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DEVELOPMENT OF THE PROPOSED MORBIDITY REPORTING AREA[1]

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At the two preceding meetings of this conference there were presented for your consideration certain suggestions relative to the establishment of a proposed morbidity reporting area. It appears to be the general consensus of opinion that in order to encourage the reporting of notifiable diseases and to secure certain and fairly comparable reports from the several States it was desirable to establish a morbidity reporting area. The purpose of this report is to present the results of the experience of the past three years in considering the feasibility and practicability of the establishment of such an area.

During the year 1930, surveys were conducted by State and local health officers, at the suggestion of the Public Health Service, in 5 States, 35 cities, and 101 counties, in an attempt to ascertain the completeness of reporting by the systems now in use. It was the expectation that those jurisdictions which could show that they were securing reports of 75 per cent of the cases of diphtheria, poliomyelitis, scarlet fever, smallpox, typhoid fever, and tuberculosis actually occurring should be admitted to the proposed morbidity reporting area. It is desired to acknowledge here, with thanks, the splendid cooperation given the Public Health Service in this matter by those State and local health officers who conducted state-wide and local surveys. The results of the state-wide surveys were most informative. The efforts of those State health officers in conducting such state-wide health surveys are especially appreciated. The data which were made available through such surveys have, perhaps, never been collected before on such a broad scale. In general it may be said that these state-wide surveys show that certain diseases are well reported in some States, while the same diseases may be poorly reported in other States.

It was evident that tuberculosis was poorly reported in all States. In general it is believed safe to state that the completeness of the reporting of the communicable diseases is below what was expected.

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It is doubtful that in many States more than 50 per cent of the cases actually occurring are reported to health officials.

These surveys have been most useful, as they emphasize quite clearly the present inadequacy of the reporting of communicable diseases throughout the country and the need for improving reports dealing with the prevalence of diseases.

The results of the surveys conducted in this manner as a whole have not been satisfactory, although much valuable information relative to morbidity reports and reporting has been secured. The principal difficulty encountered was that in many jurisdictions the number of cases was too small to give reliable information as to the completeness of the reporting. It will be recalled that the purpose of these surveys was to reach at least 1 per cent of the population and endeavor to check the cases of certain communicable diseases found against those reported to the health authorities.

Several plans for the establishment of a morbidity reporting area have been proposed. In 1916 Dr. John S. Fulton, then State health officer of Maryland, presented to the conference a plan for the establishment of an "area of known disease prevalence," based on case fatality rates. He computed fatality rates for measles, scarlet fever, diphtheria, and typhoid fever for the four years 1912 to 1915, including the States which were in the registration area for deaths.

The Public Health Service has considered at least two plans for the establishment of such an area, neither of which so far has appeared to be entirely practicable. As a further method of developing the reporting of communicable diseases, the Public Health Service had planned to secure the reports from the reporting area by payment to State health departments of 5 cents for each transcription of the original report of a case, but so far appropriations for this purpose have not been obtained. This particular method has several points to commend it. It would allow the Public Health Service to secure copies of the original reports. These would be of great value in making mass epidemiological statistical studies. No doubt much important information could be obtained from such statistical investigations. Another factor is that it would remunerate the State health department for its work and thus, in some instances, provide almost enough income to maintain an employee whose entire time could be given to the stimulation and improvement of disease reporting.

About a year ago the New York State Health Department suggested a tentative plan for determining admissibility to the morbidity reporting area, the principal feature of which was a comparison of the case fatality rates. This plan has been extensively modified and is being presented for your consideration.

After the computations made by the Public Health Service had been completed, it was found that the list of States having case fatality rates which indicated better than average morbidity reports was exactly the same as the list prepared by the New York State Health Department, although the computations were made in a different way and the years included were not the same.

It is believed that the plan herein described can be put into operation without specific appropriations at the beginning, and if it is approved by this conference it is probable that the actual work of securing morbidity reports from the area can be begun within a few months. This plan is based (*a*) on the facilities of the health department for collecting reports of cases of notifiable diseases and (*b*) on the case fatality rates for five diseases for three years. The requirements are as follows: (1) Inclusion in the registration areas for deaths and births; (2) adequate legislation to enforce reporting; (3) machinery for securing reports and keeping records; (4) a clerical force sufficient to do the work required; and (5) a willingness to cooperate in efforts to secure more nearly accurate and more nearly complete reports of morbidity.

Consideration is given to the results of the survey of the completeness of morbidity reporting which was conducted during 1930 in all States where this survey was made. In addition, the reports to the Public Health Service for the years 1927, 1928, and 1929 have been examined and an analysis of these reports on the basis of case fatality rates has been made. The diseases used in the analysis were diphtheria, measles, scarlet fever, typhoid fever, and whooping cough.

For each year for each disease we calculated a fatality rate based on all cases and deaths reported to the Public Health Service by all States which were in the registration area for deaths. This gave 15 standards, each of which was practically the average fatality rate for one year for one disease in the entire death registration area.

The reciprocal of each fatality rate for each State was divided by the reciprocal of the proper standard fatality rate, and the resulting percentages were tabulated. The percentages for each State for the three years were averaged, and then these separate averages for the five diseases were again averaged. This gave a single percentage for each State, which percentage was based on the fatality rates for three years for the five diseases. States showing a general average of more than 100 per cent (that is, having better reporting than the average as indicated by the fatality rates) were graded "Standard," while those States falling below the average of 100 per cent were classed as "Below standard." Equal weight was given to the fatality rates for each of the five diseases.

The following lists show the results of applying the method outlined, which is based on the fatality rates alone:

STATES RATED STANDARD

(Above the average number of cases reported for each death)

1. California.
2. Connecticut.
3. District of Columbia.
4. Illinois.
5. Kansas.
6. Maryland.
7. Massachusetts.
8. Michigan.
9. Minnesota.
10. Mississippi.
11. New Jersey.
12. New York.
13. North Carolina.
14. Ohio.
15. Oregon.
16. Pennsylvania.
17. Rhode Island.
18. South Carolina.
19. Utah.
20. Vermont.
21. Virginia.
22. Washington.
23. Wisconsin.
24. Wyoming.

STATES RATED BELOW STANDARD

(Below the average number of cases reported for each death)

1. Alabama.
2. Arizona.
3. Arkansas.
4. Colorado.
5. Delaware.
6. Florida.
7. Idaho.
8. Indiana.
9. Iowa.
10. Kentucky.
11. Louisiana.
12. Maine.
13. Missouri.
14. Nebraska.
15. New Hampshire.
16. North Dakota.
17. Oklahoma.
18. South Dakota.
19. Tennessee.
20. Texas.
21. West Virginia.

In the following-named States complete data for the three years were not available.

1. Georgia.
2. Montana.
3. Nevada.
4. New Mexico.

The computations were made on the numbers of cases and deaths for each disease as reported to the Public Health Service, but the figures for States which were near the dividing line were corrected by using the deaths as published by the Bureau of the Census.

The average number of cases for each death for the three years is as follows:

	Cases
Diphtheria	11
Measles	106
Scarlet fever	78
Typhoid fever	5
Whooping cough	26

This table is based on the aggregate number of cases as reported to the Public Health Service and the number of deaths as published by the Bureau of the Census.

The accompanying tables illustrate the method used in arriving at the percentages for each State.

Examples showing method of arriving at percentage for each State

MAINE

Disease and year	Cases reported	Deaths registered	Cases reported per death registered: Maine	Cases reported per death registered: Registration area (standard)	Per cent of standard	Average per cent for the 3 years
Diphtheria						76
1927	224	30	7.47	12.218	61	
1928	210	25	8.40	10.930	77	
1929	156	16	9.75	10.929	89	
Measles						83
1927	4,697	80	58.71	101.314	58	
1928	3,927	38	103.34	93.563	110	
1929	5,641	57	98.96	124.106	80	
Scarlet fever						104
1927	1,550	36	43.06	82.308	52	
1928	1,165	17	68.53	77.439	88	
1929	1,386	11	126.00	73.073	172	
Typhoid fever						127
1927	227	28	8.11	5.204	156	
1928	135	36	3.75	4.760	79	
1929	156	23	6.78	4.689	145	
Whooping cough						91
1927	1,584	75	21.12	24.193	87	
1928	1,290	54	23.89	25.863	92	
1929	965	38	25.39	27.052	94	
Final average of yearly averages for the 5 diseases						96

NEW YORK

Disease and year	Cases reported	Deaths registered	Cases reported per death registered: New York	Cases reported per death registered: Registration area (standard)	Per cent of standard	Average per cent for the 3 years
Diphtheria						145
1927	17,421	1,002	17.39	12.218	142	
1928	13,674	876	15.61	10.930	143	
1929	10,816	663	16.31	10.929	149	
Measles						131
1927	26,658	197	135.32	101.314	134	
1928	75,806	598	126.77	93.563	135	
1929	30,007	195	153.88	124.106	124	
Scarlet fever						144
1927	29,196	219	133.32	82.308	162	
1928	21,598	188	114.88	77.439	148	
1929	16,392	186	88.13	73.073	121	
Typhoid fever						162
1927	1,659	190	8.73	5.204	168	
1928	1,613	205	7.87	4.760	165	
1929	1,195	167	7.16	4.689	153	
Whooping cough						135
1927	16,231	510	31.83	24.193	132	
1928	19,075	595	32.06	25.863	124	
1929	16,256	403	40.34	27.052	149	
Final average of yearly averages for the 5 diseases						143

It is realized that this plan is not entirely above criticism. Many health authorities contend that fatality rates are so variable that these alone should not be used as a yardstick in measuring the prevalence of disease. There is some evidence to substantiate this view. However, the problem of improving the reporting of disease and the establishment of standards therefor is an extremely complicated matter. It appears that, at least for the present, some such plan as mentioned above is the most practicable one that can be put into effect. It has the advantage of being applicable at the present time, it does not require additional appropriations, and it may be varied to meet changing conditions of the future.

It is unfortunate that some States that have excellent health departments and are doing good health work are not included among the States listed as attaining the required standard. Some of these States are handicapped by local conditions which make the securing of morbidity reports more difficult than it is in other States. It is believed, however, that most of the States, with some effort, can soon reach the present average standards as shown in the table presented.

The establishment of the morbidity reporting area will not supersede the reports now received, compiled, and published. The Public Health Service now receives and disseminates some morbidity information from all of the States, the District of Columbia, Porto Rico, Hawaii, Alaska, and the Philippine Islands. It is not intended that these reports shall be curtailed, but it is hoped that the reports sent out by the Public Health Service may be made more valuable to the health officers.

No provision has been made for the admission of cities in States not included in the area; but if any State health officer desires that cities of considerable size in his State be admitted with a view to encouraging the State as a whole to meet the requirements, such an arrangement can probably be made.

It is proposed that all States that qualify be admitted tentatively. If the needed data can not be supplied regularly and with reasonable promptness, such States will not be included in the area as finally determined.

The matter of whether it is desirable that this proposed morbidity reporting area be definitely established on the basis as above described or whether its establishment should further be postponed until some more feasible plan may be devised is submitted for your consideration. In the absence of a better plan, it is recommended that your approval be given for the tentative establishment of an area to which States that attain the average standard reporting of the prevalence of disease may be admitted, these standards to be increased or changed as varying conditions may determine.

(EDITORIAL NOTE.—The conference unanimously approved the plan here outlined for the establishment of a morbidity reporting area.—Ed.)

STUDIES ON THE BIOCHEMISTRY OF SULPHUR

XI. THE SUBSTITUTION OF DITHIOETHYLAMINE (CYSTINE AMINE) FOR CYSTINE IN THE DIET OF THE WHITE RAT

By M. X. SULLIVAN, *Senior Biochemist*, W. C. HESS, *Assistant Chemist*, and W. H. SEBRELL, *Passed Assistant Surgeon, United States Public Health Service*

Osborne and Mendel (1915) gave evidence that the maintenance and growth of the white rat on a casein diet depended on the content of cystine, the sulphur-containing amino acid. They obtained normal growth on an 18 per cent casein diet supplemented by protein-free milk and butterfat. On a similar diet, but with the casein reduced to 9 per cent, subnormal growth occurred. The addition of cystine without any other supplement at once rendered the ration adequate for growth. When the diet contained 4.5 per cent or even 6 per cent of casein, little growth occurred and the addition of cystine no longer sufficed to facilitate growth as vigorously as it did in the case where 9 per cent of casein was used.

Lewis (1924), and Mitchell and Hamilton (1929) review experimental work which shows that feeding cystine increases the sulphate content of the urine and that the taurine in the taurocholic acid of the bile is derived from cystine. Friedmann (1903) oxidized cystine *in vitro* to cysteic acid by bromine water and converted the cysteic acid to taurine by decarboxylation at high temperatures. Based on Friedmann's work the formation of taurine from cystine in the animal body is presumed to proceed according to the following scheme:

cystine —	>cysteine —	>cysteic acid —	>taurine
$CH_2S—SCH_2$	CH_2SH	CH_2SO_3H	CH_2SO_3H
$CHNH_2$ $CHNH_2$	$CHNH_2$	$CHNH_2$	CH_2NH_2
COOH COOH	COOH	COOH	

Neither inorganic sulphates (Daniels and Rich, 1918) nor elementary sulphur (Geiling, 1917) (Lewis and Lewis, 1927) can serve as a substitute for cystine in the diet of white mice and rats. M. L. Mitchell (1924), on the other hand, published observations which indicate that taurine can replace cystine in the diet of mice. His results, however, have not been confirmed by later investigators. Thus Beard (1925–26) and Rose and Huddlestun (1926) found taurine of little value as a substitute for cystine in the diet of mice and rats, respectively. Lewis and Lewis (1926) concluded further that neither taurine nor cysteic acid can replace cystine even in part for the purposes of growth of the white rat. Later, Westerman and Rose (1927) concluded that neither dithioglycollic acid $CH_2S—SCH_2$ (COOH COOH) nor β-dithiodipropionic acid $CH_2S—SCH_2$ (CH_2 CH_2; COOH COOH) can serve as a substitute for cystine in the diet of the white rat.

As far as can be ascertained no one has ever tested the amine $CH_2S - SCH_2$ (CH_2NH_2 CH_2NH_2) as a substitute for cystine in the dietary of rats. This amine was made on a small scale by Neuberg and Ascher (1907) by decarboxylation of cystine by heat and was called amino-ethyl disulphide. Gabriel (1891) synthesized it and named it dithioethylamine.

To point out its close connection with cystine and to distinguish it from $\begin{array}{l}CH_2SH \\ | \\ CH_2NH_2\end{array}$ corresponding to cysteine, Sullivan and Hess (1929) gave it the short name cystine amine.

In view of the relationship of this amine to cystine and its behavior in the Sullivan cystine reaction (Sullivan and Hess, 1929) feeding experiments were started to determine whether or not this sulphur-containing amine can be substituted for cystine in the dietary of the white rat. These experiments give evidence that the so-called cystine amine, employed as the hydrochloride, can replace cystine to a considerable degree for the purpose of growth of the young white rat.

EXPERIMENTAL

Feeding experiments with cystine and cystine amine.—Young male white rats 27 to 31 days old and weighing approximately 55 grams were selected as the experimental animals. All the rats were from the same stock colony bred at the National Institute of Health for nutrition studies. All the young rats used were from mothers on the standard régime recommended by McCollum to Evans and Bishop (1922) and used by them in breeding experiments. The only modification in our work was the use of lettuce as an aid to reproduction. The constitution of the standard diet is given in Table 1.

TABLE 1.—*Stock diet*

Ingredient	Grams
Whole wheat flour	67.5
Commercial casein	15.0
Whole milk powder	10.0
Butter fat	5.0
Calcium carbonate	1.5
Sodium chloride	1.0
	100.0

Lettuce daily ad lib.

For the work detailed in this paper a basal diet which gave a slight growth was first established. This was obtained by starting with a diet comparable to diet 313T (Table 2) with 9 per cent casein and 77 per cent cornstarch. At a level of 9 per cent casein, rapid growth occurred. A 6 per cent casein diet (313T) also gave good growth. At the 4 per cent casein level (diet 349), slow growth occurred. Accordingly, diet 349 (Table 2) was made use of as a basal ration. To obtain data as to the relative value of cystine and cystine amine supplements, 0.5 gram of cystine and 0.5 gram of cystine amine dihydrochloride approximately molar equivalents were substituted for a corresponding amount of cornstarch as given in diets 349A and 364, Table 2.

TABLE 2.—*Diets employed in feeding experiments on the comparative value of cystine and cystine amine*

Ingredient	Diet 313T	Diet 349	Diet 349A	Diet 364
	Gm.	*Gm.*	*Gm.*	*Gm.*
Casein leached	6.0	4.0	4.0	4.0
Salt mixture (O. and M.)	4.0	4.0	4.0	4.0
Cod-liver oil	2.0	2.0	2.0	2.0
Cottonseed oil	3.0	3.0	3.0	3.0
Brewers' yeast (dried)	5.0	5.0	5.0	5.0
Cornstarch	80.0	82.0	81.5	81.5
Cystine			.5	
Cystine amine dihydrochloride				.5

The casein used had been leached with 2 per cent acetic acid as recommended by McCollum (1922). It was then dried in a current of hot air at about 120° C. The salt mixture was that of Osborne and Mendel (1919). The cod-liver oil was a Norwegian oil. The brewers' yeast was a dried commercial sample which had been found effective in aiding growth and preventing polyneuritis when added at a 5 per cent level. The cystine had a rotation of $[\alpha]_D^{20} -213.1$ determined on a 1 per cent solution in N hydrochloric acid. The cystine amine hydrochloride was made by the Gabriel (1891) synthesis as detailed by Sullivan and Hess (1929). The feeding experiments were conducted concomitantly on litter mates in the case of the basal diet and the basal diet plus cystine, with four rats on each diet. The cystine amine experiment was carried on later with a different set of litter mates. Each rat was in an individual cage. Each diet was eaten readily.

DIFFERENCES IN THE GROSS APPEARANCE OF THE RATS ON THE THREE DIETS

Basal.—The rats on the basal diet kept the soft, downy hair of baby rats to the end of the experiment, 20 weeks. There was in the interval more or less depilation of the abdomen, the medial surface of the thighs, and parts of the scrotum.

Basal plus cystine.—The hair of the rats on this diet was normal adult hair in excellent condition at the end of the experiment. There was little if any depilation during the feeding period.

Basal plus cystine amine.—The hair remained infantile for a number of weeks but finally appeared as normal adult hair. There was little if any depilation during the feeding period.

Though differing somewhat in size, all the rats were in excellent condition throughout the experiment.

As measured by gain in weight the results of the feeding experiments are shown in Table 3 and Charts 1, 2, and 3.

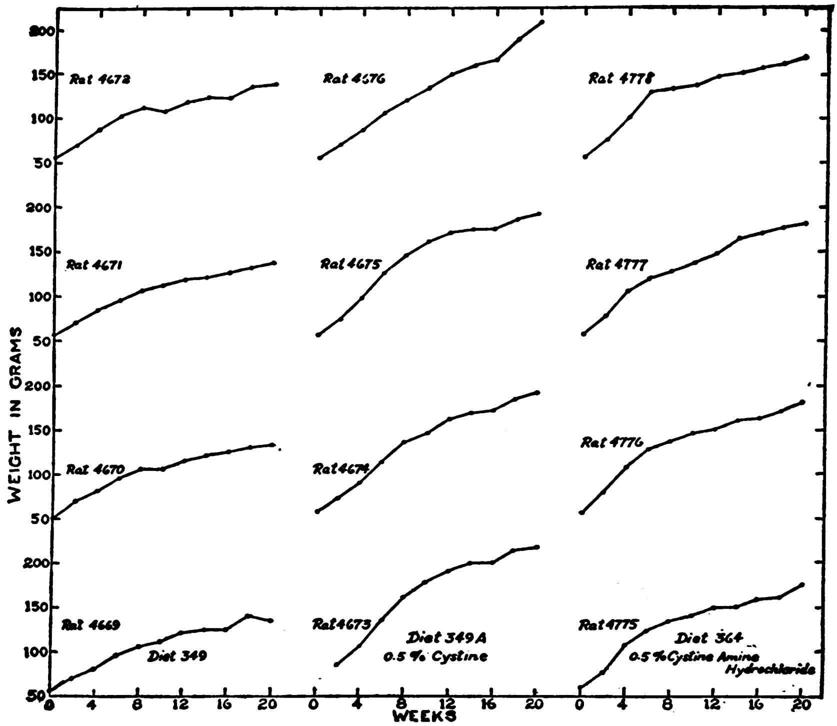

CHART 1.—Individual weight curves of the rats on each of the three experimental diets

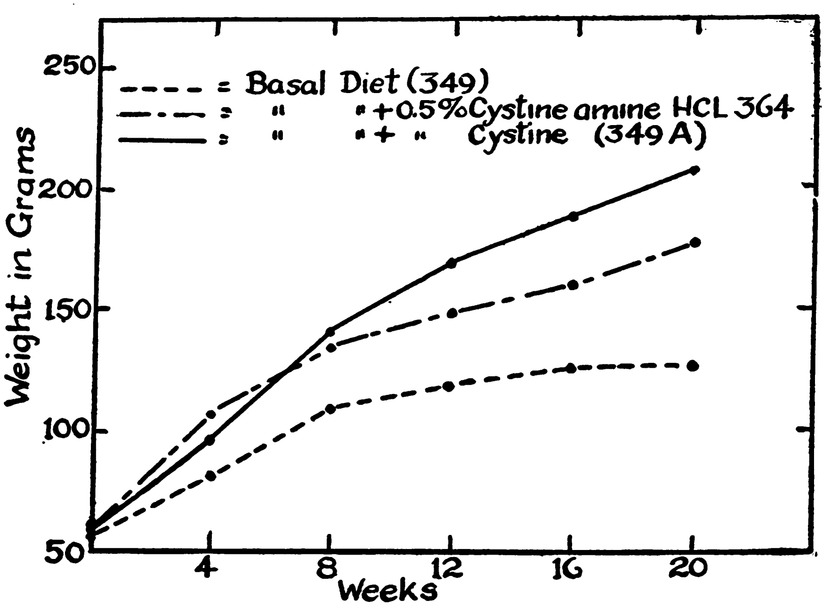

CHART 2.—Composite weight curves of the four rats on each of the three experimental diets

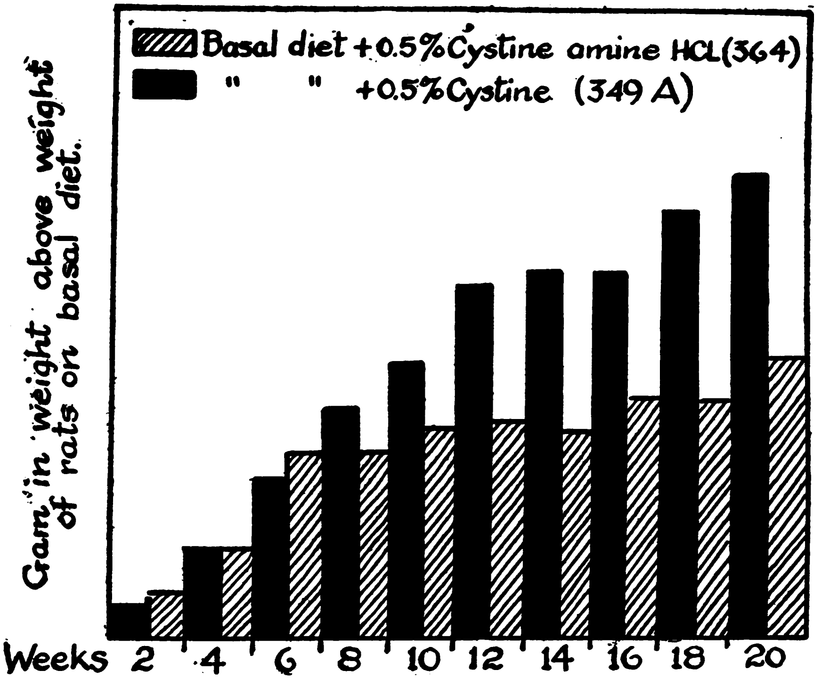

CHART 3.—Gain in weight of the rats receiving cystine and cystine amine, respectively, over the weight of the rats on the basal diet, at two-week intervals

TABLE 3.—*Summary of feeding experiments*

LITTER A548

Rat No.	Duration, weeks	Diet	Initial weight	Final weight	Gain
			Gm.	Gm.	Gm.
4669	20	Basal (349)	56	135	79
4670			55	133	78
4671			56	137	81
4672			56	139	83
Average			55.75	136	80.25

LITTER A548

Rat No.	Duration, weeks	Diet	Initial weight	Final weight	Gain
4673	20	Basal + cystine (349A)	60	217	157
4674			56	189	133
4675			56	190	134
4676			55	209	154
Average			56.75	201.25	144.5

LITTER A593

Rat No.	Duration, weeks	Diet	Initial weight	Final weight	Gain
4775	20	Basal + cystine amine (364)	58	177	119
4776			57	184	127
4777			58	182	124
4778			56	172	116
Average			57.25	178.75	121.5

Charts 1, 2, and 3 and Table 3 show that both cystine and cystine amine give increased growth of the rats over that given by the basal diet. The increase over that on the basal diet given by cystine in 20 weeks' feeding is 64.25 grams (average of 4 rats); by cystine amine 41.25 grams (average of 4 rats). Accordingly, 64.2 per cent of the weight increase obtained by adding cystine at a 0.5 per cent level to the basal diet is given by the cystine amine dehydro-chloride at the same level.

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EXPERIMENTAL STUDIES OF NATURAL PURIFICATION IN POLLUTED WATERS

VI. RATE OF DISAPPEARANCE OF OXYGEN IN SLUDGE[1]

By Emery J. Theriault, *Chemist*, and Paul D. McNamee, *Technical Assistant*, *United States Public Health Service*

The experiments to be presented in this paper were undertaken in January, 1929, and, with few interruptions, were continued for almost a year. The purpose of the experiments was to discover a possible reason for the remarkably high rate of purification observed when grossly polluted water is passed through a system of artificial channels located on the grounds of the stream-pollution laboratory in Cincinnati, Ohio.

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[1] Presented under the subtitle before the Division of Water, Sewage, and Sanitation at the Eightieth meeting of the American Chemical Society, Cincinnati, Ohio, Sept. 8-12, 1930, and published in *Industrial and Engineering Chemistry*, 22, 1330-1336 (1930).

These channels may be described as a series of shallow troughs, about 1 mile long, through which polluted water may be passed at a uniform rate. Under ordinary conditions of operation a heavy mat of sludge soon forms on the small stones or pebbles with which the bottom of the troughs is lined. In this respect the artificial channels simulate a very small stream, although, more properly they may be likened to a trickling filter, the disposition of the filter bed being horizontal instead of vertical. Excepting the facility with which reaeration is accomplished, there is also some resemblance between these channels and the system of treatment based on the use of underground tile drains. The general arrangement of the channels is such that all parts are readily accessible for sampling, so that the system is well adapted to observations of the sequence of changes which occur in natural purification. Our present interest, however, will be centered on a study of the rates of purification between selected points under controlled conditions.

Now it is reasonably well established that the deoxygenation of polluted water from a variety of sources and under widely different experimental conditions may be formulated in terms of a unimolecular reaction, it being understood that this is simply a convenient method of representing the data, and not an expression of opinion regarding the probable nature of the reaction. Other formulas might be used, although in the selection of a formula it is of consequence that the two constants in the unimolecular equation are intimately related to the problems peculiar to deoxygenation studies. Thus the velocity constant is a measure of the amount of material transformed in unit time when a unit amount of material is present. The total demand, at best an extrapolated figure, may likewise be identified with the limiting value which the observations are tending to reach. These mathematical properties are not possessed, for example, by the constants in formulas of the adsorption type. Whenever possible, therefore, we have sought to formulate our oxygen-demand results in terms of the unimolecular formula.

As to the magnitude of the deoxygenation constant, numerous observations indicate that, for river water, a value of about 0.1 at 20° C. may be accepted as a close approximation when the time is expressed in days and common logarithms are used. The somewhat higher values reported for sewage by some observers are subject to correction for "immediate" oxygen-demand effects. A velocity constant of this order of magnitude implies that 99 per cent of the first-stage oxygen demand will be satisfied in 20 days or, on the same scale, 90 per cent in 10 days. This corresponds, of course, to an exceedingly slow reaction. In the channels, on the other hand, it has been repeatedly observed that a reduction of 90 per cent in the first-stage demand may occur in a period of flow of about 20 minutes. If this purification is ascribed to oxidation according to a unimolecular formula, the velocity constant would be 3 × 24 × 10 = 720, a figure which is seven thousand two hundred times as great as the normal rate of deoxygenation in river water. Velocity constants of the same order of magnitude may be deduced from the over-all rates of purification observed in activated-sludge tanks, in trickling filters, and in other oxidizing devices. In each case the apparent velocity constant approaches that of ordinary chemical reactions.

The problem, therefore, was to discover the reason for this greatly accelerated rate of purification. In particular, it has appeared of considerably practical importance to ascertain whether these over-all rates of purification were accompanied by a corresponding degree of oxidation or were simply, as might be suspected, a result of rapid adsorption by the sludge. Enzymatic action, which we may tentatively identify with the so-called "immediate" oxygen-demand phenomenon, is also to be considered. In any event it is certain that these exceptional rates of purification are invariably associated with the presence of aerated sludge. Our studies were accordingly directed toward the evaluation of rates of oxidation in the presence of channel sludge. In view of the kinship, or even the actual identity, of aerated sludge from various sources, the methods used in this study, if not the findings themselves, may probably be adapted to studies of other oxidizing devices.

APPARATUS

The procedure used in these experiments was developed for the determination of the oxygen demand of sludges and similar materials of high oxygen-absorbing power, without resort to dilution. It consists, essentially, in the incubation of the sample in a partly filled bottle provided with stopcocks for the removal of suitable portions of the inclosed air and of the polluted liquid for examination. Continued aeration of the sample is secured by the recirculation of the air in a closed system.

The general arrangement of the aerating device is shown in Figure 1. An alternating motion is imparted to the mercury in the U tube by a plunger connected to a small fan motor. On the upstroke the lower valve, *C*, acts as a seal and air is drawn through the valve *V*. On the downstroke the valve *V* closes and bubbles of air are distributed throughout the liquid. This aerator is readily constructed from ordinary laboratory materials without expert glass blowing.

The assembled apparatus, without the aerator, is shown in Figure 2. In work with sludge the sampler for liquids shown at the left of the apparatus may be dispensed with as the dissolved-oxygen content of the sludge is generally negligible in relation to its total demand. The gas-sampling pipet shown at the right is water-jacketed and it is calibrated for the withdrawal of 10-c. c. samples of air. At the start of a test the U-shaped gas-absorption vessel shown at the extreme right of Figure 2 is filled with water of known oxygen content. The gas sample is then transferred to the absorption vessel, thereby displacing some of the water through the open limb of the vessel. Prior to inserting the stopper, 1 ml. each of the regular Winkler

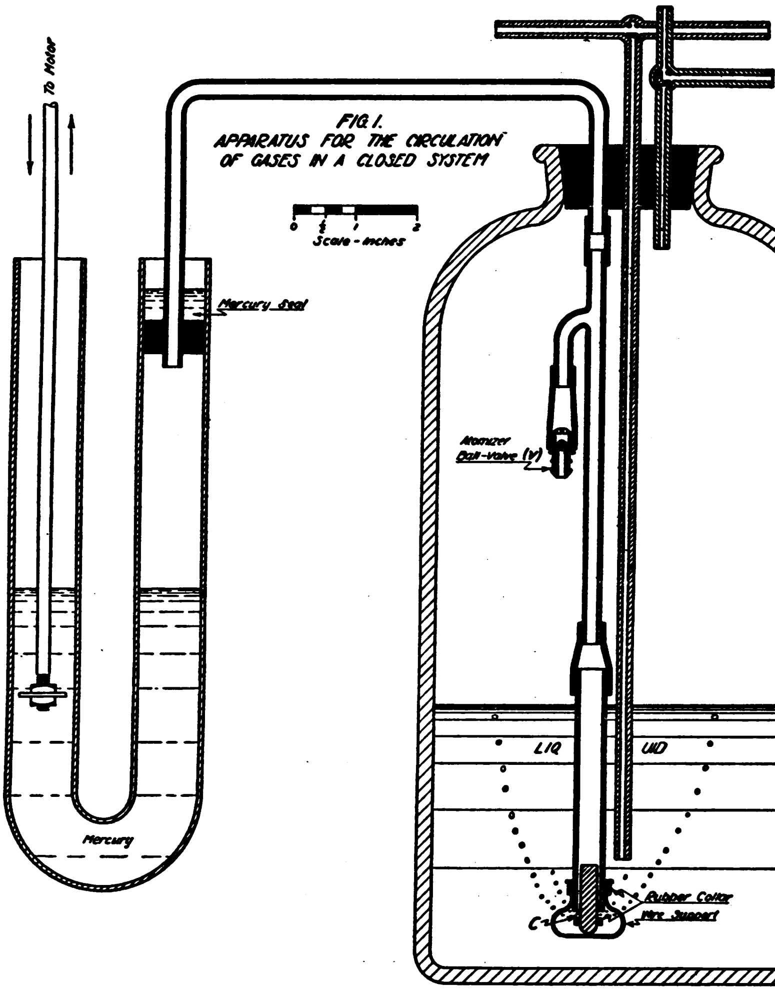

FIGURE 1.—Apparatus for the circulation of gases in a closed system

reagents is added with the usual precautions. Complete absorption of the gaseous oxygen by the manganous hydroxide is secured by agitating the air-water mixture, mechanically or other wise, for 10 minutes. The determination then follows along the usual lines. Corrections for variations of temperature and barometric pressure are avoided, as the results are obtained directly in milligrams. Ordinary air is used for reaeration, instead of pure oxygen, and an air-water

interface is maintained at all times. When 3-liter bottles containing 1 liter of sample are used, the precision of the method is within 5 mg. of oxygen.

The reader is referred to Theriault and Butterfield (1929) for a more extended discussion of the technic of oxygen-demand tests.

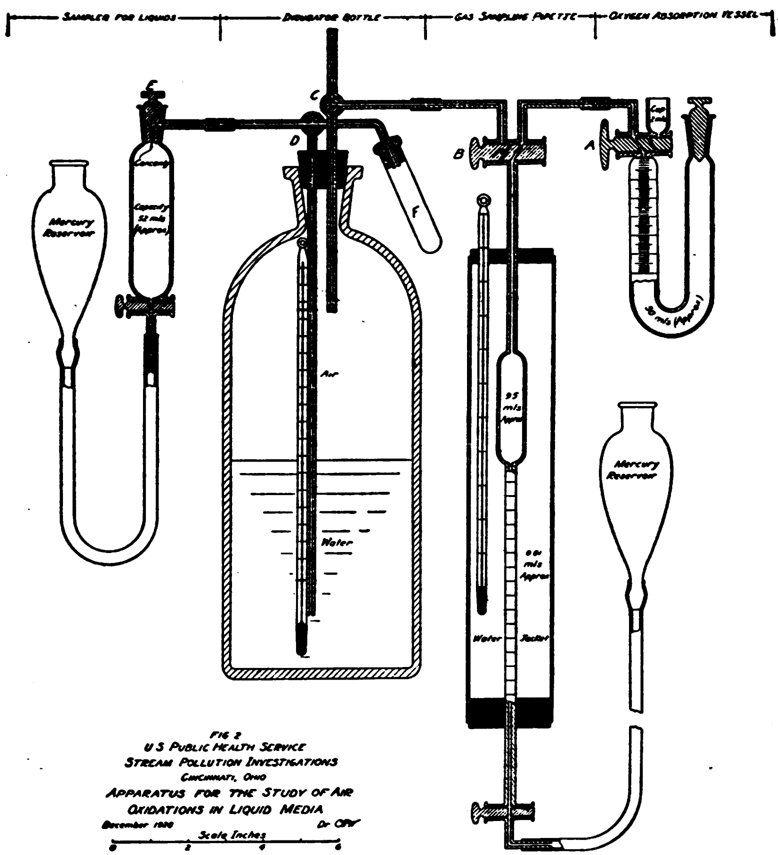

FIGURE 2.—Apparatus for the study of air oxidations in liquid media

RESULTS

The results obtained in a typical experiment (Series 10, February, 1929) with sludge from the artificial channels are presented in the fifth column of Table 1 and in the upper curve of Figure 3. The sludge used in this experiment contained around 12,000 p. p. m. of suspended matter and 23 per cent of settlable solids by volume in 30 minutes of settling. The pH value of the sludge liquor at the start of the experiment was 7.2.

Superficially, the upper curve shown in Figure 3 bears a close resemblance to the deoxygenation curves obtained with river water, although the entire curve can not be fitted, even with a fair degree of accuracy, by the usual unimolecular formula, $Y = L\ (1-10^{-kt})$. Beyond the first day, however, equations of this type do hold with remarkable accuracy, the deoxygenation constant, k, being of the same order of magnitude as that obtained with river waters.

The failure of the unimolecular formula to represent the results during the first day is to be credited to the purely chemical or enzy-

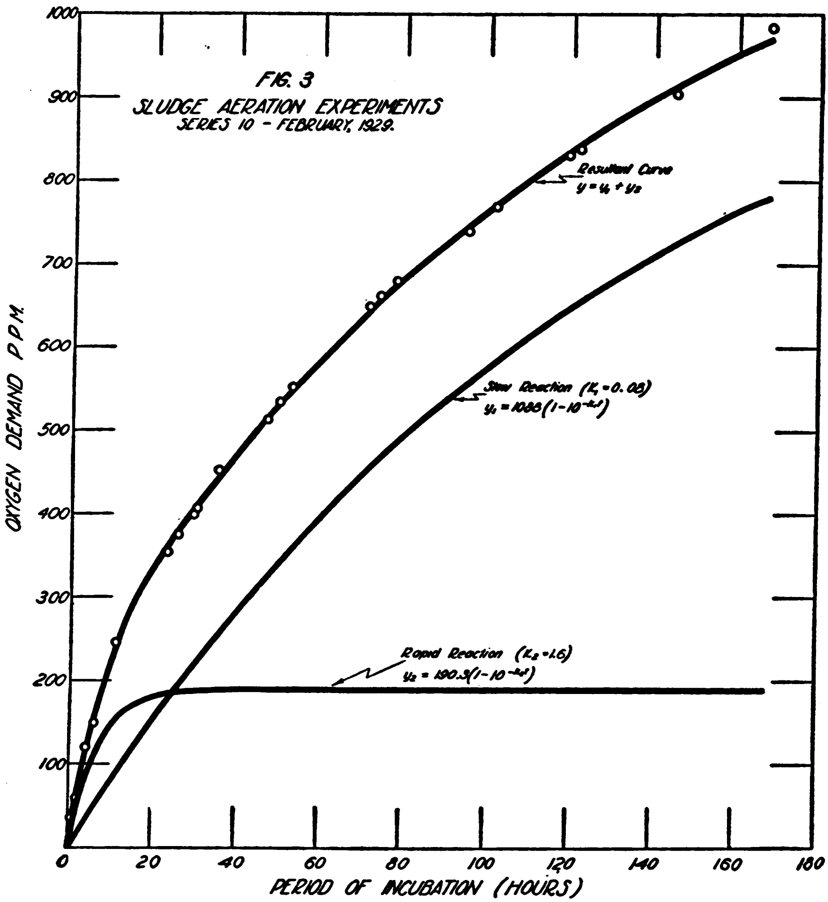

FIGURE 3.—Sludge aeration experiments. Series 10; February, 1929

matic effect generally designated as the "immediate" oxygen demand of the sludge. With stale sewage the immediate demand has been ascribed to the presence of hydrogen sulphide and other materials readily oxidizable by dissolved oxygen without biological intervention. For lack of a better expression, the term "immediate demand" will be used in this paper to describe the relatively rapid reaction in question, although, as will presently appear, this purely chemical or enzymatic reaction is by no means instantaneous.

On the basis of an extended mathematical analysis of such data it may be assumed that the immediate demand itself is satisfied according to a unimolecular formula, the deoxygenation constant being relatively large. The oxidation of sludge by atmospheric oxygen may therefore be represented as the sum of two unimolecular expressions, $Y=L_1(1-10^{-k_1t})+L_2(1-10^{-k_2t})$ where Y is the observed oxygen demand over the time t. The constants L_1 and L_2 refer, respectively, to the oxygen demand arising from the first stage of biological oxidation and from the immediate demand. The corresponding velocity constants are represented by the symbols k_1 and k_2.

The evaluation of the four constants in the sludge-deoxygenation curve offers certain mathematical difficulties which will be discussed in detail elsewhere. As a first approximation a curve might be fitted to results obtained beyond the first day. This curve could then be extended to the start of the experiment and used as a basis of correction in obtaining the immediate demand over given periods of incubation. The velocity constant of the initial reaction could then be derived from these corrected values. Actually a least-squares procedure has been used which, while it is laborious, does furnish the desired information with mechanical accuracy.

For the data in question the velocity constant which describes the rate of satisfaction of the slowest reaction was 0.08. As the experiment was conducted at a room temperature, during the day, of 18° to 22° C., this velocity constant is in substantial agreement with the river-water value of 0.10 at 20° C., or 0.09 at 18° C. For the rate of satisfaction of the immediate demand the velocity constant was around 1.6, a value sixteen to twenty times as great as the normal rate of deoxygenation under the given temperature conditions. A velocity constant of this magnitude implies that 90 per cent of the oxidation is accomplished in about 15 hours, or 60 per cent in 6 hours.

The relative magnitude of the immediate demand is also shown in Figure 3, where the calculated values for this rapid reaction are plotted together with the values for the slowest reaction. The sum of these two curves gives the resultant or upper curve shown in Figure 3, which corresponds very nearly to the actual observations (Table 1, last column). The immediate demand was 190 p. p. m. and the first stage demand was 1,088 p. p. m. Excluding nitrification, the total demand was 1,278 p. p. m. The immediate demand, accordingly, constituted about 15 per cent of the total demand. As a result approximately 35 per cent of the primary oxygen requirement was satisfied during the first day instead of 20 per cent, as observed with river water at the same temperature. It is clear that these relationships could not be deduced by a consideration of results obtained during the first few hours of aeration. In fact, when the sludge is recirculated, the actual period of aeration is to be measured in days, or even weeks, rather than in hours.

It will be noted that the plot of the observations shown in Figure 3 is a very smooth curve which gives no indication of any change of inflection when the immediate demand is satisfied. To confirm this result the experiment was repeated several times with more frequent observations during the first 24 hours. The results plotted in Figure 4 (series 19, May, 1929) represent half-hourly observations over a 12-hour period, using a sludge which contained about 10,000 p. p. m. of suspended matter. For the first four or five hours the course of the deoxygenation could very well be represented by a straight line

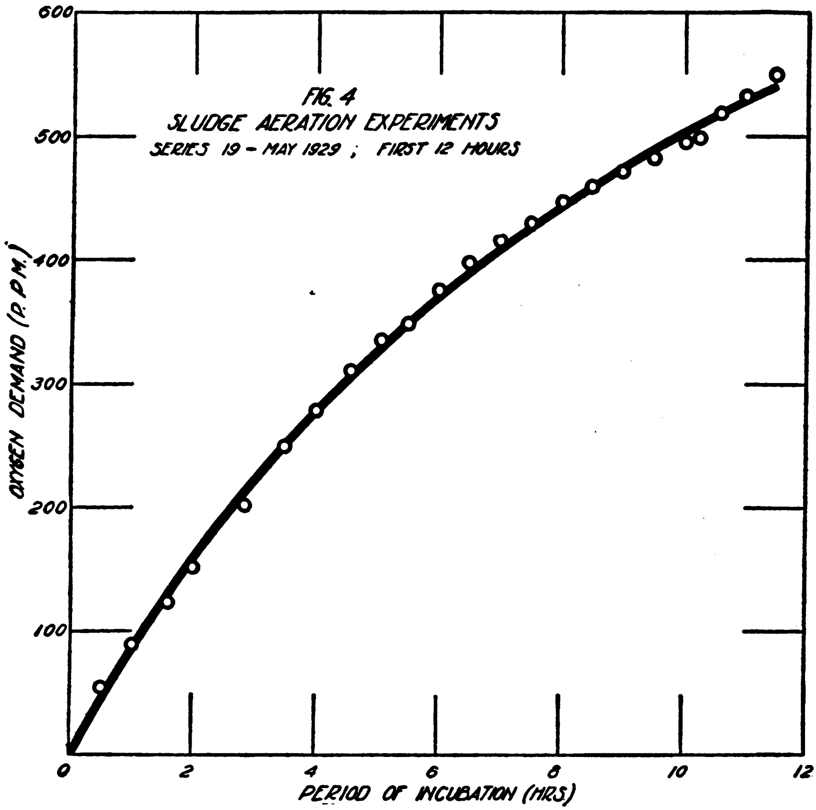

FIGURE 4.—Sludge aeration experiments. Series 19; May, 1929. First 12 hours

(*cf.* Grant, Hurwitz, and Mohlman, 1930). Thereafter the characteristics of the deoxygenation curve become unmistakable. A still higher degree of experimental precision would be required before using such slight changes of inflection as occur, for instance, at the ninth hour, as a basis of differentiation between purely chemical effects or air oxidations in the usual sense and other possible effects due to enzymatic action. Likewise the complete deoxygenation curve, as shown in Figure 5 with change of scale, does not admit of separation into distinct stages by a simple inspection of the plot.

As before, the line drawn through the observations in Figure 5 is the least-squares fit using the compound formula. The agreement between the observed and calculated values shown in Table 2 is within an expected experimental error of 5 or 10 p. p. m., corresponding to an error of 0.5 to 1.0 per cent with oxygen-demand values of 1,000 p. p. m. The total demand up to the nitrification stage was 1,547 p. p. m. The immediate demand was 368 p. p. m., or 24 per

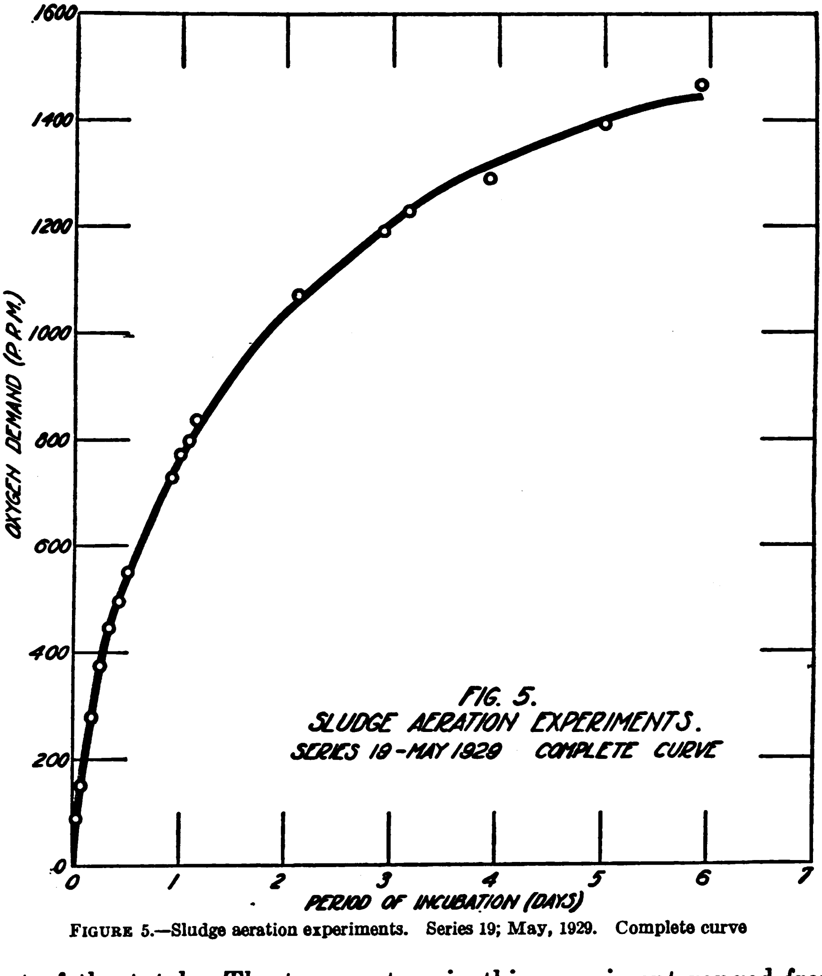

FIGURE 5.—Sludge aeration experiments. Series 19; May, 1929. Complete curve

cent of the total. The temperature in this experiment ranged from 26° to 32° C. The deoxygenation constant for the slowest reaction ($k_1=0.18$) is appreciably higher than the value found for sludge at 18° to 22° C. The order of magnitude of this velocity constant is the same as that of the corresponding constant for river water in the given range of temperatures. For the immediate demand reaction the rate of deoxygenation ($k_2=2.0$) also appears higher than in the first experiment at a lower temperature.

Experiments conducted under carefully controlled temperature conditions have indicated that, for the relatively rapid reaction at least, the derivation of a temperature coefficient would be hazardous without a consideration of other factors, notably the pH value of the medium and the degree of staleness of the sludge. As the question of variations in the deoxygenation constants is of obvious importance to the study of comparative rates of purification, the influence of various modifying factors will now be briefly discussed.

TABLE 1.—*Oxygen demand of sludge, series 10, February, 1929*

Incubation period (hours)	Oxygen demand (p. p. m.)				
	Immediate[1] Y_2'	First-stage[2] Y_1'	Calculated $Y'=Y_1'+Y_2'$	Observed Y	Difference $Y'-Y$
1	26	8	34	35	−1
2	49	16	65	59	6
4	86	32	118	120	−2
6	113	48	161	150	11
11	154	87	241	246	−5
23.5	185	177	362	356	6
26	186	194	380	376	4
29.5	188	217	405	399	6
30.5	188	223	411	407	4
35.5	189	255	444	453	−9
47	190	325	515	513	2
50	190	342	532	534	−2
53	190	358	548	552	−4
71.5	190	453	643	649	−6
74	190	465	655	663	−8
78	190	484	674	679	−5
95	190	556	746	740	6
101.5	190	582	772	769	3
119	190	644	834	832	2
122	190	654	844	838	6
145	190	723	913	904	9
168	190	781	971	984	−13

[1] $Y_2'=190.3\ (1-10^{-k_2t})$, where $k_2=0.003271$ when t is expressed in hours.
[2] $Y_1'=1088.2\ (1-10^{-k_1t})$, where $k_1=0.06505$ when t is expressed in hours. When the time is expressed in days, the rounded values of k_1 and k_2 are 0.08 and 1.6, respectively.

TABLE 2.—*Oxygen demand of sludge, series 19, May, 1929*

Incubation period (hours)	Oxygen demand (p. p. m.)		Incubation period (hours)	Oxygen demand (p. p. m.)		Incubation period (hours)	Oxygen demand (p. p. m.)	
	Observed Y	Calculated[1] Y'		Observed Y	Calculated[1] Y'		Observed Y	Calculated[1] Y'
0.50	54	44	6.50	397	390	11.5	550	542
1.00	89	85	7.00	415	408	22.0	731	737
1.58	123	129	7.50	430	426	24.0	772	766
2.00	152	159	8.00	446	443	26.0	797	794
2.83	202	213	8.50	460	459	28.0	837	820
3.50	249	251	9.00	471	474	51.0	1,072	1,061
4.00	277	278	9.50	483	489	69.5	1,192	1,195
4.55	310	305	10.00	494	503	76.0	1,229	1,232
5.05	334	329	10.25	498	510	94.0	1,291	1,317
5.50	349	349	10.58	520	519	119.5	1,393	1,399
6.00	376	370	11.00	533	529	141.5	1,467	1,446

[1] $Y'=1179.72\ (1-10^{-0.007545t})+367.59\ (1-10^{-0.08437t})$, when t is expressed in hours. The rounded values of the velocity constants are 0.18 and 2.0, respectively, when t is expressed in days.

EFFECT OF STORAGE

The effect of storing the sludge under anaerobic conditions prior to a test is illustrated by the data plotted in Figure 6 (series 33A and 34A). When stored for 5 days without access of air before aeration, the sludge evidently required much larger amounts of disolved ogygen during the first 24 hours than when it was aerated immediately after collection. Such a result would be expected in view of the known avidity of stale samples for dissolved oxygen. Attempts to correlate this increase in oxidizability with variations in the reduction potential of

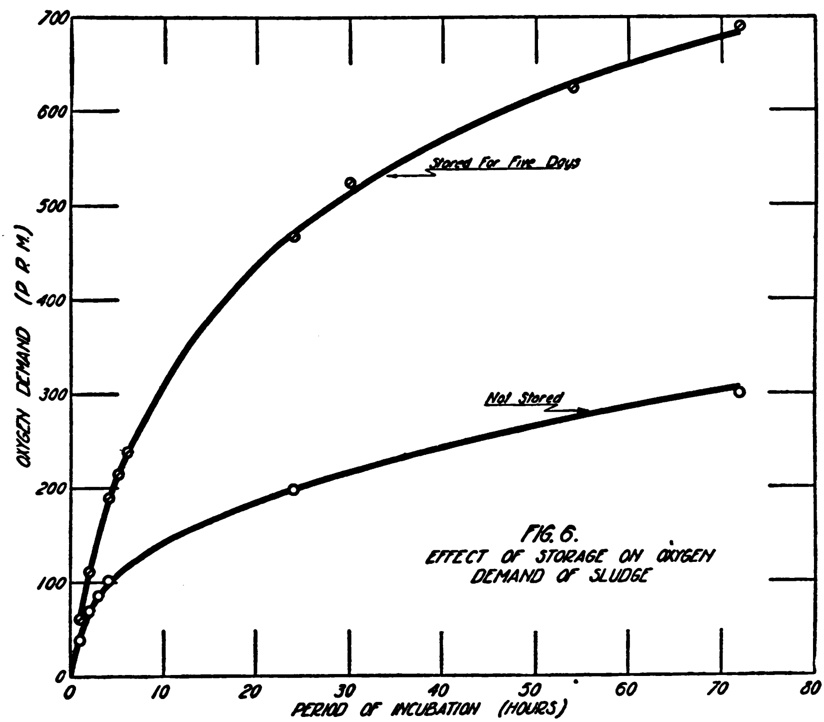

FIGURE 6.—Effect of storage on oxygen demand of sludge

the liquid have yielded inconclusive results. A repetition of these experiments with improved apparatus is in prospect.

A conclusion drawn from these and other experiments is that the immediate demand is not simply a convenient mathematical interpretation, but that it is responsive to treatments which, from known considerations, should tend to increase the putrescibility or the degree of staleness of the samples.

Despite the tremendous increase in the oxygen requirement of the stored samples, it does not appear that the specific rates of deoxygenation were materially affected when the sludge was subjected to storage prior to aeration. This is shown in Table 3, using data obtained in an experiment (series 12, March, 1929) where observations were continued for 6 days at a room temperature of about 20° C. The velocity constants deduced by least squares are $k_1=0.06$ and $k_2=1.5$. These values do not differ significantly from those already given for relatively fresh sludge at a corresponding temperature. The agreement between the observed and the calculated values is excellent.

TABLE 3.—*Effect of storage on the specific rate of deoxygenation, Series 12, March, 1929*

Incubation periods (hours)	Oxygen demand (p. p. m.)				
	Immediate [1] Y_2'	First stage [2] Y_1'	Calculated $Y'=Y_1'+Y_2'$	Observed Y	Difference $Y'-Y$
1	52.3	6.6	59	57	2
2	97.6	13.3	111	110	1
3	136.9	19.9	157	165	−8
5	200.4	32.9	233	232	1
6	225.9	39.4	265	264	1
23	376.7	144.3	521	525	−4
29.5	385.4	181.9	567	566	1
46.5	390.6	274.0	665	670	−5
72	391.0	397.1	788	787	1
96	391.0	498.2	889	899	−10
143	391.0	661.5	1,052	1,062	−10

[1] $Y_2' = 391.0\ (1-10^{-k_2t})$, where $k_2= 0.06238$.
[2] $Y_1' = 1216.0\ (1-10^{-k_1t})$, where $k_1=0.002385$. Expressing the time in days, the rounded values of k_1 and k_2 are 0.06 and 1.5 respectively.

EFFECT OF CHANGES IN pH

The effect of variations in the pH value of the sludge liquor was studied extensively. Typical results are shown in Figures 7 and 8.

In obtaining the results plotted in Figure 7 (series 22, June, 1929) a 500-ml. portion of a given sample of sludge was diluted to 1 liter with water taken from the channels.

The oxygen demand of this diluting water was negligibly small in comparison with that of the sludge. A second 500-ml. portion of the sludge was treated with 10 ml. of Clark-Lubs phosphate solution buffered at pH 7.2 and then diluted to 1 liter with water from the channels. A third 500-ml. portion was treated with 10 ml. of 16 M NaOH to obtain a pH value of 12 or 13 and then made up to 1 liter as before.

At the start of the experiment the pH value of the sludge portion which had simply been diluted with channel water was about 7.2. The pH value of the buffered sample was also 7.2. After 5 days of aeration at 20° C. the pH values were 4.9 and 5.3, respectively, for the unbuffered and buffered sludges. As shown by the two upper curves of Figure 7, the oxygen demand of the sludge was not greatly affected by this variation of 0.4 pH units. Neither did the presence of phosphate, as such, exert any material effect on the rate or extent of deoxygenation. The lower curve in Figure 7 represents the results

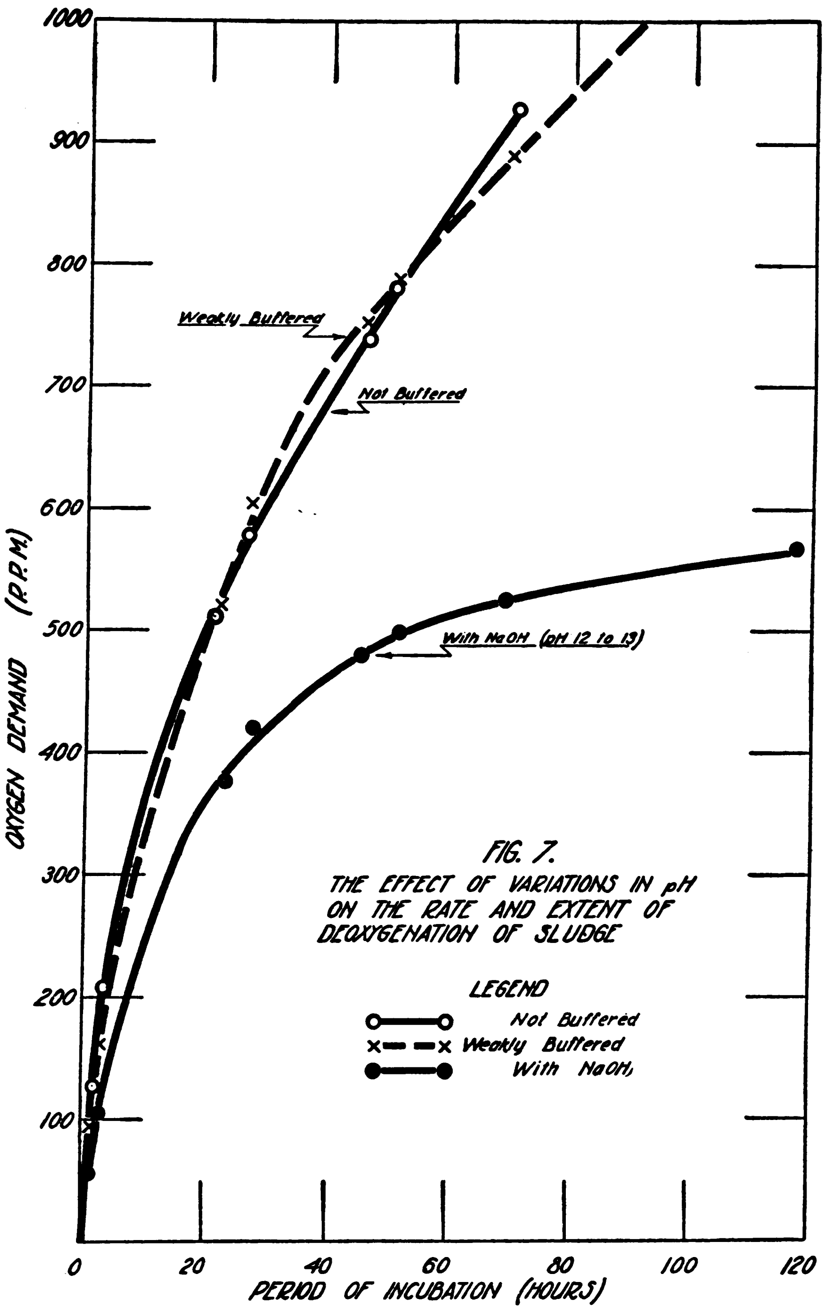

FIGURE 7.—The effect of variations in pH on the rate and extent of deoxygenation of sludge

obtained at pH values of 12 or 13. The amount of oxygen absorbed in this presumably sterile solution was surprisingly large.

In Figure 8 (series 26, July, 1929) the middle curve represents the results obtained when an 800-ml. portion of sludge was diluted to 1 liter with channel water, without addition of phosphate. The upper curve is a plot of results obtained with 800 ml. of the same sample of sludge made up to 1 liter with 100 ml. of channel water and 100 ml. of Clark-Lubs phosphate solution buffered at pH 7.2. The lower curve

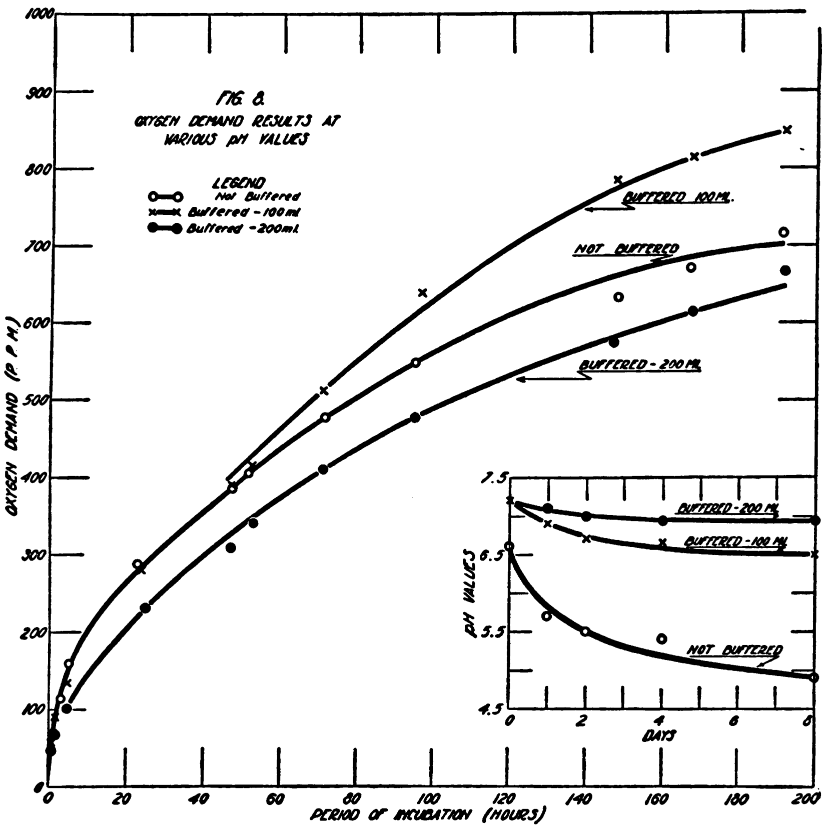

FIGURE 8.—Oxygen demand results at various pH values

gives the corresponding values when an 800 ml. portion of sludge was made up to 1 liter with 200 ml. of phosphate solution. The insert in Figure 8 gives the actual pH values at various periods of incubation.

The pH value of the unbuffered sample was 6.6 at the start of the experiment. It decreased to 5.5 after two days and to 4.9 after eight days, when the experiment was discontinued.

The pH value of the buffered samples was 7.2 in each case at the start. In the sample containing 200 ml. of buffer solution this value decreased slowly to 6.93 after eight days of incubation. With a smaller amount of phosphate solution the limiting pH value was about

6.5, a value approximating that of the unbuffered sample at the start of the experiment.

There is no indication that the presence of phosphate solution exerted any influence on the rate or extent of deoxygenation during the first two days. The higher results obtained beyond the second day with the sample containing only 100 ml. of phosphate solution may be credited either to a fortuitous adjustment of the pH value to an optimum for the particular sludge in question or else to the unfavorable effect of large amounts of phosphate.

The relatively low oxygen-demand values obtained with the unbuffered sample are probably due to the inhibitory effect of high acidity on bacterial growth.

EFFECT OF DILUTION

The effect of dilution on the specific rate of deoxygenation is illustrated in Figure 9 (series 25, July, 1929), where results with different dilutions of the same sludge have been plotted. The line drawn through the observations represents the oxygen demand at given time intervals of a mixture containing 500 ml. of sludge and 500 ml. of distilled water. In order to place the results with different concentrations of sludge on a comparable basis, the 2-day oxygen demand of this 50 per cent mixture was assigned an arbitrary value of 100. The other values plotted in Figure 9 correspond to the relative oxygen-demand values, respectively, of the undiluted sludge and of a mixture containing 25 per cent of the sludge in distilled water. For the first 72 hours the agreement between the different concentrations is very good, although there is a slight tendency for the lower concentrations to give relatively high results. Beyond the third day this tendency becomes unmistakable.

The pH value of the sludge mixtures at the start of the experiment was around 7 in each case. After 6 days of incubation the pH values with 25, 50, and 100 per cent of sludge had decreased, respectively, to 5.3, 5.0, and 4.8. On the basis of previous experiments it appears reasonable to correlate this trend in the oxygen-demand values with the progressive change in acidity and to ascribe the resulting discrepancy to inhibitory effects. In any event, it may be concluded that dilution within a fourfold range is without material effect on the specific rate of satisfaction of the immediate demand.

DISCUSSION

Despite the frequent use of the term in published reports, the writers are unaware of any previous attempts to give numerical expression to the rate of satisfaction of the "immediate" demand. As already explained, their interest in the derivation of such values was in the possibility offered of accounting for the exceptionally high rates of purification observed in the artificial channels. From the foregoing experiments it must be concluded that the rate of satisfaction of the immediate demand, although it is relatively high, does not even approach the observed rate of disappearance of the organic matter under channel conditions. This conclusion is sustained in numerous experiments where such modifying factors as the pH value of the medium, the age of the sample, and the concentration of sludge have been widely varied.

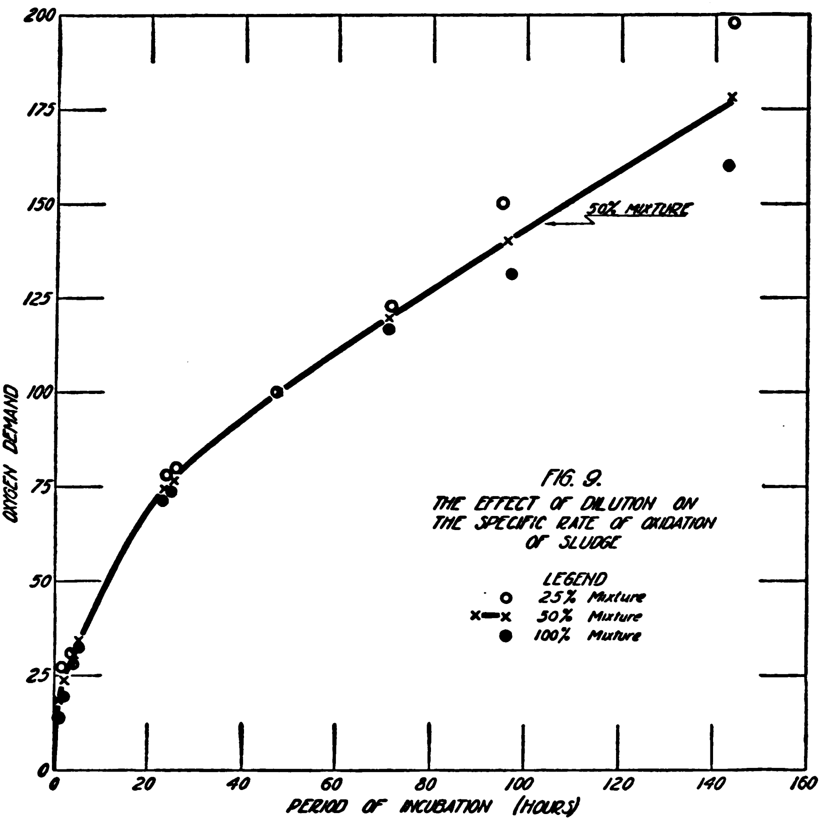

FIGURE 9.—The effect of dilution on the specific rate of oxidation of sludge

In all probability the rapid diminution of the organic matters in the supernatant liquor which is observed when sewage and aerated sludge are brought together is due to rapid adsorption by the sludge, and not to oxidation. Experiments which have a direct bearing on this point will now be briefly discussed.

RATE OF ADSORPTION OF ORGANIC MATTER BY AERATED SLUDGE

Complete deoxygenation curves are given in Figure 10 (series 32, November, 1929) for a sample of raw sewage and for the resulting supernatant liquor after treatment with sludge for a period of only 10 minutes. The raw sewage shows a 5-day oxygen demand of 135 p. p. m. and the corresponding value for the supernatant liquor is only 47 p. p. m. The apparent degree of purification accomplished, if 5-day observations only were available, would be around 65 per cent. A reduction of the same order of magnitude has recently been reported by Grant, Hurwitz, and Mohlman (1930). Actually the percentage reduction of the carbonaceous matter was considerably higher than 68 per cent, as an appreciable part of the 5-day oxygen demand of the supernatant liquor is due to nitrification. As indicated

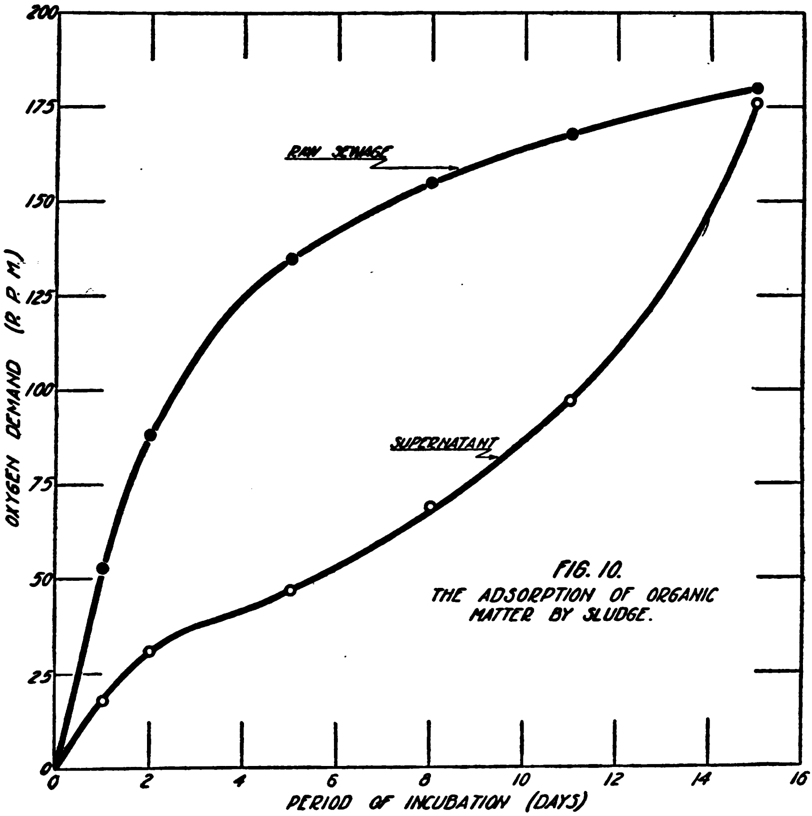

FIGURE 10.—The adsorption of organic matter by sludge

by the inflection of the curve, nitrification did not start in the raw sewage until after the tenth day.

In passing it may be remarked that no purification would be indicated if the comparison were to be based on the 15-day results. The difficulty in question has been discussed elsewhere (*cf.* Theriault, 1927, p. 146). It is only under special conditions that the oxygen-demand results obtained over arbitrarily selected periods of incubation can be applied with any degree of confidence to the estimation of the percentage removal of organic matter effected by sewage-treatment devices.

CORRESPONDENCE BETWEEN OBSERVED AND EXPERIMENTAL RATES OF PURIFICATION

A close correspondence between the rates of purification found under laboratory conditions and the rates observed in the channels themselves should be indicated if the suggested interpretation of results is valid. In an experiment designed to test these conclusions the artificial channels were first cleaned of all accumulated sludge. A heavily polluted water was then passed through at a fairly uniform rate and daily observations were made of the reduction in the first-stage demand between two selected points. Over a 21-day period it was found that 1,282 grams of oxygen would have been required to balance the apparent reduction in oxygen demand between the selected points.

Now let it be assumed that this organic matter was removed at a uniform rate by the deposited sludge and then oxidized in accordance with the sludge oxidation curve. At the end of the 21-day run the age of this deposited or adsorbed material would evidently have varied from 0 to 21 days. The average condition of this material as regards oxidation should be defined in terms of the mean value of the function which describes the oxidation of sludge.

The average temperature of the water in the channels for the 21-day period in question (August, 1929) was 28° C. At this temperature the value of k_1 deduced from extended experiments with river water (*cf*, Theriault, 1927, p. 141) is 0.14. For the present computation the value of k_2 is not critical and, with sufficient accuracy, use may be made of the figure of 2 derived in Table 2 from data which were obtained at neighboring temperatures. On the basis of numerous experiments it also appears that the immediate demand of aerated or fresh sludge constitutes about 20 per cent of the total demand during the first stage. Corrections for nitrification are unnecessary, as the oxidation did not extend to that stage in the portion of the channels selected for the experiment. The calculation leads to the conclusion that 88 per cent of the 1,282-gram requirement should have been satisfied in the channels themselves during the 21-day period of observation. The remaining oxygen requirement of 154 grams (12 per cent of 1,282) should therefore correspond to the oxygen demand of the sludge. The value actually found by direct tests on representative samples of sludge was 168 grams. The agreement between these values is satisfactory and it would not be greatly altered by minor changes in the assumed values of the deoxygenation constants.

CONCLUSION

The general conclusion drawn is that, in the sense of actual oxidation, purification by aerated sludge under channel conditions probably does not occur at a rate materially different from that observed under laboratory conditions at the same temperature. Although the design of the artificial channels is very favorable to studies of this type, the extension of these studies to tank treatment, as in the activated-sludge process, does not appear impossible. These experiments also suggest the possibility of striking an oxygen balance in small streams where the sludge mat is presumably responsible for the high degree of apparent biological efficiency.

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POISONING FROM SILVER POLISH

Recent investigation of the circumstances surrounding cases of suspected food poisoning in which the members of two families were seized with vomiting, diarrhea, and extreme prostration after attending luncheons at a country club, showed that a polish used on the silverware was responsible. This polish was found to contain hydrocyanic or prussic acid salts. Although the package was properly labeled as a poison, with full directions as to the necessity for adequate rinsing, it appeared that in these cases the rinsing had not been throough enough to remove all traces of the poison. The cases were investigated by the Westchester County (New York) Health Department and the conclusions concurred in by the New York State Health Department.

This incident recalls numerous cases of poisoning in the past from the same cause. The following is quoted from an article appearing in Westchester's Health for April 20, 1931:

> In 1928 it was reported to the State department of health that some 30 persons attending a convention dinner at a leading up-State hotel had become acutely ill several hours following the meal. Food poisoning was suspected. It was determined, however, that the silver dip used regularly, which was unquestionably responsible for the occurrence, contained over 20 per cent of cyanide of sodium. A similar outbreak was traced to the same product in another large up-State hotel shortly afterwards. * * * The elimination of silver polish from the hotels mentioned, as well as a number of others not only in this State but elsewhere throughout the country, has always promptly ended the occurrence of suspected food poisoning.
>
> In 1928 the New York State Department of Agriculture and Markets, after analysis of the silver polish in question in conjunction with the State board of pharmacy, compelled a poison label to be placed on silver polishes sold in New

York State. In 1929 * * * the Public Health Council of the State of New York amended the Sanitary Code and added thereto the following regulation which has been in effect since December of that year:

"Any polish or article or substance containing any cyanide preparation or other poison shall not be used in any hotel, club, restaurant, or public eating place for cleansing of nickel, copper, silverware, or silver-plated ware or other articles or utensils used for the service or preparation of food or foodstuffs."

The health department of the city of New York took the same action.

COURT DECISION RELATING TO PUBLIC HEALTH

Member of New York City Board of Health held to have vacated his office because holding other offices under city government.—(New York Supreme Court, Appellate Division; Metzger *v.* Swift et al., 248 N. Y. S. 300; decided Feb. 13, 1931.) The defendant was appointed as a member of the board of health in the department of health of the city of New York. He qualified under the appointment by taking the oath of office, held the said office, and received compensation from the city. At the time of his appointment to such board, the defendant was (1) a member of the board of trustees of Hunter College of the city of New York, (2) a member of the board of higher education of the city of New York, and (3) chairman of the Hunter College teachers' retirement board, which latter position he held ex officio as chairman of the college board of trustees.

Section 1549 of the Greater New York Charter provided as follows:

SEC. 1549. Any person holding office, whether by election or appointment, who shall, during his term of office, accept, hold, or retain any other civil office of honor, trust, or emolument under the Government of the United States (except commissioners for the taking of bail, or register of any court), or of the State (except the office of notary public or commissioner of deeds, or officer of the National Guard), or who shall hold or accept any other office connected with the government of the city of New York, or who shall accept a seat in the legislature, shall be deemed thereby to have vacated any office held by him under the city government.

The plaintiff, a citizen and taxpayer, brought an action pursuant to statute to prevent waste or injury to the property and finances of the city of New York. He moved for an injunction pendente lite to restrain the comptroller from paying the defendant, and to restrain the defendant from receiving, any compensation as a member of the city board of health. The appellate division held that the plaintiff was entitled to such an injunction. The court decided that the educational offices held by the defendant were not only offices connected with the government of the city of New York but were offices "under the city government." "Holding such offices," the court said, "we think the defendant 'shall be deemed thereby to have vacated any office held by him under the city government,' and that he must be deemed to have vacated, not only his office as a member of the board of health, but all the other offices held by him under the city government. However, the only official position of the defendant under attack in this taxpayer's action is that of a member of the board of health, which, of the offices held by defendant, is alone a salaried position."

DEATHS DURING WEEK ENDED MAY 9, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended May 9, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended May 9, 1931	Corresponding week, 1930
Policies in force	75, 180, 287	75, 798, 638
Number of death claims	13, 955	14, 459
Death claims per 1,000 policies in force, annual rate	9. 7	9. 9

Deaths [1] from all causes in certain large cities of the United States during the week ended May 9, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended May 9, 1931				Corresponding week, 1930		Death rate [2] for the first 19 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (81 cities)	8, 297	12. 2	662	[4] 50	13. 1	804	13. 6	13. 3
Akron	48	9. 7	1	10	8. 8	8	9. 6	8. 6
Albany [5]	33	13. 3	3	59	13. 9	1	15. 3	16. 9
Atlanta	90	16. 9	7	72	15. 5	7	16. 3	17. 1
White	42	--------	4	63	--------	4	--------	--------
Colored	48	(6)	3	86	(6)	3	(6)	(6)
Baltimore [5]	205	13. 1	14	47	15. 5	13	16. 7	15. 7
White	151	--------	11	48	--------	9	--------	--------
Colored	54	(6)	3	47	(6)	4	(6)	(6)
Birmingham	69	13. 4	8	80	15. 9	7	15. 4	14. 5
White	30	--------	5	86	--------	4	--------	--------
Colored	39	(6)	3	73	(6)	3	(6)	(6)
Boston	215	14. 3	19	54	16. 9	36	16. 3	16. 3
Bridgeport	26	9. 2	6	100	9. 9	1	12. 6	13. 5
Buffalo	157	14. 1	12	49	14. 5	18	15. 0	14. 6
Cambridge	37	16. 9	2	40	14. 2	1	14. 0	14. 1
Camden	37	16. 2	10	174	17. 1	7	17. 6	15. 0
Canton	32	15. 6	2	46	9. 9	3	11. 4	11. 5
Chicago [5]	724	10. 9	39	34	11. 2	68	11. 7	11. 7
Cincinnati	138	15. 7	7	42	17. 8	12	17. 8	17. 4
Cleveland	196	11. 2	19	55	11. 3	25	12. 5	12. 5
Columbus	94	16. 6	4	39	19. 1	5	15. 0	18. 5
Dallas	47	9. 0	7	--------	12. 7	8	12. 5	12. 4
White	34	--------	6	--------	--------	5	--------	--------
Colored	13	(6)	1	--------	(6)	3	(6)	(6)
Dayton	50	12. 6	0	0	11. 3	5	13. 2	10. 6
Denver	78	13. 9	9	87	12. 5	9	15. 5	15. 4
Des Moines	28	10. 1	2	35	14. 6	3	11. 9	12. 6
Detroit	266	8. 4	18	29	10. 3	38	9. 5	10. 6
Duluth	25	12. 8	1	25	8. 2	1	11. 7	11. 2
El Paso	34	16. 9	7	--------	17. 2	6	18. 0	18. 5
Erie	24	10. 6	1	19	13. 4	4	11. 6	11. 2

Deaths from all causes in certain large cities of the United States during the wee ended May 9, 1931, infant mortality, annual death rate, and comparison wit corresponding week of 1930. (From the Weekly Health Index, issued by th Bureau of the Census, Department of Commerce)—Continued

City	Week ended May 9, 1931				Corresponding week, 1930		Death rate [2] fo the first 19 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Fall River [5] [7]	29	13.1	2	45	13.1	6	13.5	14.
Flint	37	11.8	5	64	11.2	2	8.2	10.
Fort Worth	44	13.7	3		13.7	4	12.5	11.
White	28		3			4		
Colored	16	(6)	0		(6)	0	(6)	(6)
Grand Rapids	38	11.5	2	30	7.1	0	9.8	11.
Houston	65	10.9	13		13.2	11	11.8	12.
White	48		12			6		
Colored	17	(6)	1		(6)	5	(6)	(6)
Indianapolis	105	14.8	4	33	14.1	0	15.1	15.
White	89		3	28		0		
Colored	16	(6)	1	67	(6)	0	(6)	(6)
Jersey City	61	10.0	8	71	16.6	17	13.3	13.
Kansas City, Kans	24	10.2	5	103	13.2	4	14.8	12.
White	19		5	123		3		
Colored	5	(6)	0	0	(6)	1	(6)	(6)
Kansas City, Mo	94	12.0	6	46	13.6	6	15.0	14.
Knoxville	27	12.9	1	21	12.7	5	14.0	15.
White	22		1	24		4		
Colored	5	(6)	0	0	(6)	1	(6)	(6)
Long Beach	29	9.9	4	97	9.1	0	10.7	10.
Los Angeles	279	11.0	21	61	10.5	21	11.6	11.
Louisville	74	12.5	8	69	15.8	3	16.4	14.
White	62		5	49		3		
Colored	12	(6)	3	199	(6)	0	(6)	(6)
Lowell [7]	25	12.9	5	127	15.0	3	14.0	15.
Lynn	15	7.6	1	26	13.2	4	11.6	12.
Memphis	70	14.1	3	32	20.5	6	17.8	18.
White	30		2	33		3		
Colored	40	(6)	1	29	(6)	3	(6)	(6)
Miami	22	10.2	1	25	10.3	1	14.1	12.
White	19		0	0		1		
Colored	3	(6)	1	88	(6)	0	(6)	(6)
Milwaukee	119	10.5	13	56	11.3	18	10.4	10.
Minneaoplis	114	12.5	12	77	12.0	4	12.1	11.
Nashville	43	14.4	3	45	11.8	0	17.9	17.
White	27		1	20		0		
Colored	16	(6)	2	118	(6)	0	(6)	(6)
New Bedford [7]	28	13.0	3	80	10.7	1	13.5	12.
New Haven	34	10.9	2	38	14.4	1	13.5	15.0
New Orleans	134	14.9	11	60	15.5	17	18.8	19.
White	83		6	50		10		
Colored	51	(6)	5	81	(6)	7	(6)	(6)
New York	1,561	11.5	133	56	12.8	169	13.0	12.
Bronx Borough	205	8.0	14	32	8.5	11	9.4	8.7
Brooklyn Borough	519	10.3	55	58	11.8	77	12.1	11.
Manhattan Borough	648	18.6	54	92	18.5	56	20.0	18.
Queens Borough	147	6.6	6	16	10.2	18	8.4	8.0
Richmond Borough	42	13.4	4	72	16.7	7	14.2	15.
Newark, N. J	105	12.3	6	31	14.4	11	13.4	14.1
Oakland	45	8.0	4	51	8.6	1	11.6	11.7
Oklahoma City	46	12.2	1	14	8.3	4	12.3	10.3
Omaha	67	16.1	4	45	15.3	4	14.7	14.3
Paterson	33	12.4	5	86	15.4	5	15.5	13.7
Philadelphia	498	13.2	34	49	14.5	58	15.6	14.0
Pittsburgh	211	16.3	32	110	14.3	28	17.5	15.7
Portland, Oreg	73	12.4	1	12	10.2	2	12.6	13.4
Providence	75	15.3	9	83	15.6	5	14.9	15.3
Richmond	51	14.4	3	44	15.1	5	17.6	16.3
White	39		2	44		5		
Colored	12	(6)	1	43	(6)	0	(6)	(6)
Rochester	69	10.8	3	27	12.4	2	13.6	13.0
St. Louis	210	13.2	11	37	14.3	10	17.6	15.0
St. Paul	60	11.3	1	10	11.9	4	11.6	11.1
Salt Lake City [5]	32	11.7	1	15	13.0	2	13.3	14.1
San Antonio	80	17.4	19		19.2	11	15.7	18.4
San Diego	35	11.7	1	20	12.2	3	15.0	15.1
San Francisco	167	13.4	6	40	13.5	8	14.2	13.8
Schenectady	17	9.2	2	59	16.9	3	11.7	12.7

Deaths from all causes in certain large cities of the United States during the week ended May 9, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended May 9, 1931				Corresponding week, 1930		Death rate[2] for the first 19 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1931	1930
Somerville	30	14.9	3	112	9.0	1	11.1	12.3
South Bend	14	6.8	1	25	7.5	3	9.1	9.8
Spokane	20	9.0	1	26	15.8	1	13.2	13.6
Springfield, Mass	51	17.5	5	77	12.1	2	13.9	14.1
Syracuse	50	12.2	5	59	13.9	3	12.9	13.2
Tacoma	17	8.2	0	0	13.2	2	14.4	13.3
Toledo	58	10.2	4	37	16.3	4	13.2	14.4
Trenton	45	18.9	3	52	19.0	7	19.3	17.9
Utica	43	21.9	4	104	17.9	2	16.5	17.4
Washington, D. C	136	14.4	12	66	17.8	11	17.9	16.4
White	83		7	57		6		
Colored	53	(6)	5	86	(6)	5	(6)	(6)
Waterbury	18	9.3	2	60	9.9	2	11.2	10.6
Wilmington, Del.[7]	29	14.2	2	43	15.7	3	16.5	15.9
Worcester	54	14.3	5	69	13.6	5	14.9	15.4
Yonkers	24	9.0	1	26	6.9	0	9.8	9.2
Youngstown	23	6.9	1	14	12.5	1	11.3	11.1

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 76 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

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

UNITED STATES

CURRENT WEEKLY STATE REPORTS

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

Reports for weeks Ended May 16, 1931, and May 17, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 16, 1931, and May 17, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended May 16, 1931	Week ended May 17, 1930	Week ended May 16, 1931	Week ended May 17, 1930	Week ended May 16, 1931	Week ended May 17, 1930	Week ended May 16, 1931	Week ended May 17, 1930
New England States:								
Maine	3	4	1		9	77	1	2
New Hampshire		4		4	76	2	0	0
Vermont					7	39	0	0
Massachusetts	25	59	1	4	570	1,474	2	7
Rhode Island	3	3			80	2	0	0
Connecticut	17	21	2		699	75	1	4
Middle Atlantic States:								
New York	131	120	[1] 11	[1] 16	3,261	2,851	14	19
New Jersey	42	83	5	10	1,124	1,483	8	4
Pennsylvania		106			3,635	1,580	9	18
East North Central States:								
Ohio	50	23	42	7	1,439	713	6	3
Indiana	12	17	5		1,048	137	7	5
Illinois	126	117	3	40	2,081	578	19	8
Michigan	34	63	7	4	263	2,243	9	24
Wisconsin	17	14	17	10	732	900	3	2
West North Central States:								
Minnesota	13	5			400	169	1	5
Iowa	4	4			58	478	0	4
Missouri	25	30	10	6	452	90	5	12
North Dakota	9	2			20	17	0	3
South Dakota	7	3			59	107	0	0
Nebraska	4	9	4		11	168	0	0
Kansas	23	13	5		99	776	1	1
South Atlantic States:								
Delaware		1			124	12	0	0
Maryland [2]	16	25	9	17	1,169	102	3	1
District of Columbia	8	5	1		353	47	2	0
West Virginia	8	6	17	14	79	97	0	2
North Carolina	17	18	10	15	948	60	1	1
South Carolina	11	6	391	245	134		0	2
Georgia	12		57	8	186	190	1	0
Florida	7	7	2	2	221	247	0	0
East South Central States:								
Kentucky					88	21	4	2
Tennessee	4	2	21	21	26	117	1	14
Alabama	9	4	58	9	198	112	7	2
Mississippi	5						0	5
West South Central States:								
Arkansas	1	4	16	23	48	52	1	2
Louisiana	16	11	50	16	2	23	4	2
Oklahoma [3]	8	8	95	36	30	184	0	2
Texas	21	27	55	40	45	259	0	1
Mountain States:								
Montana	1	2			5	10	0	1
Idaho		2			1	12	0	1
Wyoming					2	46	0	0
Colorado	6	5			100	641	1	0
New Mexico	1	1	1		84	43	0	3
Arizona	3	4	8	7	31	152	1	3
Utah [2]	2		5		5	311	0	2
Pacific States:								
Washington	4	1			108	579	0	3
Oregon	11	6	18	13	82	97	1	0
California	83	45	53	30	1,174	2,033	7	5

[1] New York City only.
[2] Week ended Friday.
[3] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 16, 1931, and May 17, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended May 16, 1931	Week ended May 17, 1930	Week ended May 16, 1931	Week ended May 17, 1930	Week ended May 16, 1931	Week ended May 17, 1930	Week ended May 16, 1931	Week ended May 17, 1930
New England States:								
Maine	0	0	27	26	0	0	2	12
New Hampshire	0	0	3	13	0	0	0	0
Vermont	0	0	3	4	0	1	0	0
Massachusetts	0	4	375	214	0	0	8	2
Rhode Island	0	0	69	20	0	0	0	8
Connecticut	0	1	42	71	0	0	5	0
Middle Atlantic States:								
New York	4	1	887	442	3	11	17	18
New Jersey	0	1	299	183	0	0	5	3
Pennsylvania	3	0	542	421	0	1	12	13
East North Central States:								
Ohio	1	1	612	166	29	79	9	6
Indiana	0	0	166	123	138	195	1	8
Illinois	1	0	576	369	94	161	4	17
Michigan	0	0	436	283	27	71	4	2
Wisconsin	1	0	144	165	15	13	0	0
West North Central States:								
Minnesota	0	0	70	111	6	6	4	0
Iowa	0	0	69	64	71	124	0	1
Missouri	1	0	216	96	29	37	2	9
North Dakota	0	0	15	28	3	36	0	1
South Dakota	1	0	9	12	9	58	0	0
Nebraska	0	0	44	35	64	47	0	0
Kansas	0	0	55	73	75	40	4	7
South Atlantic States:								
Delaware	0	0	17	12	0	0	0	0
Maryland [2]	0	0	68	70	0	0	6	7
District of Columbia	0	0	14	9	0	0	0	2
West Virginia	0	0	56	22	3	27	3	11
North Carolina	0	1	55	24	1	20	7	9
South Carolina	1	2	8	3	0	2	6	17
Georgia	0	0	57	15	0	0	10	8
Florida	0	0	6	4	2	0	0	2
East South Central States:								
Kentucky	0	0	45	23	36	20	6	3
Tennessee	0	9	17	27	7	19	5	12
Alabama	4	0	12	9	11	10	6	3
Mississippi	0	0	18	3	28	6	6	4
West South Central States:								
Arkansas	0	0	13	1	43	13	5	1
Louisiana	0	0	26	10	18	6	16	18
Oklahoma [3]	0	0	23	22	46	98	7	4
Texas	0	0	28	34	49	61	5	10
Mountain States:								
Montana	0	1	14	24	1	3	2	0
Idaho	0	0	6	2	1	1	1	1
Wyoming	0	0	17	10	1	6	0	0
Colorado	0	0	26	22	5	6	0	2
New Mexcio	0	2	6	11	2	5	3	1
Arizona	0	1	2	6	0	9	1	4
Utah [2]	0	0	7	2	0	2	0	0
Pacific States:								
Washington	0	0	27	36	18	62	6	4
Oregon	0	0	23	14	18	19	4	3
California	4	14	151	142	27	47	8	6

[2] Week ended Friday.
[3] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

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

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
April, 1931										
Colorado	3	25	2		790		0	138	12	3
District of Columbia	13	60	13		1,325		0	105	0	1
Indiana	46	107	143		4,267		2	1,165	436	13
Iowa	9	26			271		1	367	314	1
Massachusetts	8	182	31	1	2,200	1	5	1,586	0	12
New Jersey	24	218	62		3,843		2	1,341	0	12
Pennsylvania	47	360		2	17,932	1	2	2,413	1	44
South Carolina		70	3,871	694	566	411	4	33	13	15
Vermont		1			13			30	2	

April, 1931

	Cases
Anthrax:	
Iowa	1
Massachusetts	2
Chicken pox:	
Colorado	348
District of Columbia	107
Indiana	316
Iowa	334
Massachusetts	1,007
New Jersey	1,786
Pennsylvania	3,355
South Carolina	375
Vermont	79
Dengue:	
South Carolina	1
Diarrhea:	
South Carolina	327
Dysentery:	
New Jersey	1
German measles:	
Colorado	1
Iowa	23
Massachusetts	632
Pennsylvania	721
South Carolina	185
Hookworm disease:	
Indiana	1
South Carolina	84
Impetigo contagiosa:	
Colorado	2
Lead poisoning:	
Massachusetts	2
New Jersey	7
Pennsylvania	2
Leprosy:	
Indiana	1
Massachusetts	1
Lethargic encephalitis:	
District of Columbia	1
Iowa	1
Massachusetts	2
New Jersey	8
Pennsylvania	9
South Carolina	5
Mumps:	
Colorado	243
Indiana	85
Iowa	154
Massachusetts	767
Mumps—Continued.	
New Jersey	289
Pennsylvania	2,211
South Carolina	157
Vermont	98
Ophthalmia neonatorum:	
Massachusetts	45
Pennsylvania	12
South Carolina	13
Paratyphoid fever:	
South Carolina	2
Puerperal septicemia:	
Pennsylvania	13
Rabies in animals:	
South Carolina	21
Rocky Mountain spotted or tick fever:	
Colorado	1
Septic sore throat:	
Colorado	2
Indiana	1
Massachusetts	19
Tetanus:	
Pennsylvania	4
Trachoma:	
Indiana	2
Massachusetts	4
Pennsylvania	3
Trichinosis:	
Iowa	1
Tularaemia:	
Pennsylvania	1
Undulant fever:	
District of Columbia	1
Massachusetts	1
New Jersey	3
Pennsylvania	1
Vermont	1
Vincent's angina:	
Iowa	2
Whooping cough:	
Colorado	285
District of Columbia	31
Indiana	309
Iowa	91
Massachusetts	615
New Jersey	833
Pennsylvania	896
South Carolina	219
Vermont	97

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 95 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,360,000. The estimated population of the 88 cities reporting deaths is more than 31,815,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended May 9, 1931, and May 10, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	877	1,051	
95 cities	428	487	760
Measles:			
44 States	19,575	18,777	
95 cities	8,372	8,894	
Meningococcus meningitis:			
46 States	116	216	
95 cities	62	91	
Poliomyelitis:			
46 States	25	24	
Scarlet fever:			
46 States	5,367	3,917	
95 cities	2,494	1,625	1,323
Smallpox:			
46 States	784	1,257	
95 cities	93	151	64
Typhoid fever:			
46 States	168	203	
95 cities	29	41	33
Deaths reported			
Influenza and pneumonia:			
88 cities	793	856	
Smallpox:			
88 cities	0	1	
Omaha, Nebr	0	1	

City reports for week ended May 9, 1931

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

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	4	0	0	----------	0	1	8	1
New Hampshire:								
Concord	0	0	0	----------	0	10	0	0
Manchester	0	0	0	----------	0	0	0	1
Vermont:								
Barre	1	0	0	----------	0	0	0	1
Burlington	0	0	1	----------	0	0	0	0
Massachusetts:								
Boston	69	30	3	4	0	85	10	22
Fall River	1	2	3	1	1	5	12	1
Springfield	2	2	0	----------	0	8	9	2
Worcester	8	3	4	----------	0	2	33	4
Rhode Island:								
Pawtucket	----------	1	----------	----------	----------	----------	----------	----------
Providence	21	5	3	----------	0	88	18	7
Connecticut:								
Bridgeport	2	3	1	----------	0	9	3	4
Hartford	4	5	0	1	1	47	1	7
New Haven	13	1	0	----------	0	187	12	5
MIDDLE ATLANTIC								
New York:								
Buffalo	11	10	7	----------	0	277	51	24
New York	317	239	105	11	10	1,480	77	193
Rochester	3	4	1	----------	0	75	25	2
Syracuse	5	2	1	----------	0	9	0	4
New Jersey:								
Camden	6	7	3	2	2	10	4	4
Newark	121	15	6	5	1	33	16	4
Trenton	9	2	1	3	0	7	5	7
Pennsylvania:								
Philadelphia	78	58	10	2	7	1,185	45	51
Pittsburgh	50	16	2	4	5	120	38	30
Reading	3	2	1	----------	0	10	10	2
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	11	5	5	1	2	85	15	13
Cleveland	160	22	13	12	3	150	337	22
Columbus	8	3	3	2	0	15	2	5
Toledo	39	3	2	----------	0	----------	13	3
Indiana:								
Fort Wayne	0	1	0	----------	0	2	0	1
Indianapolis	24	3	4	----------	1	370	23	8
South Bend	3	1	1	----------	0	20	0	2
Terre Haute	4	0	0	----------	0	1	0	2
Illinois:								
Chicago	150	83	80	3	6	777	85	49
Springfield	10	0	1	----------	0	42	5	2

City reports for week ended May 9, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Michigan:								
Detroit	127	41	23	6	6	15	65	20
Flint	33	2	0	----------	0	1	9	5
Grand Rapids	6	2	1	----------	0	44	3	4
Wisconsin:								
Kenosha	1	0	1	----------	0	0	118	0
Madison	29	0	1	----------	----------	2	46	----------
Milwaukee	98	10	3	----------	0	288	524	9
Racine	6	1	0	----------	0	4	13	0
Superior	3	0	0	----------	0	0	0	1
WEST NORTH CENTRAL								
Minnesota:								
Duluth	9	0	0	----------	1	1	5	2
Minneapolis	66	12	2	----------	0	150	158	6
St. Paul	63	8	0	----------	0	25	2	6
Iowa:								
Davenport	0	0	0	----------	----------	0	0	----------
Des Moines	2	1	0	----------	----------	0	0	----------
Sioux City	23	0	0	----------	----------	3	17	----------
Waterloo	0	0	0	----------	----------	3	0	----------
Missouri:								
Kansas City	21	3	3	----------	0	300	4	9
St. Joseph	4	1	4	----------	0	13	0	1
St. Louis	25	30	18	----------	----------	22	12	5
North Dakota:								
Fargo	0	0	0	----------	0	4	9	0
Grand Forks	0	0	0	----------	----------	0	0	----------
South Dakota:								
Aberdeen	3	1	0	----------	----------	3	0	----------
Sioux Falls	0	0	0	----------	----------	0	0	----------
Nebraska:								
Omaha	9	2	7	----------	0	1	35	6
Kansas:								
Topeka	4	1	1	1	1	3	42	4
Wichita	7	1	2	----------	0	6	4	2
SOUTH ATLANTIC								
Delaware:								
Wilmington	3	1	0	----------	0	43	1	2
Maryland:								
Baltimore	66	20	10	2	0	847	36	21
Cumberland	0	0	0	1	0	1	0	1
Frederick	0	0	0	----------	0	18	0	0
District of Columbia:								
Washington	23	12	7	5	6	299	0	17
Virginia:								
Lynchburg	14	1	0	----------	0	6	0	0
Norfolk	15	0	0	2	0	220	0	3
Richmond	2	2	5	----------	0	342	0	5
Roanoke	5	0	0	----------	0	10	2	0
West Virginia:								
Charleston	1	0	0	----------	0	0	0	2
Wheeling	28	0	0	----------	0	2	0	0
North Carolina:								
Raleigh	11	0	0	----------	0	47	0	2
Wilmington	1	0	0	----------	0	0	0	1
Winston-Salem	13	0	0	----------	0	55	17	1
South Carolina:								
Charleston	0	0	1	7	0	1	0	0
Columbia	0	0	0	----------	0	0	2	7
Greenville	0	0	0	----------	0	0	1	0
Georgia:								
Atlanta	1	2	6	12	5	40	0	5
Brunswick	0	0	0	----------	0	0	2	0
Savannah	5	0	1	15	0	16	12	2
Florida:								
Miami	2	2	1	----------	0	61	2	0
St. Petersburg	----------	0	----------	----------	0	----------	----------	0
Tampa	8	0	2	----------	0	72	14	0

City reports for week ended May 9, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	1	1	2		0	25	0	3
Tennessee:								
Memphis	21	2	3		2	122	0	6
Nashville	0	1	1		3	54	1	2
Alabama:								
Birmingham	6	2	0		2	11	2	8
Mobile	1	0	0	1	1	1	0	0
Montgomery	3	0	1			4	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	4	0	0			0	0	
Little Rock	6	0	0		1	4	4	6
Louisiana:								
New Orleans	6	8	14	2	2	1	0	12
Shreveport	2	0	0		0	1	0	1
Oklahoma:								
Muskogee	31	0	0	1	0	1	2	0
Texas:								
Dallas	37	4	6	1	0	4	34	1
Forth Worth	13	2	0		2	0	2	4
Galveston	0	0	1		0	2	0	0
Houston	3	4	6		0	9	0	5
San Antonio	1	2	5		1	24	1	8
MOUNTAIN								
Montana:								
Billings		0						
Great Falls	6	0	1		0	0	0	0
Helena	0	0	0		0	0	0	0
Missoula	0	0	0		0	0	0	0
Idaho:								
Boise		0	0					
Colorado:								
Denver	55	9	1		3	39	36	3
Pueblo	1	0	0		0	20	0	3
New Mexico:								
Albuquerque	7	0	0		1	1	0	0
Utah:								
Salt Lake City	11	2	1		0	3	20	2
Nevada:								
Reno	0	0	0		0	0	0	3
PACIFIC								
Washington:								
Seattle	52	2	2			10	49	
Spokane	0	2	1			0	0	
Tacoma	6	0	0		0	0	18	2
Oregon:								
Portland	19	6	1	1	1	36	14	3
Salem	3	0	1	2	0	14	12	0
California:								
Los Angeles	64	30	22	29	2	146	28	11
Sacramento	4	2	1		0	55	0	3
San Francisco	27	13	5	1	1	45	5	13

City reports for week ended May 9, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	4	7	0	0	0	0	0	0	0	7	21
New Hampshire:											
Concord	0	1	0	0	0	0	0	0	0	0	7
Manchester	1	4	0	0	0	2	0	1	1	0	22
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	1	2
Burlington	0	0	0	0	0	1	0	0	0	3	11
Massachusetts:											
Boston	73	117	0	0	0	14	1	1	0	25	215
Fall River	4	74	0	0	0	3	0	0	0	1	29
Springfield	9	15	0	0	0	3	0	0	0	4	46
Worcester	8	38	0	0	0	2	0	0	0	3	-------
Rhode Island:											
Pawtucket	1	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Providence	12	45	0	0	0	7	0	1	0	2	75
Connecticut:											
Bridgeport	9	10	0	0	0	1	0	0	0	0	26
Hartford	5	4	0	0	0	1	0	0	0	2	29
New Haven	6	2	0	0	0	0	0	0	0	4	34
MIDDLE ATLANTIC											
New York:											
Buffalo	24	18	0	6	0	8	0	0	0	48	154
New York	294	564	0	0	0	106	9	7	1	198	1,561
Rochester	10	67	0	0	0	3	0	0	0	14	66
Syracuse	10	38	0	0	0	1	0	0	0	12	50
New Jersey:											
Camden	4	7	0	0	0	1	0	0	0	3	37
Newark	29	38	0	0	0	7	0	0	0	51	109
Trenton	3	5	0	0	0	2	0	3	0	0	45
Pennsylvania:											
Philadelphia	94	173	0	0	0	33	2	1	0	39	498
Pittsburgh	29	91	0	0	0	8	0	0	0	19	211
Reading	5	1	0	0	0	1	0	0	0	0	25
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	16	41	2	0	0	9	1	0	0	2	138
Cleveland	39	83	0	0	0	14	1	0	0	19	196
Columbus	7	9	1	0	0	0	0	0	3	1	94
Toledo	11	5	1	1	0	3	0	1	0	5	58
Indiana:											
Fort Wayne	4	4	1	0	0	1	0	1	0	0	37
Indianapolis	12	44	7	4	0	6	0	1	0	49	-------
South Bend	5	0	1	3	0	1	0	0	0	3	14
Terre Haute	2	4	1	2	0	0	0	0	0	0	15
Illinois:											
Chicago	117	238	2	1	0	38	2	0	0	53	724
Springfield	3	10	0	0	-------	0	0	0	0	0	22
Michigan:											
Detroit	114	205	1	0	0	17	2	2	2	92	266
Flint	10	33	2	0	0	1	0	0	0	18	37
Grand Rapids	11	15	1	0	0	0	1	0	0	12	38
Wisconsin:											
Kenosha	2	0	0	0	0	0	0	0	0	0	9
Madison	4	0	0	-------	-------	-------	0	0	-------	2	-------
Milwaukee	26	28	0	0	0	5	0	0	0	108	119
Racine	4	7	0	0	0	0	0	0	0	19	10
Superior	2	1	0	0	0	0	0	0	0	0	4
WEST NORTH CENTRAL											
Minnesota:											
Duluth	7	1	0	0	0	0	0	1	0	0	25
Minneapolis	31	16	0	2	0	5	0	0	0	28	114
St. Paul	22	11	1	3	0	4	0	0	0	20	61

City reports for week ended May 9, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST NORTH CENTRAL—continued											
Iowa:											
Davenport	1	0	1	9			0	0		0	
Des Moines	8	8	2	9			0	0		0	28
Sioux City	2	8	1	1			0	0		4	
Waterloo	2	0	0	0			0	0		17	
Missouri:											
Kansas City	18	3	1	5	0	4	0	0	0	6	94
St. Joseph	4	3	1	0	0	0	0	0	0	1	10
St. Louis	33	168	2	6	0	9	1	0	0	19	210
North Dakota:											
Fargo	1	8	0		0	0	0	0	0	5	3
Grand Forks	0	0	0	0	0		0	0	0	0	
South Dakota:											
Aberdeen	0	0	0	0			0	0		0	
Sioux Falls	2	2	1	1			0	0		0	9
Nebraska:											
Omaha	3	9	4	10	0	3	0	0	1	1	67
Kansas:											
Topeka	2	0	0	1	0	0	0	0	0	0	15
Wichita	2	3	1	13	0	0	0	0	0	9	33
SOUTH ATLANTIC											
Delaware:											
Wilmington	4	7	0	0	0	3	0	0	0	1	29
Maryland:											
Baltimore	37	39	0	0	0	22	1	1	0	30	205
Cumberland	1	0	0	0	0	0	0	0	0	0	10
Frederick	0	0	0	0	0	0	0	0	0	0	5
District of Columbia:											
Washington	24	32	1	0	0	10	0	1	0	5	136
Virginia:											
Lynchburg	1	0	0	0	0	0	0	0	0	0	14
Norfolk	1	1	0	0	0	2	0	0	0	6	
Richmond	3	9	0	0	0	5	0	0	0	0	53
Roanoke	0	1	0	0	0	0	0	1	0	0	12
West Virginia:											
Charleston	1	1	0	0	0	2	0	1	1	0	31
Wheeling	1	1	0	0	0	0	1	0	0	0	19
North Carolina:											
Raleigh	0	0	0	0	0	2	0	0	0	31	15
Wilmington	0	0	0	0	0	0	0	0	0	15	11
Winston-Salem	1	0	1	0	0	0	0	0	0	20	17
South Carolina:											
Charleston	0	0	1	0	0	3	1	0	0	0	25
Columbia	0	0	0	0	0	0	0	0	0	0	15
Greenville	0	1	0	0	0	0	0	0	0	3	
Georgia:											
Atlanta	4	48	2	4	0	6	0	0	1	6	90
Brunswick	0	0	0	0	0	0	0	0	0	0	4
Savannah	0	1	1	0	0	1	1	0	0	12	33
Florida:											
Miami	0	0	0	0	0	1	1	0	0	1	22
St. Petersburg	0		0		0	1	0		0		15
Tampa	1	1	0	0	0	0	1	0	0	0	23
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	11	0	0	0	1	0	0	0	0	20
Tennessee:											
Memphis	7	22	0	7	0	11	1	0	0	17	70
Nashville	1	4	0	0	0	3	1	1	0	10	43
Alabama:											
Birmingham	1	5	1	0	0	6	0	0	0	13	69
Mobile	0	0	0	0	0	0	0	0	0	1	14
Montgomery	0	1	0	0			0	0		0	

City reports for week ended May 9, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0	--------	-------	0	0	--------	8	--------
Little Rock	0	1	0	0	0	3	0	0	0	1	10
Louisiana:											
New Orleans	10	16	0	14	0	18	2	1	0	1	134
Shreveport	0	0	1	1	0	2	0	0	0	5	27
Oklahoma:											
Muskogee	0	0	2	0	--------	-------	0	0	--------	0	--------
Texas:											
Dallas	4	4	2	1	0	2	0	0	0	20	47
Fort Worth	2	2	3	8	0	1	0	0	0	0	44
Galveston	0	0	0	0	0	1	1	1	0	0	11
Houston	2	6	1	3	0	3	1	0	0	0	65
San Antonio	1	4	0	0	0	2	0	0	0	0	80
MOUNTAIN											
Montana:											
Billings	0	-------	0	-------	--------	-------	-------	-------	--------	-------	--------
Great Falls	1	3	0	0	0	0	0	0	0	6	12
Helena	0	1	0	0	0	0	0	0	0	0	6
Missoula	1	1	0	0	0	1	0	0	0	0	7
Idaho:											
Boise	0	-------	1	-------	--------	-------	0	-------	--------	-------	--------
Colorado:											
Denver	12	11	1	0	0	6	0	0	0	29	76
Pueblo	1	2	0	0	0	0	0	0	0	19	9
New Mexico:											
Albuquerque	0	0	0	0	0	4	0	0	0	0	8
Utah:											
Salt Lake City	2	1	1	0	0	1	0	0	0	37	32
Nevada:											
Reno	1	0	0	0	0	0	0	0	0	0	4
PACIFIC											
Washington:											
Seattle	8	13	3	0	--------	-------	0	1	--------	93	--------
Spokane	5	0	7	1	--------	-------	0	0	--------	0	--------
Tacoma	2	0	3	1	0	1	0	0	0	2	17
Oregon:											
Portland	7	3	9	1	0	3	0	0	0	0	73
Salem	0	0	0	0	--------	-------	0	0	--------	0	--------
California:											
Los Angeles	30	33	6	4	0	16	1	2	0	30	279
Sacramento	2	0	1	0	0	3	0	1	0	30	29
San Francisco	21	8	1	0	0	14	1	0	0	41	162

City reports for week ended May 9, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
NEW ENGLAND									
Massachusetts:									
Boston	1	1	0	0	0	0	0	1	0
Worcester	1	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
Buffalo	2	2	0	1	0	0	0	0	0
New York	4	4	2	1	0	0	1	3	1
New Jersey:									
Newark	1	0	0	0	0	0	0	0	0
Trenton	0	0	1	1	0	0	0	0	0
Pennsylvania:									
Philadelphia	4	2	0	1	0	0	0	0	0
Pittsburgh	2	1	0	1	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cleveland	2	0	0	0	0	0	0	0	0
Columbus	1	1	0	0	0	0	0	0	0
Indiana:									
Indianapolis [1]	1	1	0	0	0	0	0	0	0
Illinois:									
Chicago	13	5	1	1	0	0	0	0	0
Springfield	1	0	0	0	0	0	0	0	0
Michigan:									
Detroit	2	1	2	1	0	0	1	0	0
Flint	1	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL									
Missouri:									
Kansas City	0	1	0	0	0	0	0	0	0
St. Joseph	4	0	0	0	0	0	0	0	0
St. Louis	4	2	0	0	0	0	0	0	0
North Dakota:									
Fargo	0	0	0	1	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	1	0	1	0	2	2	0	0	0
District of Columbia:									
Washington	0	0	0	0	0	1	0	0	0
Virginia:									
Norfolk	0	0	0	0	0	1	0	0	0
West Virginia:									
Charleston	[2] 1	[2] 1	0	0	0	0	0	0	0
North Carolina:									
Wilmington	0	0	0	0	1	0	0	0	0
Winston-Salem	0	0	0	0	0	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	4	1	0	0	0
Columbia	1	1	0	0	0	1	0	0	0
Georgia:									
Atlanta	1	0	0	0	1	0	0	0	0
Savannah	0	0	0	0	1	0	0	0	0
Florida:									
Miami	0	0	0	0	1	0	0	0	0
Tampa	1	0	0	0	0	0	0	1	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	0	1	0	0	0	0	0	0	0
Nashville	1	1	0	0	0	0	0	0	0
Alabama:									
Birmingham	3	0	0	0	1	0	0	1	0

[1] Rabies (in man): 1 death at Indianapolis, Ind.
[2] Nonresident.

City reports for week ended May 9, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	2	2	0	0	1	0	0	0	0
Shreveport	0	0	0	0	0	2	0	0	0
Texas:									
Dallas	0	0	0	0	3	0	0	0	0
Galveston	0	0	0	0	0	1	0	0	0
Houston	2	1	0	0	0	0	0	0	0
San Antonio	1	1	0	0	0	0	0	0	0
MOUNTAIN									
Colorado:									
Denver	0	1	0	1	0	0	0	0	0
PACIFIC									
Washington:									
Seattle	1	0	0	0	0	0	0	0	0
Tacoma	0	0	0	0	0	0	0	1	0
California:									
Los Angeles	1	1	0	0	0	0	0	0	0
Sacramento	1	0	0	0	0	0	0	0	0
San Francisco	1	0	1	0	1	1	0	0	0

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended May 9, 1931, compared with those for a like period ended May 10, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, April 5 to May 9, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Apr. 11, 1931	Apr. 12, 1930	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930
98 cities	65	93	66	86	53	91	[2] 64	83	[3] 67	77
New England	84	82	79	119	58	85	36	82	[9] 35	65
Middle Atlantic	59	92	62	83	46	99	61	72	61	85
East North Central	86	115	83	96	58	113	[4] 87	130	82	103
West North Central	63	89	63	87	67	68	[5] 64	68	71	45
South Atlantic	49	80	65	64	51	64	[6] 70	50	63	62
East South Central	17	6	23	18	23	48	6	0	41	6
West South Central	54	153	74	206	71	101	68	94	108	73
Mountain	35	79	17	9	26	88	[7] 27	44	[8] 28	70
Pacific	57	51	43	36	63	49	53	61	61	49

MEASLES CASE RATES

98 cities	1,326	1,195	1,316	1,227	1,342	1,356	[2] 1,259	1,293	[3] 1,308	1,411
New England	1,503	1,562	1,349	1,628	1,286	1,710	964	1,942	[9] 1,103	2,303
Middle Atlantic	1,422	966	1,543	1,097	1,418	1,192	1,411	1,284	1,433	1,295
East North Central	831	904	790	1,074	1,075	999	[4] 923	1,005	1,102	927
West North Central	704	1,199	589	1,009	830	1,352	[5] 692	1,003	1,016	1,269
South Atlantic	4,546	1,067	4,343	1,089	4,049	1,306	[6] 3,919	1,188	3,553	1,298
East South Central	1,751	329	1,612	299	1,600	407	1,426	185	1,263	442
West South Central	68	721	101	502	139	592	156	731	152	711
Mountain	844	7,674	923	6,793	661	8,802	[7] 686	5,912	[8] 576	9,128
Pacific	499	2,059	417	1,800	517	2,067	505	1,773	501	1,992

SCARLET FEVER CASE RATES

98 cities	362	320	382	298	405	262	[2] 373	296	[3] 390	258
New England	474	351	584	402	575	348	582	268	[9] 631	310
Middle Atlantic	413	281	415	262	488	239	409	235	448	266
East North Central	338	430	383	391	432	360	[4] 399	394	439	318
West North Central	537	309	518	366	469	248	[5] 521	384	440	238
South Atlantic	355	308	306	302	304	248	[6] 274	294	276	242
East South Central	465	132	582	143	396	126	407	132	250	138
West South Central	105	108	112	115	98	59	132	115	105	94
Mountain	174	335	278	352	191	229	[7] 199	361	[8] 177	370
Pacific	104	217	116	144	86	176	94	109	106	130

SMALLPOX CASE RATES

98 cities	19	29	22	27	21	30	[2] 23	27	[3] 15	24
New England	0	2	0	2	0	0	0	0	[9] 0	2
Middle Atlantic	1	0	2	0	1	0	1	1	3	0
East North Central	6	23	19	23	20	18	[4] 11	21	6	22
West North Central	96	149	92	139	71	145	[5] 123	132	78	101
South Atlantic	18	10	10	4	6	0	[6] 6	0	8	0
East South Central	0	12	52	18	35	42	58	36	41	6
West South Central	81	28	95	70	98	38	101	31	64	38
Mountain	17	62	9	26	17	97	[7] 0	150	[8] 0	79
Pacific	53	89	27	71	41	109	51	73	12	83

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931, and 1930, respectively.
[2] South Bend, Ind., Flint, Mich., St. Paul, Minn., Wilmington, N. C., and Boise, Idaho, not included.
[3] Pawtucket, R. I., Billings, Mont., and Boise, Idaho, not included.
[4] South Bend, Ind., and Flint, Mich., not included.
[5] St. Paul, Minn., not included.
[6] Wilmington, N. C., not included.
[7] Boise, Idaho, not included.
[8] Billings, Mont., and Boise, Idaho, not included.
[9] Pawtucket, R. I., not included.

Summary of weekly reports from cities, April 5 to May 9, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	Apr. 11, 1931	Apr. 12, 1930	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930
98 cities	5	5	5	6	3	6	[2] 6	6	[3] 5	6
New England	2	0	2	7	2	5	7	2	[9] 5	0
Middle Atlantic	5	1	4	2	4	5	7	3	5	4
East North Central	3	1	2	2	2	6	[4] 4	6	2	2
West North Central	0	4	4	8	4	4	[5] 2	4	2	8
South Atlantic	16	22	8	22	2	12	[6] 14	6	8	16
East South Central	6	18	12	6	6	0	12	24	6	18
West South Central	3	7	7	7	0	24	0	21	7	3
Mountain	0	44	9	18	9	0	[7] 0	53	[8] 0	18
Pacific	8	4	10	8	4	4	6	6	8	20

INFLUENZA DEATH RATES

	Apr. 11, 1931	Apr. 12, 1930	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930
91 cities	18	16	17	15	13	12	[2] 11	9	[3] 12	9
New England	19	7	7	7	7	12	7	5	[9] 5	10
Middle Atlantic	12	20	12	14	12	9	12	9	11	10
East North Central	14	8	10	12	6	14	[4] 5	7	11	9
West North Central	15	9	29	18	18	9	[5] 10	9	6	3
South Atlantic	30	26	32	22	10	12	[6] 20	16	22	6
East South Central	69	45	76	58	44	39	19	19	50	13
West South Central	45	25	45	25	55	25	38	21	14	28
Mountain	17	26	17	9	17	18	[7] 27	0	[8] 28	0
Pacific	19	12	10	2	5	0	2	5	7	7

PNEUMONIA DEATH RATES

	Apr. 11, 1931	Apr. 12, 1930	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930
91 cities	155	164	161	149	137	140	[2] 122	135	[3] 117	133
New England	173	186	144	160	132	189	154	164	[9] 135	131
Middle Atlantic	168	185	180	180	165	160	141	163	144	176
East North Central	118	127	128	114	98	108	[4] 75	107	87	92
West North Central	253	150	244	156	230	81	[5] 192	114	121	126
South Atlantic	199	230	188	202	168	210	[6] 176	204	130	132
East South Central	176	201	290	207	126	227	120	123	120	142
West South Central	169	181	173	121	145	132	152	110	114	164
Mountain	191	185	113	167	104	150	[7] 63	62	[8] 102	123
Pacific	60	72	67	37	46	50	46	42	70	52

[2] South Bend, Ind., Flint, Mich., St. Paul, Minn., Wilmington, N. C., and Boise, Idaho, not included.
[3] Pawtucket, R. I., Billings, Mont., and Boise, Idaho, not included.
[4] South Bend, Ind., and Flint, Mich., not included.
[5] St. Paul, Minn., not included.
[6] Wilmington, N. C., not included.
[7] Boise, Idaho, not included.
[8] Billings, Mont., and Boise, Idaho, not included.
[9] Pawtucket, R. I., not included.

FOREIGN AND INSULAR

CANADA

Quebec Province—Communicable diseases—Week ended May 9, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended May 9, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Puerperal fever	1
Chicken pox	59	Scarlet fever	50
Diphtheria and croup	12	Tuberculosis	53
German measles	13	Typhoid fever	20
Measles	649	Whooping cough	40
Mumps	18		

CUBA

Provinces—Communicable diseases—Four weeks ended March 14, 1931.—During the four weeks ended March 14, 1931, cases of certain communicable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer			1	1	3		5
Cerebrospinal meningitis		1					1
Chicken pox		54	3	20		1	78
Diphtheria		24	1	3		1	29
Malaria	1	4		1	4	62	72
Measles		34		16	1		51
Paratyphoid fever		1		2	1	1	5
Poliomyelitis		1					1
Scarlet fever		6		2			8
Tetanus (infantile)					2		2
Typhoid fever	8	17	4	30	16	18	93

CZECHOSLOVAKIA

Communicable diseases—March, 1931.—During the month of March, 1931, certain communicable diseases were reported in the Republic of Czechoslovakia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	6		Paratyphoid fever	9	2
Cerebrospinal meningitis	11	5	Scarlet fever	1,043	20
Diphtheria	1,350	96	Trachoma	169	
Dysentery	4		Typhoid fever	279	35
Malaria	18		Typhus fever	5	

DENMARK

Communicable diseases—February, 1931.—During the month of February, 1931, cases of certain communicable diseases were reported in Denmark, as follows:

Disease	Cases	Disease	Cases
Anthrax	1	Paratyphoid fever	4
Cerebrospinal meningitis	8	Poliomyelitis	3
Chicken pox	47	Puerperal fever	16
Diphtheria and croup	353	Scabies	735
Erysipelas	258	Scarlet fever	103
German measles	4	Syphilis	166
Influenza	57,337	Tetanus	1
Lethargic encephalitis	8	Typhoid fever	1
Measles	1,294	Undulant fever (Bac. abort. Bang)	42
Mumps	436	Whooping cough	1,788

ESTONIA

Vital statistics—1920, 1929, and 1930.—The estimated populations, as of July 1 of each year, the numbers of births, birth rates per 1,000 population, and deaths and death rates per 1,000 population in Estonia for the years 1920, 1929, and 1930 are given in the following table:

Year	Estimated mid-year population	Births		Deaths	
		Number	Per 1,000 population	Number	Per 1,000 population
1920	1,067,772	19,625	18.4	21,363	20.0
1929	1,115,650	19,110	17.1	20,178	18.1
1930	1,116,072	19,410	17.4	16,598	14.9

GERMANY

Vital statistics—1924-1929.—A report based on data from *Wirtschaft und Statistik*, of February 26, 1931, states that a gradual increase in the general death rate in Germany is expected, owing to the steady increase in the number of individuals in the higher age groups. The following table gives mortality data for the years 1924 to 1929.

	Number of deaths	Deaths per 1,000 population	Deaths under 1 year of age per 1,000 live births
Average, 1924 to 1926	746,042	11.9	105
1927	757,020	12.0	97
1928	739,520	11.6	89
1929	805,962	12.6	96

Cities of more than 15,000 population—Vital statistics—1928–1930.—According to preliminary figures published for the year 1930, the number of marriages in German cities with more than 100,000 inhabitants decreased from 10.3 per 1,000 in 1929 to 9.8 in 1930. The number of live births reported in these cities was 13.0 per 1,000 as compared with 13.3 in 1929. The following table gives the birth and death rates per 1,000 inhabitants in cities for the years 1928–1930.

	Birth rate per 1,000 population			Death rate of residents per 1,000 population (exclusive of stillbirths)		
	1928	1929	1930	1928	1929	1930
Large cities	13.6	13.3	13.0	10.6	11.5	10.1
Communities of—						
50,000 to 100,000 population	16.1	15.5	15.2	10.3	11.4	9.9
30,000 to 50,000 population	16.2	15.6	15.1	10.1	11.0	9.7
15,000 to 30,000 population	16.2	15.4	14.8	9.7	10.9	9.6
Total communities with more than 15,000 population	14.5	14.0	13.7	10.4	11.4	10.0

MEXICO

Vera Cruz—Deaths—March 30 to May 3, 1931.—During the 5-week period from March 30 to May 3, 1931, deaths from certain causes were reported in Vera Cruz, Mexico, as follows:

Disease	Deaths	Disease	Deaths
Bronchitis	4	Pneumonia	7
Cancer	1	Pyemia	1
Dysentery	1	Septicemia	1
Erysipelas	2	Syphilis	4
Gastro-intestinal disorders	27	Tetanus	3
Hookworm disease	3	Tuberculosis	23
Malaria	1	Whooping cough	1
Meningitis	1		
Pleurisy	1	Total, all causes	167

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

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

CHOLERA

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

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931: 14	Feb. 21	Feb. 28	March, 1931: 7	Mar. 14	Mar. 21	Mar. 28	April, 1931: 4	Apr. 11	Apr. 18	Apr. 25	May, 1931: 2	May 9	May 16
Ceylon: Colombo	C								1									
China:																		
Canton	C												1					
India	C	11,112	10,637	15,334	3,529	2,549	3,173	2,293	2,471	857	2,551							
	D	5,933	5,639	8,123	1,846	1,325	1,703	1,257	1,252	473	1,314							
Bassein	C														2			
	D														2			
Bombay	C	13		21									2					
	D	7		9									1					
Calcutta	C	22	28	121	27	33	45	65	80	102	129	125	95	82	71			
	D	16	20	86	22	25	26	39	49	68	69	70	55	51	44			
Karikal	C		1		4		1	4	2	1	7	2						
	D				4			4	2	1	7	2						
Madras	C		201	99	18	20	19	15	4	5	7	4	3	1	4	18		
	D		67	47	5	4	14	6	5	3	2		5	1	3	5		
Negapatam	D			3	1		2											
Rangoon	C		1															
	D		1	1														
Tuticorin	C	5	1	1		1												
India (French):																		
Chandernagor	C	1	2	1		1	2	2	2	2	2	1			1			
	D		3	1		1	3	1	2	3	1							
Pondicherry	C	4	31	19	10	20	31	39	29	25	26	20	5	3				
	D	4	21	11	10	9	6	9	6	5	4	3	1	3				
India (Portuguese)	C		1															
Indo-China (see also table below):																		
Pnompenh	C	2		4		3	3	3					1	1				
	D	2		2		1	2	2		1					1			
Saigon and Cholon	C	3	9	6			3	1	1		1	3	2	3	7	15		
	D	1	4	3			3	1	2	1	1	1		3	6	13		
Persia: Rafsandjan	C																31	
	D																12	

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

CHOLERA—Continued

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

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931			March, 1931				April, 1931				May, 1931		
					14	21	28	7	14	21	28	4	11	18	25	2	9	16
Philippine Islands: [1]																		
Iloilo	C	1	1	2														
	D	3	1	2														
Provinces—																		
Capiz	C			59	69	54	28	35	29	11	4	4		3	8	18	11	3
	D			47	55	39	23	29	24	10	4	3		3	8	13	11	3
Iloilo	C	45	28	145	27	42	10	16	2	5								
	D	27	22	110	21	22	11	11	2	2								
Masbate	C								21									
	D								9									
Negros, Occidental	C	163	120	90	1	1	2											
	D	123	97	56	1	1	2											
Negros, Oriental	C			1														
	D			1														
Pampanga	C																1	
Samar	C	8	17															
	D	8	9															
Siam	C	6	2	3		1				4	4	2					11	
	D	6	2	1						1	1						3	
Ayudhaya District	C											1						
Bangkok	C	4	2	3	1			1		1	1		1		1			
	D	4	2	1				1		1	1							
Bismulok Province	C									4	4							
	D									1	1							

Place		October, 1930	November, 1930	December, 1930			January, 1931			February, 1931			March, 1931		
				1–10	11–20	21–31	1–10	11–20	21–31	1–10	11–20	21–28	1–10	11–20	21–31
Indo-China (French) (see also table above):															
Cambodia [2]	C	22	26	28			7	19	36		35				65
Cochin-China [2]	C	28	13	8			7	4	13		5				33

[1] Figures for cholera in the Philippine Islands are subject to correction.

[2] Reports incomplete.

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

PLAGUE

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

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931 14	February, 1931 21	February, 1931 28	March, 1931 7	March, 1931 14	March, 1931 21	March, 1931 28	April, 1931 4	April, 1931 11	April, 1931 18	April, 1931 25	May, 1931 2	May, 1931 9	May, 1931 16
Algeria:																		
Algiers	C	2	1	2	1							1						
	D											1						
Bone	C			1														
Constantine, vicinity of	C		50	1	1													
	D			1														
Philippeville	C		1															
	D		1															
Argentina:																		
Cordoba Province	C			1		2												
Entre Rios Province—Diamante	C						2											
Jujuy Province—Palpala	C			1		1												
Santa Fe	C					2												
Belgian Congo	C	1								2								
	D	1								2								
British East Africa (see also table below):																		
Tanganyika	C	3	2				15	7		8								
	D	3	2				4			1								
Uganda	C	111	67	25	6	4		5	4	7	4							
	D	112	67	24	6	4		5	4	7	4							
Ceylon: Colombo	C	9	9	8	6	2	1	2	1	3	3	1	1	3			1	
	D	8	9	6	7	2	1	3	1	3	2	1	1	2				
Plague-infected rats		2		2	1	1	1			3	1			1				
Dutch East Indies:																		
Batavia and West Java	C	208	239	180	29	36	46	30	18	31	23	12						
	D	206	238	168	29	35	46	28	17	28	23	12						
East Java and Madura	C			4			1		1		1	2						
	D			4			1		1		1	2						
Java and Madura	D	557	615	427	89	108	99	80	65	81	68	63						
Egypt:																		
Alexandria	C	4	3	1	1			1	1									
	D	1																
Plague-infected rats		3	1	1		1												
Assiout	C	9	7	26	9		17	15	6	10	1	1	5	16	8	3	4	5
	D	1	1	6	4		3	4		4	1	1		11	4	2	2	4

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

PLAGUE—Continued

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

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931: 14	21	28	March, 1931: 7	14	21	28	April, 1931: 4	11	18	25	May, 1931: 2	9	16
Egypt—Continued.																		
Aswan	C	3																
Beni-Suef	C			1											10	2	3	
	D			1											3		1	
Cairo	C											1						
Deirout	C			21	6	10										3	7	1
	D			4		4										1	2	2
Gharbieh	C			1														
	D			1														
Girga	C		7	1						14	37	35	31	9	4		1	1
	D		2	1						2	5	17	13	3	5	1	1	1
Kena	C										5				3			
	D										2				1			
Manfalut	C		23	30	11		2	2	3	5	9							
	D		5	6	4		1			2	1							
Minieh	C	1		2						2	1			1			5	
	D			1						1	1						2	
Greece (see table below).																		
India	C	3, 259	3, 740	5, 335	1, 270	1, 095	1, 726	1, 366	2, 674	2, 271	2, 462							
	D	1, 856	2, 226	3, 422	862	774	1, 213	812	1, 887	1, 624	2, 009							
Bassein	C		2	4				1								1		
	D		1	3	1											1		
Bombay	C			1	1				1	1	1	1	4	4	1	2		
	D			1	1					2	1		4	4		3		
Plague-infected rats		32	38	34	14		8	10	17	14	21	18	34	43	30	30		
Calcutta	C												1	1				
	D												1	1				
Madras Presidency	C	148	220	312	30	19	13	12	9	12	7							
	D	78	154	182	17	18	7	4	4	12	5							
Rangoon	C		2	2							1		1				1	
	D		1	1							1		1				1	
Plague-infected rats		4	2	4		8						1	1	3				
Indo-China (see also table below): Pnompenh	C	6	1	7				1										
	D	6	1	7		1	2	1	2	1	1	2	2	1	1			
Iraq: Baghdad	C	4		5			1	2	1	3	3	1		5	10	8	7	10
	D	2		4				2		3	1	1		2	5	1	3	4

Madagascar (see also table below): Tamatave	C	4	2	9														
	D	3																
Morocco	C		19	13														
	D		8	4														
Nigeria: Lagos	C	9	5	1									2		1			
	D	9	5	1									2		1			
Plague-infected rats		5	5															
Peru (see table below).																		
Senegal (see table below).																		
Siam	C			4	5	9	3	1	2	2								
	D			2	4	6	4		1	1								
Bangkok	C	1	3	8	1	2	3		29									
	D	1	3	8		1	4		6									
Nagara Rajsima	C	11	17	9	7						1							
	D	9	10	10	6													
Syria: Beirut	C		1	1		1												
Tripolitania	C	13		8		1			1									
	D	1		3														
Tunisia: Tunis	C	P	13	1		9	2	3		5		5	5	7		4		
	D					7						4	4	2		2		
Union of Socialist Soviet Republics:																		
Gouranduz	D			28														
Transcaucasia—Karabakh	C			6														
Union of South Africa:																		
Cape Province	C	P																
Orange Free State	C		2	P	P	1	P		2		4							
	D		2			1					1							
On vessel: S. S. Marionga de Thermiotis at Avonmouth	C		1															

Place		Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931
British East Africa (see also table above):							
Kenya	C	58	62	50	69	21	7
Greece	C	2					
Indo-China (see also table above)	C	2	5	1			4
Madagascar (see also table above):							
Ambositra Province	C	4	44	95	100		
	D	4	44	87	96		
Antisirabe Province	C	3	18	27	66		
	D	3	18	26	57		
Miarinarivo Province	C	18	12	18	28		
	D	18	12	18	26		
Moramanga Province	C	20	19	13	7		
	D	20	19	11	5		
Tananarive Province	C	125	170	178	92		
	D	116	164	172	89		

Place		Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931
Peru	C	42	34	8			
	D	20	14				
Senegal:							
Baol [1]	C	53					
	D	35	4				
Louga [1]	C	37	10				
	D	25	3				
Rufisque [1]	C					2	
Thies [1]	C	24	27	2			
	D	15	23	1			
Tivaouane [1]	C	53	21	2			
	D	31	25	1			

[1] Reports incomplete.

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

SMALLPOX

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

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931			March, 1931				April, 1931				May, 1931		
					14	21	28	7	14	21	28	4	11	18	25	2	9	16
Algeria:																		
Algiers	C		1	1		1					2			2				
Bone	C			1														
Constantine	C									1								
Oran	C	3																
Arabia: Aden	C			1	1													
Belgian Congo	C		79	50														
Belgium	C				1													
Brazil:																		
Porto Alegro (alastrim)	C	36		3	1	1	2	3	7	12	16	14						
	D							1				1						
British East Africa (see also table below): Tanganyika	C	385	84	70	35	42	13	1	6	2								
	D	36	4	5		12	1		1	2								
British South Africa: Southern Rhodesia	C	18	18	3														
	D	3																
Canada:																		
Alberta	C	1	19	7	1													
British Columbia	C	1	3	2	1	2	5											
Manitoba	C			1			1											
Winnipeg	C		1				1											
Nova Scotia	C			1							1							
Ontario	C	23	17	49	10	4	7	8	2	3	3	1	4		6	7		
Kingston	C		6	1		1									2	3		
North Bay	C		2		1													
Ottawa	C	12	2	3		1												
Sault Ste. Marie	C		1	30			2						3	1				1
Toronto	C	4							1		1			4			1	
Quebec	C	2		2														
Saskatchewan	C	18		38	17	18	18	10	40	10	8		5	16	3	22		
Regina	C					1					2				2			
Canary Islands: Las Palmas	C										1							
China:																		
Canton	C				2			1	1	2	2	2	1	2	1			
Chungking	C	P	2															

Foochow	C	P	P	P		P		P		P		P						
Hong Kong	C		1	1	2	5		2			1	1		1	2			
	D				1	1	1				2				1			
Manchuria—																		
Harbin	C			1			4		1		1							
Kwantung—Dairen	C	4	1								2				1	1		
	D	1																
Nanking	C	P	P	P	P	P	P	P		P	P	P	P	P				
Shanghai—																		
Foreigners only	C	8	14	12	4	7	2	3	3	1	1	1	2	1	2	2		
Including natives	D	4	11	13	5	2	4	3	5	2	2	1	2	7	4	5		
Swatow	D	3	5	7		3	3	7	3	6	9	8	2					
Tientsin	C	2		1														
Chosen (see table below).																		
Columbia: Cali	D	1																
Dutch East Indies: Java—Batavia and West Java	C	6	4	29		2			1									
	D	2	2	2	1													
France (see table below)																		
Great Britain:																		
England and Wales	C	508	665	958	221	50	247	227	171	219	226	179	177	163	212	192		
Bradford	C	1	1	4		1				1		1	1		1	4		
Leeds	C		2									1		1	1			
London	C	184	161	149	23	16	23	36	26	54	32	35	51	39	84	53		
London and Great Towns	C	433	560	693	150	186	189	158	117	154	166	117	142	126	162	128		
	D	1				1									1			
Sheffield	C			3		16	6	10	2	1	6	1	4	2	1			
Stoke-on-Trent	C			1				1										
Greece (see table below)																		
Honduras:																		
Amapala	C							1										
Ocotopeque and Gracias districts	C							P										
Puerto Castilla	C		4	11	3													
Tegucigalpa	C														1			
Tela	C												1					
India	C	3,627	5,623	9,623	2,996	2,766	3,003	3,457	3,440	1,695	3,395							
	D	874	1,381	2,245	665	620	706	669	655	303	655							
Bombay	C	1	2	7		1	3	2	4	1	4	1	2	2	1	3		
	D	1	2	1		1	1	1		1	2	1	1			4		
Calcutta	C	18	59	143	35	51	83	82	53	69	75	86	101	60	61	65		
	D	11	40	100	26	41	66	55	36	54	50	63	78	42	50	54		
Cochin	C	22	15	29	19		16	24	15	17	14		10	11	12	6		
	D	4	1		1		1	1										
Karachi	C	3		3			4			3		1		5		1		
	D	1		2							2							
Madras	C	20	4	16	4	1	3	1	6	3	9	4	12	4	1	2		
	D	3				1				2	1		2	1	1	1		
Moulmein	C			2														
Negapatam	C	6											1	1		1		
Rangoon	C	1			2		1	1	1	1	1		2	2	1	6		
	D								1							1		
Vizagapatam	C			1			8		1		1		2	2	4	2		
	D						2				1		1		1			

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

SMALLPOX—Continued

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

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931: 14	21	28	March, 1931: 7	14	21	28	April, 1931: 4	11	18	25	May, 1931: 2	9	16
India (French):																		
Chandernagor	C		5	9	2		6	6	3	3	6	2						
	D		3	1			1					2						
Karikal	C		3	5	2		16	1			3							
	D		2	4	2		16											
Pondicherry Province	C	19	34	45	1	1	10	7	7		4	3	3			3		
	D	17	32	45	1	1	10	7	7		4	3	3	3		3		
India (Portuguese)	C		4	5	2	3	6	3		3	5							
	D				2		1			1	2							
Indo-China (see also table below):																		
Pnompenh	C	1	2	1					1									
	D	1		1														
Saigon and Cholon	C	2		6		2	2		4	1	1	2	1					
	D	2		4			1		3	1	2	2	1					
Iraq:																		
Baghdad	C						3	6										
Mosul Liwa	C	16	1	3		5												
	D	2				1												
Ivory Coast (see table below).																		
Japan:																		
Kobe	C						1	1										
Taiwan	C			1														
Mexico (see also table below):																		
Jalisco (State)—Guadalajara	D	3		1							1					1	1	
Mexico City and surrounding territory	C	6	10		7	5		11	13	13	7		17	9				
	D	6	6	1	1	3	2	2	5	5	6	6	4	6				
Torreon	C													1				
	D													2				
Vera Cruz	C				1		1	1		1	1			1		1	1	
Morocco (see table below).																		
Nicaragua: Porto Cabezas	C		2															
Nigeria: Lagos	C										2							
Panama Canal Zone	C			2														
Poland	C	3	25			1												

Portugal: Lisbon	C	37	72	103		12	19	9	16	15	17	4	8	18	11	19		
Siam	C		1	4	1	1												
Somaliland, British: Boales	C	1																
	D		1															
Spain	C	P	P	P	P	P	P	P	P	P	P							
Straits Settlements	C	17	6	7			2				2	1	1		1			
	D	7	3	1			1				1		1	1				
Sudan (Anglo-Egyptian)	C	50	64	11	1	1	44	51	3	1	4					3		3
	D	5	6	7			6	4		1	1							
Sudan (French) (see table below).																		
Syria (see table below).																		
Tunisia: Tunis	C		17	8							4							
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P				P			P							
Orange Free State	C	P		P			P	P			P							
Transvaal	C	P	P	P	P	P	P	P	P		P							
Upper Volta	C	6	4			8	10				3			3				
	D		2								1							
On vessel:																		
S. S. Clan Mactoggart at Suez	C				2													
S. S. Muncaster Castle at Manila from Hong Kong	C		1															
S. S. Matheran at Suez from Calcutta	C			1														
S. S. Clan Buchanan at Suez	C						2											
S. S. Rotterdam at Naples from Venice	C										1							
S. S. Clan McTavish at Manila from Chittagong	C													1				
S. S. Benvenue at Sydney from Shanghai	C			1														
S. S. Clan MacBrayne at Cochin	C				1													
S. S. Chilka at Rangoon	C					1												
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C															1		

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

SMALLPOX—Continued

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

Place		Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931
British East Africa (see also table above):							
Kenya	C		653				
Chosen	C	22			1		11
	D	6			1		3
France	C					16	
Greece	C			4		4	
Mexico (see also table above)	D	893		1		3	
Morocco	C	4	20	25		4	6
Turkey	C	74	65	116		37	1
	D	1	1	9		6	

Place		October, 1930	November, 1930	December, 1930			January, 1931			February, 1931			March, 1931		
				1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-28	1-10	11-20	21-31
Indo-China (see also table above)	C	258	86	38	9	14		48	46		46				139
Ivory Coast	C	4	2	9											
Sudan (French)	C	17		43		96							4		P
	D	2		16		4									
Syria: Beirut	C							1							

TYPHUS FEVER

Place		Oct. 19-Nov. 15, 1930	Nov. 16-Dec. 13, 1930	Dec. 14, 1930-Jan. 10, 1931	Jan. 11-Feb. 7, 1931	Week ended— February, 1931			March, 1931				April, 1931				May, 1931	
						14	21	28	7	14	21	28	4	11	18	25	2	9
Algeria:																		
Algiers	C	1	2			1	1					3				2		
Constantine Department	C	1	2	6	31			4			1		2	2		6		
Oran	C		5		3				1							1		
Australia; western	C												1					
Bulgaria	C	3	11	3	13		2		3				9		28			
	D			1									2		3			
Chile: Valparaiso	D										1							
China:																		
Canton	C				2					1								
Manchuria—Harbin (see also table below)	C		1		3			5										
Shanghai	C				2													
Tientsin	C		1											1				

Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C	2	2												1			
	D	2																
Beheira Province	C			1										3				
	D			1										2				
Cairo	C		1	1	1													
Port Said	C	2			1													
Eritrea: Asmara	C									1								
Great Britain: Scotland	C				1													
Glasgow	C				2													
	D				1													
Greece (see table below).																		
Guatemala.[1]																		
Iraq: Baghdad	C					2	1	1	1	1								2
	D					1												2
Irish Free State: Mayo County—Belmullet	C														1			
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico (see also table below):																		
Durango	D				1													
Mexico City, including municipalities in Federal District	C	11	14	12	39	13	13	9		46	66	73	31	67	34			
	D	4	7	10	34	4	7	5		20	13	31	20	18	7			
San Luis Potosi	D		2			2	2		1	1	1	2	1	1	2			
Morocco	C	3	1	8	8	7	8	5	8	2	2	3			1		12	
	D				2		1										1	
Palestine	C	3	7	4	2	3				2	1	1	1	1	2		2	2
Paraguay: Asuncion	D				4													
Poland	C	37	42	63	106	49	41	43	56	62	58	85	82	93	176	140	129	
	D		7	3	8	3	3	4	9	4		7	4	8	7	6	7	
Portugal: Oporto	C	4	6		1													
Rumania	C	41	34	113	193	49	53	12	38	55	53	52		70				
	D	2	3	5	16	5	11	3	5	4	5	3		8				
Spain	C	4	1															
	D		1															
Tunisia:																		
Sbeitla, vicinity of	C												20					
	D												7					
Sfax	C											2						
Tunis	C		28		16			6	12	5	2	7		2			10	
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P	P	P	1		P						
Municipality of East London	C	1	1	3	3							P						
Natal	C	P		P	P	P	P				1	P						
Orange Free State	C	P		P	P	P		P	P	P								
Transvaal	C	P	P	P	P	P	P	P	P	P		P						
Yugoslavia (see table below).																		

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reports an unusual outbreak of typhus fever in a small village in Guatemala.

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

TYPHUS FEVER—Continued

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

Place		Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931
China: Harbin (see also table above)	C	3					
Chosen: Seoul	C	7	1	1	1		3
Czechoslovakia	C		16	24	60		
Greece	C	4	4	10	10	17	8
	D				2	2	1
Latvia	C					12	
Lithuania	C	1	5	6	26	3	22
	D		1	3	3	1	2
Mexico (see also table above)	D	47	47	47			
Turkey	C	28	3	2		18	
Yugoslavia	C	2	2	1	20		
	D	1		1	2		

YELLOW FEVER

	Cases	Deaths
Brazil:		
Bahia State—		
Mar. 14, 1931	1	
Mar. 15–21, 1931	1	
Ceara State—Mar. 14, 1931	2	
Barbalha, Feb. 7, 1931	1	1
Minas Geraes State—		
Mar. 20, 1931	2	
Apr. 5–11, 1931	1	
Apr. 19–25, 1931	2	1
Apr. 26–May 2, 1931	2	1
May 3–9, 1931	1	1
Brazil—Continued.		
Rio de Janeiro State—		
Mar. 7, 1931	1	1
Mar. 14, 1931	1	1
Mar. 21, 1931	1	1
Cambucy—		
Jan. 1–25, 1931	3	3
Feb. 1–7, 1931	1	1
Friburgo (imported), Jan. 25–30, 1931	1	
Padua—		
Jan. 18–24, 1931	1	1
Feb. 1–7, 1931	1	1
Feb. 8–14, 1931	1	
British Cameroon: Mamfe, May 14, 1931	3	1

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