	3			
Senegal: [1]																						
Baol	C	23	72	95	P		P															
	D	13	33	40																		
Cayor	C	227	463	176	48																	
	D	166	233	88	28																	
Dakar	C	46	20	1																		
	D	32	12																			

[1] During January, 1928, 5 cases were reported in interior of Senegal.

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

PLAGUE—Continued

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

Place		July 31–Aug. 27, 1927	Aug. 28–Sept. 24, 1927	Sept. 25–Oct. 22, 1927	Oct. 23–Nov. 19, 1927	Week ended— Nov. 26, 1927	December, 1927					January, 1928				February, 1928				March, 1928	
							3	10	17	24	31	7	14	21	28	4	11	18	25	3	10
Senegal—Continued.																					
Louga	C		5	8																	
	D		4																		
Rufisque	C	44	16																		
	D	38	12																		
Thies	C		9	1	1																
	D		7																		
Siam	C			13	1	2			1	1	7	4	4	5	3	6					
	D			9		1			1	1	1	5	4	1	1	5					
Bangkok	C			2							1				1		1				
	D				1						1				1		1				
Straits Settlements: Singapore	C				1											1	1	1			
	D				1											1	1	1			
Turkey: Constantinople	C		1	1		1	1														
	D			1			1														
Union of South Africa:																					
Cape Province	C				2			2						1							
	D				2			1						1							
Orange Free State	C				1	8	P								2						
	D				1	6									1						
U. S. S. R.:																					
Chita district	C			1																	
	D			1																	
Northern Caucasus	C		14	1																	
	D		10																		
Venezuela [2]																					
On vessel:																					
At La Plata, from Rosario, Argentina	C										1										
S. S. Aghios Gerasimos at, Vigo Spain	C				3																

Place		July	August	September	October	November	December	January
Algeria: Algiers	C				2			
British East Africa: Kenya	C	13	61	21	18	28	16	26
Ecuador: Gauyaquil	C	5	7	3	4	9	5	4
	D					3	2	4
Indo-China (French)	C			14	3	3	4	7
Madagascar	C	46	98	170	166	209	317	
	D	43	89	154	155	189	261	
Ambositra Province	C	6	1		6	1	18	
	D	6	1		6	1	10	
Antisirabe Province	C		34	5	19	18	72	
	D		34	4	10	17	72	
Itasy Province	C	14	11	21	16	26	62	
	D	14	7	20	15	25	54	
Moramanga Province	C	5	4	3	24	46	25	
	D	5	4	3	20	41	22	
Madagascar—Continued. Tananarive Province	C	21	48	142	99	170	139	
	D	19	43	127	93	153	108	
Mauritius	C			1				
Nigeria	C	9	8	15	27	16	20	16
	D	7	8	14	27	16	18	16
Peru	C	8	11	15	14	6	14	
	D	7	6	6	5	2	4	
Callao	D	3					3	
Lima	C						7	
	D				1	1	1	
Syria: Beirut	C						2	

SMALLPOX

Place		July 31–Aug. 27, 1927	Aug. 28–Sept. 24, 1927	Sept. 25–Oct. 22, 1927	Oct. 23–Nov. 19, 1927	Week ended— Nov. 26, 1927	December, 1927					January, 1928				February, 1928				March, 1928	
							3	10	17	24	31	7	14	21	28	4	11	18	25	3	10
Algeria	C	459	382	683	661		68	55	47	81	26	7	15	17	18	11					
Algiers	C								3	3	4		2	3	1	7					
Oran	C	9	16	11	20	9	11	10	9	8	15	2	4	2	2	4		1		2	
Arabia: Aden	C				1		1	1	1	1								1			
Brazil:																					
Para	C	1																			
Rio de Janeiro	C	6	10		1																
	D	4	9		1																
British East Africa: Tanganyiki	D	21	8	P	P	P	P	P				2	6	4							
British South Africa:																					
Northern Rhodesia	C	55	39	164	185	57	15	125	55	2	81	141	12	3		230					
	D	1	2	11	64	18	7	28	9		8	23				23					
Southern Rhodesia	C				3				2	1							3	2			

[2] Plague was reported at Tacata and Cua, State of Miranda, Venezuela, Mar. 11, 1928.

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

SMALLPOX—Continued

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

Place		July 31–Aug. 27, 1927	Aug. 28–Sept. 24, 1927	Sept. 25–Oct. 22, 1927	Oct. 23–Nov. 19, 1927	Week ended— Nov. 26, 1927	December, 1927					January, 1928				February, 1928				March, 1928	
							3	10	17	24	31	7	14	21	28	4	11	18	25	3	10
Canada:																					
Alberta	C	17	17	23	10	7	3	3	6		3	3	5	1	19	1	6		3		7
Calgary	C	1																			
Edmonton	C			1	1	6		1	1			3	2	1			2	1		11	1
British Columbia: Vancouver	C		2					4		1	3	3	1	11	3	1	11	2	1		1
Manitoba	C	13	9	7	19	1	3	1	2	2	2	2	5		1						
Winnipeg	C	5	4	2	2			1	1	1			1	1	1						
New Brunswick	C		2							1									1		
Nova Scotia	C		1	1																	
Halifax	C			1																	
Ontario	C	60	22	96	264	71	90	82	104		53	83	76	52	77	63	51	40	51		20
Hamilton	C						2														
Kingston	C				1					1							1				
Ottawa	C	27	40	67	134	10	19		34	18	9	10	23	20	16	23	9	11	3	1	7
Toronto	C		2	10	34		25	14		7		11	10	8	5	1	6	4	4	2	4
Windsor	C			9																	
Quebec	C	1		8	25	8	5	3		14	3	10	17	7		11	8	11	13		18
Montreal	C				1					1		1	6	3	4	1		5	1	3	
Quebec	C						2		2		2		3		5				2	5	
Riviere du Loup	C				3																
Saskatchewan	C	14	68	31	34	9	15	19	15	12	13	15	12	39	15	9	34	7	8		7
Moose Jaw	C	10	16	3					1		1	2	1	4	2	3	2		2	6	5
Regina	C	8		5	1				1												
Saskatoon	C							2			4			13	1		1		2		
Ceylon: Colombo	C	1			1		2							1		1	2	2	1		
	D	1					1							1							
China:																					
Antung	C												1								
Canton	C		1																		
	D		1																		
Chefoo	C		1	P		P															
	D		1																		
Foochow	C	P	P	P	P	P		P	P	P	P		P		P		P				

Hong Kong	C	1	2										1	1				3					
	D	1	2									1			1			1					
Manchuria—																							
Changchun	C					1									4								
Dairen	C			1	2				1			2	3					1					
	D			1																			
Fushun	C		1		1																		
Harbin	C								2		1				2								
Mukden	C			2	1										1		3	18					
Pensihu	C			1																			
Shanghai—																							
Foreigners only	C													1	2		2	1					
Including natives	D													3	2	3	3	5	4				
Tientsin	C		4	13	8	4	1	2	2	2			6	20	10	10	8						
Curacao (alastrim)	C													2				3					
Dutch East Indies:																							
Borneo—																							
Samarinda District	C				P																		
South and East Borneo Residency	C	P																					
Java—																							
Batavia and West Java	C	4		4	25											1							
	D				15																		
East Java and Madura	C	4	22	8	9	4	3	2			3	1	1	2									
	D			1																			
Sumatra: Medan	C								3		8		1	3	5	5	10						
	D								2		1		2	4	4		3						
Egypt	C		3				4				4												
	D		1	1				1															
Cairo	C					1	1																
Great Britain:																							
England and Wales	C	568	508	473	902	233	366	230	212	255	247	275	398	405	370	386	369	369	392	365			
Birmingham	C	1		1										14	17	11	2	1		2			
Bradford	C				11	9	6	2	2	2	2	4	24	6	9	7	2	7	1				
Bristol	C			6	4	2	4	2							2		1			1			
Cardiff	C				1							1											
Leeds	C	5	3	7	5	3	3	6	4	4	6	1		1			2	1	2	4			
Liverpool	C												1										
London	C													2		1	5	10	1	2			
Manchester	C			3	6	2	5	10	8		1	2	2	11	6	4	4	1	4	1			
Newcastle upon Tyne	C	1	2	6	9	28	18	5	4	2	13	2	5	14	3	4	6	4	1	4			
Nottingham	C											7	6	4	8	6	9	6	1	3			
Sheffield	C	2	1	10	6	1	8			3		1	10	4		4		1	2	2			
Stoke on Trent	C	1										3	1			1		2	4	3			
Greece: Saloniki	D	2																					
India	C	5,911	4,398	3,153	4,052	1,031	1,556	1,939	2,205	2,225	2,502	2,664	3,285	4,129									
	D	1,668	1,120	715	927	307	359	465	519	515	578	551	785	964									
Bassein	C	1															1						
	D	1																					
Bombay	C	33	12	10	4		4		5		4	4	6	10	23	10	18	29	23				
	D	19	8	2	3		1		1					2	8	7	7	15	13				

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

SMALLPOX—Continued

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

Place		July 31–Aug. 27, 1927	Aug. 28–Sept. 24, 1927	Sept. 25–Oct. 22, 1927	Oct. 23–Nov. 19, 1927	Week ended— Nov. 26, 1927	December, 1927					January, 1928				February, 1928				March, 1928	
							3	10	17	24	31	7	14	21	28	4	11	18	25	3	10
India—Continued.																					
Calcutta	C	27	22	5	5	4	3	11	7	----	17	9	14	14	11	23	10	9	18	----	----
	D	25	----	6	2	2	1	6	2	----	17	4	6	10	7	10	7	5	11	----	----
Madras	C	6	7	8	7	2	2	5	2	2	----	11	8	9	16	20	29	15	33	----	----
	D	----	2	----	2	1	1	1	----	1	----	4	1	3	2	2	1	3	3	----	----
Nagapatam	C	3	1	----	----	----	----	----	----	----	----	----	5	----	4	2	2	1	----	----	----
	D	2	1	----	----	----	----	----	----	----	----	----	3	----	2	1	----	----	----	----	----
Rangoon	C	14	9	17	6	5	2	1	6	36	28	23	49	41	34	103	97	----	82	----	----
	D	3	2	3	1	1	1	----	2	5	13	4	9	13	10	18	23	----	24	----	----
Vizagapatam	C	----	3	----	----	----	----	----	----	----	----	3	----	2	1	5	2	----	1	----	----
	D	----	2	----	----	----	----	----	----	----	----	----	----	6	1	----	1	----	----	----	----
India (French):																					
Karikal	C	3	1	2	P	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
	D	3	1	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Pondicherry	C	39	37	38	42	15	6	6	14	6	16	25	18	15	----	----	----	----	----	----	----
	D	31	37	38	42	15	6	6	14	6	14	12	18	15	----	----	----	----	----	----	----
Indo-China: Saigon	C	1	1	----	----	----	----	----	1	----	1	1	1	----	----	----	----	----	----	----	----
Iraq:																					
Baghdad	C	----	1	7	5	1	5	7	12	9	9	3	2	7	6	5	3	----	----	----	----
	D	----	1	4	4	----	5	4	5	7	3	2	----	3	3	2	1	----	----	----	----
Basra	C	1	4	2	3	----	2	2	----	----	2	----	----	1	----	----	----	----	----	----	----
	D	1	4	2	1	----	2	1	----	----	1	----	----	----	----	----	----	----	----	----	----
Italy (Rome and vicinity)	C	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Jamaica (outside Kingston) (alastrim)	C	6	9	9	7	1	----	1	1	----	2	----	----	----	4	----	1	1	3	----	----
Kingston	C	----	3	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Japan:																					
Nagasaki	C	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
	D	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Tokyo	C	----	----	----	----	----	----	----	----	----	----	----	----	2	1	----	1	----	----	----	----
	D	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	----	----	----	----	----
Mexico:																					
Acapulco	C	----	2	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
	D	----	2	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Chihuahua	D	----	----	----	----	----	----	----	----	----	----	1	----	----	----	----	----	----	----	----	----
Guadalajara	D	----	----	----	----	1	----	----	1	----	----	----	----	----	----	----	----	----	----	1	----

Manzanillo	D													1									
Mexico City and surrounding territory	C					1	1	1	1								1	1	2				
Monterey	C																						
	D																						
San Luis Potosi	D	1																					
Tampico	C																						
Torreon	D	1		2																1			
Palestine: Jerusalem	C						1									1							
Paraguay	D																						
Persia: Teheran	D																						
Poland	C	2							1	5	1				1		1		1				
	D	1																					
Porto Rico [1]																							
Portugal:																							
Lisbon	C		3	8	4		3	3	4	1	2	4	5	5	2	2		3	3	9			
	D								1														
Oporto	C		1																				
Senegal: Dakar	C																						
Siam	C	51	27	6	1		8		1	2	5	8	8	13	7	5			8				
	D	10	15						1			2		1	1	2							
Bangkok	C		3		1		1				1	2											
	D		1									1											
Spain:																							
Malaga	D				1	1																	
Seville	C														1								
Valencia	C			1							1	1											
Straits Settlements: Singapore	C				1														1				
Switzerland	C									2													
Tunisia: Tunis	C										2	2			3				2				
Union of South Africa:																							
Cape Province	C	P		P										P									
Orange Free State	C	P			P	P	P	P	P	P				P									
Transvaal	C			P	7																		
Venezuela: Maracaibo	D		2	1															1				

Place		July, 1927	August, 1927	September, 1927	October, 1927	November, 1927			December, 1927			January, 1928			February, 1928	
						1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20
Algeria	C	376	459	382	682											
Oran	C	14	10	16	11											
Indo-China	C	19	3	21	25	13	3	22	10	4	20		40	18		
Syria:																
Aleppo	C										1		1			
Beirut	C								1		1			15	11	26
Damascus	C		3	5	22		13		4	6	2	11	2			

[1] An epidemic of smallpox near Fajardo, P. R., was unofficially reported Mar. 12, 1928.

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

SMALLPOX—Continued

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

Place		July	August	September	October	November	December	January
Angola	C	42	2	5	73	71		
	D				2			
Congo	C			5	77			
Cuanza-Norte	C			1				
Cuanza-Sul	C				2			
Loanda	C			1				
Zaire	C			3	4	1		
Brazil: Porto Alegre	C	5	3	3	4	1		
British East Africa: Zanzibar	C				2			
	D				1			
Chosen	C	19	2		2	2		
	D	6				1		
Ecuador, Guayaquil	C		2	2	1	1	4	2
France	C	23	6	8	7	4	14	11
Gold Coast	C	1	1	5	4			

Place		July	August	September	October	November	December	January
Greece	C	3	3	4	4		5	6
Latvia	C				2			
Mexico	D	93	73	55				
Morocco	C	53	76	51	81	140	401	55
Nigeria	C	492	91	237	223	93		
	D	83	20	70	51	30		
Persia	D					2		
Spain: Madrid	D					1		
U. S. S. R.:								
Railways, etc	C	11	6	9	7	11		
Other territories in Europe	C	146	111	109	220			
Transcaucasus, Siberia, and Central Asia	C	36	29	15	40	21		
Ukraine	C	16	4	7	11	20		

TYPHUS FEVER

Place		July 31–Aug. 27, 1927	Aug. 28–Sept. 24, 1927	Sept. 25–Oct. 22, 1927	Oct. 23–Nov. 19, 1927	Week ended— Nov. 26, 1927	December, 1927: 3	10	17	24	31	January, 1928: 7	14	21	28	February, 1928: 4	11	18	25	Mar. 3, 1928
Algeria:																				
Algiers	C														1					
Oran	C									1	1	1	1		2			2		6
Austria: Vienna	C															1				
Bulgaria: Sofia	C			17	6				1	1	4	1		1						
	D				1															
Chile:																				
Antofagasta	D			1																
Valparaiso	C		1		1	1	1						1							
	D	2	1		2															

China:																					
Manchuria—Harbin	C	2			1																
Tientsin	C		2																		
Egypt	C	2		12	4	1	7	3	3	1									1		
	D	3		5			5	1	2												
Cairo	C							1	1												
	D							1													
Port Said	C			1			1														
Ireland (Irish Free State):																					
Cork County	C							3				1									
Donegal County, Letterkenny	C			4																	
Mexico:																					
Guadalajara	D					1															
Mexico City, including municipalities in Federal District	C	17	19	18	28	7	6	4		4	4	4	3	2	1		2	1			
	D				2				1	1	3	1									
Morocco	C											107	235	257	214	370	210				
Palestine	C	11	1	5	3	5	1	2	1				8		2	2	1	1			
Poland	C	50	35	19	64	13	28	17	35	26	33	68	68	101	92	87	66				
	D	6	2	4	11	1	5		4	1	3	6	6	4	3	5	7				
Portugal: Oporto	C	1			1												1				
Rumania	C	36	16	17	22	6	8	8	13	32	17	19									
	D	1		2							2	1									
Syria: Aleppo	C		2									2									
Tunisia	C	14	1	3	1				1	1			5	4				1			
Union of South Africa:																					
Cape Province	C	P	P	P	P	P	P	P	P	P	1	P		P	P	1					
Natal	C	P	P	P	P	P	P	1	1	2	P	P	1		P						
Orange Free State	C			P				P								P					
Transvaal	C	1		5	P	P	P									P					

Place		1927				November, 1927			December, 1927			Jan. 1-10, 1928
		July	August	September	October	1-10	11-20	21-30	1-10	11-20	21-31	
Algeria	C	67	33	10	12							
	D	13			1							
Algiers	C	2	2	6	2							
Bulgaria	C	12	24	7	2							
	D		1	2	1						2	7
Morocco	C	148	76	7	11	5	14	7	5	6	1 75	

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

TYPHUS FEVER—Continued

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

Place		July	August	September	October	November	December	January
Argentina	C					1		
	D						1	
China: Shanghai	D					1		
Chosen	C	72	17	1	16	26	38	
	D	8			1	2	3	
Chemulpo	C	1	2					1
Gensan	C	2						1
Seoul	C	2	3		2			
	D	1			1			
Czechoslovakia	C	6		6	1		6	
Greece: Athens	C	1		2			1	2
Japan	C	1						
Latvia	C	6						
Lithuania	C	44	18	7	9	18	27	86
	D	5	8	1	1	1	1	10
Mexico	D	12	38	14	36	29		
Peru:								
Arequipa	D		2	1	2		1	2
Lima	D	8						
U. S. S. R.:								
Railways, etc	C	30	22	25	23	33		
Transcaucasus, Siberia, and Central Asia	C	79	69	60	61	49		
Ukraine	C	96	85	114	151	198		
Other territories in Europe	C	732	552	555	521			
Yugoslavia	C	11	9		1	1		7
	D	4	1					3

YELLOW FEVER

Place		July 3–30, 1927	July 31–Aug. 27, 1927	Aug. 28–Sept. 24, 1927	Sept. 29–Oct. 22, 1927	Week ended— Oct. 29, 1927	November, 1927 5	12	19	26	December, 1927 3	10	17	24	31	January, 1928 7	14	21	28	Feb. 4, 1928
Ashanti: Obuasi	C		1																	
	D		1																	
Belgian Congo:																				
Boma	C														3					
	D														2					
Matadi	C														6	12	11	1	5	8
	D														2	6	8	2	5	6

Dahomey:																					
Grand Popo	C									1											
	D									1											
Porto Novo	C	1																			
	D	1																			
Ivory Coast	C	1												1							
	D	1												1							
Liberia: Monrovia	C			1																	
Nigeria	C			2																	
	D			2																	
Senegal	C	3	10	21	31	9	16	6	6	7											
	D	3	9	21	31	8	10	4	4	6											
Dakar	C	1			12	3	6		5	2	1	4			1	1					
	D				7	2	4		4	2	1	4			1	1					
Togoland	C		1																		
	D		1																		

Place		July	August	September	October
Gold Coast	C	15	2	6	1
	D	4	2	4	1

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