PUBLIC HEALTH REPORTS

VOL. 42 JUNE 17, 1927 NO. 24

REORGANIZATION OF THE NATIONAL HEALTH SERVICE OF CHILE

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Following my arrival at Santiago, Chile, in July, 1925, as technical adviser in public health to the Ministry of Hygiene, a detailed study of the existing health organization and of the health laws and regulations was begun, in conjunction with the Director General of Health, the legal adviser, and several other officers of the Health Service.

In August, inasmuch as the constitution of Chile was being revised, it was suggested to the President that a provision be included in the revised constitution recognizing and establishing the duty of the State to care for the health and well-being of its citizens, and making it mandatory upon the Congress to appropriate each year a sufficient sum of money to assure the maintenance of an efficient National Health Service. The suggestion was well received by the President, and an appropriate clause was included in the draft of the new constitution.

The constitution was ratified by a plebiscite, and was promulgated on September 18, 1925.

In the meantime it had been decided that, instead of attempting to modify existing health laws, a new Sanitary Code, which would include all matters pertaining to health and sanitation, should be drafted. This was done. The new Sanitary Code was drafted in such manner as to include all useful matter that was contained in the former sanitary laws, and additional provisions were included which facilitated the application of the health regulations that were later drafted in conformity with the code, prohibited prostitution, prohibited the use of sewage for irrigation purposes, concentrated all administrative authority in the hands of the Director General of Health, and established the manner in which the country should be divided into health zones, boards of health, sanitary districts, and sanitary divisions. A chapter was included which provided for the ratification by Chile of the Pan American Sanitary Code and its incorporation into the national health laws.

In the preparation of the draft of the Sanitary Code, the sanitary laws and regulations of the Philippine Islands, of the United States, of the Panama Canal Zone, and of other countries were fully drawn upon.

For the purpose of having a real codification of the sanitary laws of Chile, a repealing clause was added to the code, which provided that all laws and parts of laws having to do with the public health, even though not in conflict with the Sanitary Code, were repealed from the date of its publication in the Official Gazette.

On September 4, 1925, the draft of the Sanitary Code was presented to the Minister of Hygiene. The code was favored by the President, the medical society, the faculty of the university, and the medical profession. It was approved by the Council of Ministers, became decree law No. 602, approved October 13, 1925, and was published in the Official Gazette October 20, 1925.

During the period before the approval of the Sanitary Code, a number of cities and towns were visited, inspections were made of sanitary conditions, and numerous public addresses on health matters were made. The addresses were well received by the public, the theaters, etc., in which the addresses were given, being crowded to the limit of their capacity.

There was probably never encountered an entire population that was so keenly interested in public health as were the people of Chile. All the counsels and recommendations made were eagerly seized upon; and even before the organization of the Health Service was completed, fly campaigns were under way, personal hygiene began to improve, greater interest was manifested in the prevention of infant mortality, and a wave of protest against producers of bad milk and against adulterators of foods made itself manifest. As a result of this public interest and the organized work that the Health Service was able to perform a little later, a substantial reduction was obtained in infant mortality, especially, and in the general mortality of the city of Santiago, as well as in the mortality of the country as a whole. The reductions obtained are shown in the tables that appear further on in this report.

As soon as the Sanitary Code became law, the formation of the health organization was begun. The organization was completed, the country was divided into sanitary zones and sanitary divisions, boards of health and sanitary districts were formed, all appointments of personnel were approved by the Minister of Hygiene and the President of the Republic by December, 1925. The appointments of the officials and employees, however, with a few exceptions, did not receive the approval of the Minister of the Treasury, on the ground that funds were insufficient to pay them and that the salaries provided were excessive. This caused considerable delay, but the great majority of the officers and employees performed their duties in a very satisfactory manner, with the concrete results shown later in this report and in the statistical tables. In the meantime, the necessary regulations were prepared and approved by the Minister of Hygiene and the President.

Finally, a bill was presented to the Congress for the purpose of securing legislative action of such nature as would make it possible to proceed with the work in a satisfactory manner.

In August, 1926, the Congress passed a law which set forth the salaries that should be paid, fixed the number of the officers and employees, and authorized an advance on the appropriations of the Health Service. This advance was necessary because the general appropriation law of the Government for the year 1926 had not then been approved, and it was not finally approved until October or November.

In addition to the laws above described, an international loan was authorized in the sum of 7,500,000 pesos, in order to assure the financing of the Health Service in case a shortage of funds should occur in the general appropriations.

Under authority of the above described laws, the health organization was rapidly completed, and by December, 1926, practically all appointments had been again passed and approved and the appointees were attending to their duties. In addition to, or as an adjunct to, the central national health organization, 13 boards of health were formed, 10 sanitary districts were established, and the 10 health zones were divided into 85 sanitary divisions.

During the years 1925 and 1926, active fly-extermination campaigns were carried on in Santiago, Valparaiso, Talca, Antofagasta, Concepcion, and in some of the smaller cities. Excellent results were obtained in Santiago, Valparaiso, and Concepcion. Flies were reduced to a very low point, and it was universally conceded that flies were much less prevalent than they had ever been before. Four thousand stables were carefully supervised in Santiago and suburbs alone; and garbage and waste matters were disposed of in a very satisfactory manner by using them for the filling of lowlands, the garbage and waste matter being covered with earth immediately after it was dumped. The owners of stables complied in a satisfactory manner with the health ordinances and very few fines had to be imposed.

WATER SUPPLIES

A study of the water supplies of the entire country was made. As a result it was concluded that out of 75 public supplies, four could be considered as reasonably safe; the remainder doubtful or dangerous. Following this study, chlorination apparatus was ordered and installed in the cities of Santiago, San Antonio, Concepcion, and Cartagena, with a total population of about 700,000.

Apparatus was ordered installed in 23 other cities, including Valparaiso, with 200,000 inhabitants; and before the end of 1927, all these cities should have safe water. The number of inhabitants that will use this safe water will total about 1,250,000—between one-third and one-fourth of the total population of Chile.

In addition to the chlorinated supplies, the water systems of several other cities were improved and extended, and safe sources were secured; and during the present year other supplies will be improved in the same manner. All this should mean that by the end of 1927 between 1,500,000 and 2,000,000 people will be using safe water in sufficient quantity.

The initiative and energy manifested by the chief engineer of the division of water supplies and sewage is deserving of the highest praise.

MILK SUPPLIES

The quality of the milk furnished by the dairies has improved considerably. Adulteration and watering of milk has declined markedly. Pasteurized milk, which laboratory examination shows to be satisfactory, can now be obtained at reasonable prices, and housewives are insisting as never before in having a good quality of milk.

VITAL STATISTICS

The Division of Vital Statistics now furnishes reliable mortality statistics weekly in Santiago and every 15 days for the remainder of the country. It is too early to attempt to obtain morbidity statistics. Through the use of the mortality statistics and the maintenance of a "sanitary barometer," several threatened outbreaks of disease were detected during the year 1926 early enough to take the necessary measures to prevent further spread.

INFANT MORTALITY

Much educational matter was distributed, the formation of women's clubs was fostered and, most important of all, a school for public health nurses was organized and installed. This school was formally inaugurated on March 1, 1927.

Only graduate nurses are taken in the beginning; and these are to be given a course of instruction that will last from eight months to a year. Provision was made for 30 students in the appropriations for 1927.

RESULTS OBTAINED

Some of the results are shown in the accompanying tables. Part of the reductions shown is due to better and more carefully prepared statistics and the elimination of still births from the statistics. The greater portion is, however, due to results obtained from better water, better milk, reduction in fly prevalence, the prohibition of the use of crude sewage for irrigation purposes, the sanitary awakening of the people as a whole, and the improvement in personal hygiene, such as improvements in homes, better medical and surgical attention, and greater interest in reducing the high infant mortality.

In order to confirm the general impression that the public was interested in improving sanitary conditions, some of the principal wholesale houses, and producers and vendors of food supplies were asked for figures as to sales of articles having relation to the public health in 1926 as compared with sales in previous years. Some of the information obtained was as follows:

The sale of soap increased ten times as compared with 1925.

The sale of canned milk increased from five to six times; and for the first time milk producers were willing to make wholesale sales on the basis of the fat content of the milk, thereby removing all incentive to water or adulterate it.

A number of new and modern dairies began to function, three in Santiago alone, and Pasteurized milk can now be obtained at fairly reasonable prices—an entirely new condition.

Sales of fly-killing substances increased from five to six times.

Refrigerating apparatus was sold as fast as it could be obtained; and a tremendous demand grew up for the better care and conservation of milk and other foods.

Physicians, hospitals, dispensaries, and clinics reported a larger clientele than ever before, and the patients arrived in earlier stages of the disease, so that results were better.

Curiously, quacks and fakers also increased, and the Health Service had more prosecutions of this type than ever before.

It became the custom to inquire of the Health Service as to the sanitary security of summer resorts and bathing places, especially during the vacation season from December to March, and hundreds of inquiries were answered by telephone and letter.

The sales of bottled gaseous waters, of preparations containing chlorine for the sterilization of water, also markedly increased.

In all, it is conservatively estimated that probably 10,000,000 pesos more were invested by the public during 1926 in articles having a bearing on the public health than were so invested in any previous year.

With reference to venereal diseases, 19 provincial hospitals, a number of hospitals of Santiago, the medical service of the Government railroads, and the venereal disease dispensaries of Santiago and Valparaiso reported a marked diminution in new and acute cases, reduction percentages varying between 18 and 30 per cent. The Santiago dispensary reported that new cases of syphilitic chancres diminished each month as compared with the month preceding. Similar reports were received from the physicians engaged in the physical examinations of stevedores, domestic servants, employees of hotels and restaurants, coal miners, and laborers in the nitrate fields.

Food and drug standards have also improved, owing to the vigorous efforts of the chief of the division of foods and drugs at that time, now the Director General of Health.

Smuggling and dealing in opium, heroin, and cocaine were also vigorously prosecuted, and Chile is well on the way toward losing her former reputation as a center for contraband and illicit traffic in noxious and habit-forming drugs.

An interesting phenomenon was the large increase in complaints and reports as to the existence of nuisances and insanitary conditions received by the Health Service from private citizens. It was stated that this had never happened prior to 1925, except in very exceptional cases, and then the complaints were not so much for sanitary as for other reasons.

CONCLUSION

When the writer left Chile on March 2, 1927, the National Health Service was fully organized, functioning, provided with sufficient funds, and was producing results that could be measured, and public opinion was strongly in favor of the work done and results being obtained.

Since that time, however, it has been reported in the press and from other sources, that, for motives of economy in an attempt to balance the national budget, changes have been made in the personnel and the services of some employees have been discontinued. Apparently, however, no changes have been made in the laws and regulations, and only those changes in the organization, such as consolidations of functions, etc., as were made necessary by the reductions in the amount of funds available.

Vital statistics, Republic of Chile

[Including the city of Santiago]

Year	Population	Total number of deaths	Rate per 1,000	Number of births	Rate per 1,000	Annual natural increase
1921	3,753,799	124,197	32.7	147,795	39	23,598
1922	3,792,254	108,756	28.7	147,205	38.8	38,449
1923	3,831,034	126,877	32.8	151,805	39.2	24,928
1924	3,869,814	114,172	29.2	155,100	39.7	40,928
1925	3,908,594	108,787	27.8	156,225	40	47,438
Average		116,557	30.2	151,626	39.3	35,068
1926	3,947,374	108,223	27.2	159,540	40.1	51,317

City of Santiago, Chile

Year	Population	Total number of deaths	Rate per 1,000	Number of births	Infant mortality	Infant mortality rate
1922	520,730	14,105	27	14,851	3,990	268
1923	534,159	15,909	29.7	15,532	5,151	331
1924	547,588	14,620	26.7	15,322	4,464	291
1925	561,017	13,697	24.4	14,431	4,288	297
1926	574,446	13,600	23.6	15,497	4,214	272
Average		14,386	26.3	15,126	4,421	291.8

The average annual death rate of Chile for the 50-year period 1876–1925, inclusive, was 30.8 per 1,000 inhabitants, substantially the same as the rate of 30.2 per 1,000 for the period 1921–1925 inclusive.

Based upon a population of 3,947,374, the reduction in the death rate obtained in 1926 (3 per 1,000) as compared with the five year period 1921–1925, inclusive, would seem to indicate that 11,842 fewer people died in Chile in 1926 than would have died had the former average rate of 30.2 per 1,000 prevailed during that year. Apparent confirmation of this assumption is noted in the annual increase in population for 1926, viz, 51,317, as compared with the average annual increase of 35,068 for the five preceding years—a difference of 16,249 in favor of 1926.

The death rate for 1926 of 27.2 per 1,000 inhabitants is not only lower than the average rate for the past 50 years, but is actually the lowest rate that the country has had in any year since 1903. In that year the annual death rate was 26.8 per 1,000 inhabitants.

This report can not be concluded without acknowledging the steadfast and wholehearted cooperation and support received from Dr. Lucas Sierra, Director General of Health during my entire period of service in Chile. His unfailing optimism, his courage and energy, and the nation-wide prestige that he has acquired as a result of his many years of service as professor of surgery in the University of Chile, contributed largely toward such measure of success as was eventually obtained.

RECENT DEVELOPMENTS IN SEWAGE CHLORINATION[1]

By L. H. Enslow, *Sanitary Engineer, The Chlorine Institute, New York City*[2]

Progress in chlorination processes made in the United States and Canada during the year 1926 is shown in the data presented on the following pages.

Credit for the experimental procedure and facts disclosed in the laboratory and plant scale studies, from which conclusions and

[1] An abbreviation of the paper presented at the Texas Water Works School, January, 1927.

[2] The Chlorine Institute is an association the chief aim of which is the improving of methods of chlorine application in the field of sanitation, and finding new uses for chlorine.

recommendations can be drawn from the data to be presented, is entirely due to several independent investigators.

It has been very definitely shown that one can not, with any degree of certainty, rely upon a *fixed* dosage of chlorine to produce continuously effective disinfection. Not only does the quantity of chlorine required differ for different sewages, but for the same sewage the requirement will vary as much as 100 per cent during a cycle of 12 months.

The simplest and most satisfactory method of determining with certainty that the dosage of chlorine is correct is the application of the orthotolidine test. The presence of residual chlorine after a 10-minute contact period between the chlorine and sewage is indicative of efficient disinfection.

The quantity of chlorine required for disinfection is influenced by the *soluble* organic and oxidizable inorganic matter in the sewage. As the oxygen demand of the sewage increases, the chlorine demand likewise increases. The chlorine demand of the sewage must be satisfied before the slight excess (i. e., residual chlorine) becomes available to destroy the pathogenic organisms. It appears evident that chlorine demand and biochemical oxygen demand are very closely related characteristics of sewage.

Data recently published by Keefer (1) show the marked increase of the biochemical oxygen demand value of the sewage reaching the Baltimore disposal plant in summer as compared with that of the winter sewage. With the first appearance of warm weather in the spring; the oxygen demand mounts rapidly, remains high all summer, and falls again with the advent of cold weather in November.

Having conducted a 15-month study of the chlorination of Imhoff tank effluent at Huntington, Long Island, Tiedeman (2) found that the chlorine demand of sewage also varies markedly during the year. There was found proportionately as great a difference between the summer and winter chlorine demand as there was in the oxygen demand values at Baltimore. The two curves tend to parallel each other to a marked degree. Increasing oxygen demand and chlorine demand appear with the advent of warm weather, which is conducive to peptization of suspended solids and to septicity. Reduced biological activities, with the advent of cold weather, allow a greater quantity of the suspended solids to remain as such without becoming colloidized in the sewer proper. As a result of this retardation of biological activity, the biochemical oxygen demand—and also the chlorine demand—drop, only to increase again with the return of warm weather and renewed biological activity in the sewers and settling tanks.

The following figures show the seasonal variations of chlorine demand, in parts per million, at Huntington, Long Island, as found by Tiedeman:

1925: October, 13 p. p. m.; November, 11.3 p. p. m.; December, 9.7 p. p. m. *1926:* January, 9.7 p. p. m.; February, 6.5 p. p. m.; March, 7.2 p. p. m.; April, 8.7 p. p. m.; May, 9.7 p. p. m.; June 11.6 p. p. m.; July, 12.7 p. p. m.; August, 11.8 p. p. m.; September, 10.4 p. p. m.; October, 10.5 p. p. m.; November, 9.9 p. p. m.; December, 7.0 p. p. m.

The maximum for the 12-month period was 12.5 p. p. m.[3] in July. The minimum demand was but 6.5 p. p. m. in February, and the 12-month average was 9.6 p. p. m. There was a material difference in the demand of October, 1925 (13 p. p. m.), and that of October, 1926 (10.5 p. p. m.). This difference indicates to what extent chlorine consumption may be reduced when the settling tanks are operated and maintained with great care. It was but natural to assume that the plant operator kept the plant in somewhat better condition during the time when the studies were under way, whereas prior to the beginning of such studies, i. e., October, 1925, the maintenance had been less efficient. By less efficient maintenance is meant that the flow chambers were not kept clean and the sludge was not drawn as frequently as it should have been. There appears, then, a direct relationship between the economy of chlorination and the efficiency of operation of sewage plants. This same relationship has also held true at Schenectady, N. Y.

As was true at Huntington, Long Island, the studies at Dallas and Austin, Tex.; Cleveland, Ohio, Stamford, West Haven, and Bridgeport, Conn., and Schenectady, N. Y., likewise indicate that unless residual chlorine is maintained in the treated sewage, the efficiency of disinfection is not satisfactory.

So far as we are aware, the State Department of Health of New Jersey was the first to realize (1925) that the application of a constant dosage of chlorine to certain sewage effluents failed to produce continuously satisfactory disinfection. It was left, however, for Tiedeman, of the New York State Department of Health, to show for the first time (1925–26) how markedly the chlorine required actually varies during the year and how the dosage might be controlled scientifically.

The Maryland State Department of Health (unpublished data) found, in 1923, that efficient disinfection of sewage effluent from sprinkling filters could be had with a very few minutes of contact when residual chlorine was present. The results were not accepted as conclusive, because of the limited number of tests. The practice of operating State-owned sewage plants on an excess chlorine basis, however, has been followed for some years in Maryland.

[3] P. p. m.=pounds of chlorine per million pounds of sewage treated. 1 p. p. m.=8.33 pounds per million gallons.

CONTACT PERIOD RELATIVELY UNIMPORTANT

So far as the writer knows, Tiedeman, of the New York State Department of Health, was the first to show the relative unimportance of providing contact periods in excess of 10 minutes. Even less contact is required in the case of efficiently clarified effluents, if residual chlorine is found to the extent of 0.5 p. p. m. in the sewage sample held 10 minutes after the chlorine application before the test is applied. Chlorine absorption by sewage effluent is extremely rapid, the greatest portion being absorbed instantaneously. After 10 minutes the reactions are, for all practical purposes, complete, and additional absorption is extremely slow and of little consequence.

In instances in which the amount of chlorine applied is just slightly under that required to produce residual chlorine as indicated by the orthotolidine test, but is sufficient to produce a distinct positive test with the starch-iodide test in the presence of acid, there appears to be some slight merit in long periods of contact. In such instances the efficiency after 60 to 90 minutes will be greater than that after 10 minutes. This is probably indicative of the presence of chloramines or allied compounds formed, which possess delayed or slow-acting toxic properties. But little additional chlorine is required to obtain a positive residual test with orthotolidine after the acid starch-iodide test shows positive. With the appearance of the slight yellow color indicative of residual chlorine by the orthotolidine test, the killing of 99.5 per cent, or more, of the total bacteria and *B. coli* is almost instantaneous. In practically every case where 0.2 to 0.5 p.p.m. of residual chlorine was found, the disinfection was satisfactory in less than five minutes after application of the chlorine.

Rapid, spontaneous mixing of chlorine and settled sewage is of far greater importance than the period of contact.

As a result of the knowledge gained concerning contact period, economies in sewage plant construction may be effected, i. e., contact chambers may be reduced to extremely small dimensions in future designs. As a matter of fact, "prechlorination" of sewage, as shown later in this paper, may result in the complete elimination of special contact chambers.

Again the reader is referred to Tiedeman's data (2) showing the spontaneous reductions of pathogenic bacteria in the presence of residual chlorine, such holding true at all seasons of the year. These experiments were conducted on a tank effluent heavily impregnated at times with settleable solids.

One of the most interesting disclosures as a result of the Huntington study has been that which indicates the effectiveness and rapidity with which the settleable solids leaving the tanks are penetrated by the chlorine. In the presence of residual chlorine the efficiency of the killing of bacteria within the settleable solids in the effluent was practically as great as that obtained in the watery portions. The most painstaking work seemed to indicate effective penetration of the solids by the chlorine.

The considerable data collected by O. M. Bakke and Edgar Whedbee, during the Dallas studies of 1926 (unpublished), show that reduction of 37° bacteria from 5,000,000 or more per cubic centimenter to 1,000 and less per cubic centimeter was accomplished within 5 minutes whenever residual chlorine was present. Their findings also show a lack of benefit to be gained with increased contact periods regardless of presence or absence of residual chlorine.

In unpublished data collected by the State Department of Health of Connecticut, the necessity of residual chlorine and the relative unimportance of contact periods beyond 10 minutes is also indicated.

Studies at present under way on fine screen effluent at Bridgeport, Conn., indicate that contact periods beyond 10 minutes are nonessential when residual chlorine is maintained.

PRECHLORINATION OF SEWAGE

Two of the greatest obstacles in the way of economically effective chlorination are the degree of septicity of the sewage, and more important, its hydrogen sulphide content. The presence of ferrous iron compounds is likewise a factor, but not so important as are hydrogen sulphide and other sulphur compounds.

In the absence of sulphates in the carriage water, the septicity of the sewage is of much less importance than otherwise. Sulphates are broken down by the bacteria in sewage to form hydrogen sulphide. This action is disastrous to economical chlorination if any considerable sulphate was initially present.

Bacterial activity in the presence of sulphates is also responsible for the production of odoriferous sewage at disposal plants. Not only do these reactions progress in long sewers, pump pits, inverted siphons, and short sewers with low velocity flow, but they also frequently progress with rapidity in the flow chambers of the plain settling or Imhoff tanks.

As indication of such progress in hydrogen sulphide production in the sewer and through the tank, the Marlin, Tex., studies revealed the following:

The domestic sewage fresh from the sewer in the city exhibited a chlorine demand of but 5.5 p. p. m. Some distance down the sewer at a point beyond that at which a well water of high sulphate content entered, the chlorine demand had increased to 12 p. p. m. (Note: The chlorine demand of the well water, containing 300 p. p. m. sulphate was but 2 p. p. m.) After the sewage-mineral water mixture had passed an inverted siphon ahead of the plant, the chlorine demand was found to vary between a minimum of 15 p. p. m. and a maximum of 35 p. p. m. The effluent of the Imhoff tank exhibited at various times a chlorine demand ranging between 35 p. p. m. minimum and 90 p. p. m. maximum.

As further evidence of the possible increase in chlorine demand which occurs in the flow chambers of Imhoff tanks, the crude sewage entering the Dallas tanks required from 30 to 75 per cent less chlorine to produce residual chlorine than did the tank effluent.

At West Haven, Conn., where the flow chambers were in bad condition at the time of the test, the chlorine demand of the effluent was 66 per cent greater than that of the crude influent.

In all cases where the demand of the effluent exceeded that of the influent, the odor of hydrogen sulphide was marked in the effluent. The Dallas effluent at times contained as much as 15 p. p. m. of hydrogen sulphide.

On the other hand, one or two tests made on the Fort Worth sewage indicated that practically the same dosage of chlorine was required for the crude influent as for the Imhoff effluent. No odors of hydrogen sulphide are in evidence around the Fort Worth plant, and it is known that the crude sewage contains only a minor quantity of sulphate in solution.

The studies at Schenectady reveal a smaller chlorine demand exhibited by the crude sewage than by the effluent in the early spring when the tanks are fairly filled with sludge and the flow chambers are not in good condition. With the progress of sludge withdrawal and cleansing of the flow chambers, the demand of the effluent decreases to a point where practically the same chlorine demand is exhibited by the crude influent as by the settled effluent.

So far we have not observed, during warm weather, a single plant in which the tank clarification produced an effluent possessing a lesser chlorine demand than the influent, and for the majority of cases studied the reverse is true.

On this evidence it has appeared advisable to recommend prechlorination of sewage as a means of reducing the chlorine consumption.

The advantages gained by prechlorination are as follows:

1. Greater chlorine economy.
2. The flow chamber is maintained in a fresher condition.
3. Reduction, if not elimination, of odors in the effluent.
4. The necessity of providing chlorine contact chambers beyond the tank is eliminated.
5. The oxygen demand of the effluent is reduced.
6. The "balance-wheel" effect secured by the flow chamber of the tank which acts as a large contact chamber is also a distinct advantage in smoothing out fluctuations.

7. Finely divided or flocculent solids, leaving the tank in the effluent, are effectively penetrated and disinfected when residual chlorine is maintained in the influent end of the tank, not necessarily in the effluent.

8. Imhoff-tank foaming appears to have been controlled at certain plants through prechlorination (3).

Observation of an Imhoff tank at Portsmouth, Ohio, receiving prechlorinated sewage for six months, failed to show any deleterious effects as regards digestion of solids. On the contrary, the digestion appeared improved, and the vents were remarkably free from scum.

Application of prechlorinated sewage to sprinkling filters does not appear to have any deleterious effect on the process of nitrification, as shown by Cohn (4), at Schenectady, and by Dr. H. Bach, chemist of the Emscher Corporation, in Essen, Germany (5). Doctor Bach reports also that solids separating from prechlorinated sewage are amenable to satisfactory anaerobic digestion to no less degree than solids from unchlorinated crude sewage.

Observations at Schenectady, N. Y., and Marlin, Tex., appear to show a tendency toward the precipitation of flocculent masses from the sewage as a result of prechlorination. Doctor Bach has observed a similar action and believes it an aid toward reducing the organic load ordinarily discharged in the effluent in the form of nonsettling solids.

Concerning the relationship of chlorine demand of crude sewage versus tank effluents it has been interesting to review the efficiencies of sewage chlorination which were secured at Cleveland, Ohio, during the past Summer (1926).

At the easterly plant crude sewage is chlorinated; at the westerly plant Imhoff tank effluent is chlorinated. The easterly sewage is relatively fresh, whereas the westerly tank effluent is impregnated with packing wastes, sulphate of iron, and other industrial wastes. It is also septic and odoriferous during warm weather.

The dosages of chlorine applied during the summer season averaged 8.9 p. p. m. to the westerly (Imhoff) effluent and 8.2 p. p. m. to the crude easterly sewage. In the Imhoff effluent the chlorine demand during the daytime was always in excess of that applied and no residual chlorine could be found upon test. In the crude easterly sewage residual chlorine to the extent of 0.2 p. p. m. or more could be maintained.

Contrary to the usually accepted ideas, the crude sewage containing the solids underwent a greater bacterial reduction than that obtained in the case of the westerly tank effluent receiving practically the same chlorine dosage.

In the case of the chlorinated crude sewage the total bacteria and *B. coli* reduction during the months of June to September, inclusive, averaged 96.33 and 94.5 per cent, respectively, as compared with an average reduction of only 79.4 per cent total bacteria and 84.6 per cent *B. coli* in the Imhoff effluent. This is but another indication of the difficulty of chlorinating septic sewage and also of the great importance attached to the maintenance of residual chlorine in a treated sewage.

Chlorination is practiced at Cleveland primarily for protection of the bathing beaches, and is discontinued in winter; therefore the much-to-be-desired opportunity for comparison of summer and winter disinfection efficiencies and seasonal variations in chlorine demand at Cleveland was not available.

POSSIBILITIES OF "SPLIT" CHLORINATION

From what has been said relative to the great effect of septic action, the undersirability of hydrolysis of the solids, and the attendant increase in biochemical oxygen demand and chlorine demand resulting, it becomes somewhat pertinent to inquire into the effect which may be accomplished through "split" or "cumulative" chlorination.

It appears from preliminary studies made at the Fort Worth plant that a minor dosage of chlorine (about one-third that necessary to satisfy the chlorine demand) is all that is necessary to stay hydrolysis and septic action in a highly organic and putrefiable substance, such as packing-house wastes.

It is highly probable that a relatively small dosage of chlorine, if applied to the sewers direct, at a point some distance ahead of the disposal plant, may serve to retard materially the progress of biological activity in the sewers. If so, the sewage arriving at the plant in a partially preserved condition will have more of the qualities of fresh sewage. The solids will be less in solution and more of them will remain in a settleable condition. The oxygen demand should be less and the quantity of chlorine required materially less. Thus it appears probable that chlorination "split" between the sewer proper and the influent to the disposal plant will effect an over-all economy.

Added to this is the probability that the biochemical oxygen demand value may be kept in the solid phase, which the settling process may remove, and thus insure a tank effluent of less oxygen demand than would be otherwise. Also the production of hydrogen sulphide, which is so destructive to sewers, should be retarded if not actually prevented as a result of partial chlorination some distance ahead of the plant. Whether or not subsequent chlorination is to be required at the plant is a matter entirely apart from the possible advantageous effects to be secured by partial chlorination in the sewer proper.

This problem demands immediate attention and study. At this time plans are already under way toward securing such studies under highly competent supervision and direction. The Chlorine Institute has established a fellowship at Rutgers University, where chlorination studies will be conducted under Doctor Rudolfs, chief of the department of sewage investigations.

In California experiments under the supervision of the State department of health will shortly be under way to determine what benefits accrue from the application of chlorine to long trunk sewers and outfalls.

ODOR CONTROL OR ELIMINATION

That reduction and ultimate elimination of odors emanating from sprinkling filters handling septic sewage can be effected by chlorination has been demonstrated by Cohn, at Schenectady, N. Y., and by Goodrich, at Marlin, Tex.

At Portsmouth, Ohio, the chief reason for changing the point of chlorine application to the influent of the tank was to effect reduction of odors in the vicinity of the plant. The desired effect was produced and odors have ceased to be a problem.

The quantity of chlorine required to effect the desired reduction of odor depends primarily upon the quantity of hydrogen sulphide in the sewage as it reaches the plant. The odor is reduced in direct proportion to the quantity of chlorine added. The odor reduction reaches a maximum when residual chlorine can be first detected.

In the case of Schenectady, 4 parts per million satisfactorily reduced the odors without the necessity of maintaining residual chlorine. At Marlin, Tex., the sulphide content was so great—as a result of the extremely high content of sulphate in the carriage water—that the quantity of chlorine required proved prohibitive, varying between 15 and 35 p. p. m. at the inlet of the Imhoff tank. At Portsmouth, Ohio, highly efficient disinfection and odor elimination are provided with but 10 p. p. m. of chlorine. The chlorine is sufficient only to produce residual chlorine in the tank influent. The effluent contains none during most of the time; but even so, odors are absent. The tank effluent contains *B. coli* rarely in excess of 10 per cubic centimeter, indicating also satisfactory disinfection.

It is evident that, in cases of odor control, as well as disinfection, the problem is as variable as are the sewages which create it. The old saying that "every tub must rest on its own bottom" applies in the case of sewage chlorination. In the matter of odor control, chlorination in the sewers proper holds great prospect of solving the problem more economically than attempting to destroy the hydrogen sulphide at the plant. In other words, it would seem more logical to retard or prevent hydrogen sulphide production in the sewers or tanks than to attempt to destroy it later.

REDUCTION OF FLY NUISANCE AND FILTER CLOGGING

The *Psychoda*, or filter fly, considered such a nuisance around sprinkling filters, breeds in the upper stone layers. The heavy surface film on the top stones is the breeding ground of this fly. The eggs are laid and hatch out in this film. The larvæ so produced advance to the adult stage within a few days.

Cohn, at Schenectady (*4*), has been successful in controlling the fly breeding by eliminating the breeding ground. Applications of sewage containing relatively high concentration, viz, 3 to 5 p. p. m., of residual chlorine causes the film around the surface stones to loosen and wash out of the filter. With the film go the millions of eggs and larvæ of the fly. The adult fly is not affected by the treatment and therefore three to five days must elapse before the ultimate effect of the treatment is felt—i. e., after the majority of the adult flies present at the time of treatment have completed their natural life span.

The treatment at Schenectady called for approximately 25 p. p. m. of chlorine applied at intervals of 14 days. The duration of such application for the first treatment appears to be 48 hours for best results. Subsequent applications at intervals of 14 days should be given the flow during one night. Treating the night flow, which is usually of less volume and chlorine demand, is for the purpose of effecting chlorine economy.

Simultaneously with the film removal, the filters are relieved of the "pooling" tendency. The pipe lines from the siphon and the nozzles are cleaned of the filamentous growths which are responsible for head loss and nozzle cloggage. A better spray is obtained and less labor is required to keep the spray nozzles in operating condition. Other advantages appear also.

REDUCTION OF THE BIOCHEMICAL OXYGEN DEMAND

Exactly what the mechanism of the reactions between the organic matter in sewage and chlorine is, has not been definitely determined. It appears fairly certain, as may be judged from the data at hand, that the action of the chlorine on the putrescible organic matter of certain classes so alters its composition as to render it nonputrescible. That is to say, some particular peptone, amino compound, or proteid may be a satisfactory bacterial food, as such, while the chlorine substitution products set up between these and the chlorine are distinctly not satisfactory foods. To the contrary, most chloro-compounds, notably chloramines, are toxic to bacteria and also to some of the higher forms of life.

Milk is a highly satisfactory food for living beings, including man. The introduction of a small quantity of formalin into milk renders it nondigestible. The casein is precipitated as a nonputrescible compound from which billiard balls or fountain pens may be made. The putrescible casein has been so changed through interaction with the formalin as to render it a highly stable and nonputrefiable compound.

That this same reasoning should apply to the treatment of soluble sewage matters with chlorine does not seem far-fetched.

In any event, chlorinated sewage, which is subsequently innoculated with sewage bacteria, fails to exhibit the oxygen demand which it possesses prior to chlorination. This therefore, is not merely a delayed demand, but appears to be a true or permanently reduced demand.

Contrary to expectation, it appears that the reduction of the oxygen demand is not composed principally of the 24-hour (immediate) demand, but is practically evenly divided between the immediate demand and the 5-day demand.

Bakke and Whedbee, during the Dallas studies early in 1926, were the first investigators, so far as the writer is aware, to show the marked effect of chlorine in reducing permanently the oxygen demand of Imhoff tank effluent.

The Dallas effluent, containing great quantities of packing wastes and also hydrogen sulphide, possessed, at times, excessive demands for oxygen—varying between 160 and 340 p. p. m.—and, consequently, possessed a very high demand for chlorine at times. Depending upon the dosage applied—the maximum being sufficient barely to insure the presence of residual chlorine—the oxygen demand reduction obtained varied from 10 per cent with minor dosages and residual chlorine absent, to 60 per cent when residual chlorine was present.

The reductions effected with dosages sufficient to produce residual fell within a range of 45 per cent minimum to 62 per cent maximum, which, in actual p. p. m. reduction, was between 80 and 200. As the demand of the effluent increased, the reduction possible likewise increased.

At the Schenectady plant Cohn has observed oxygen demand reduction when applying but 4 to 6 p. p. m. of chlorine to the crude sewage entering the tanks. The effluent of the chlorinated tank vs. nonchlorinated indicated reduction of oxygen demand by chlorine to the extent of 25 per cent on the average. The minimum reduction was 11 per cent and the maximum 43 per cent.

The Schenectady results are of interest in view of the fact that the chlorine application was primarily for odor reduction and therefore was 50 per cent to 60 per cent less than would have been required to insure residual chlorine.

Interesting experiments, in which crude sewage was chlorinated, were conducted during 1926 under the direction of Prof. Gordon M.

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Fair, of the School of Sanitary Engineering at Harvard University. This work constituted the thesis of R. J. Morton, a graduate student (7).

It is interesting to note that the oxygen demand reduction secured by chlorination of the crude sewage appeared to have been permanent for at least 12 days, after which the experiment was discontinued. The over-all difference between the chlorinated and nonchlorinated sewage amounted to 90 p. p. m. (five-day incubation) and 110 p. p. m. after the eleventh day of incubation of the samples. The percentage reduction was 33 per cent (five-day test).

Tiedeman, in the Huntington, Long Island, studies heretofore referred to (2) found a notable, but variable, reduction of oxygen demand as a result of chlorination of sewage effluent. The dosage of chlorine varied between 6.5 p. p. m. and 12 p. p. m. In each series of tests the dosage was sufficient to produce residual chlorine. The chlorinated sewage was reinoculated with unchlorinated effluent. The reduction of the five-day demand obtained was greater than 33 per cent in all tests.

Gaunt and Abbott (8), working in China, found that the chlorination of effluent from an activated sludge plant reduces its five-day oxygen demand materially. In the case of a somewhat inferior effluent containing 30 p. p. m. suspended solids and oxygen demand of 35 p. p. m., the addition of 2 p. p. m. chlorine reduced the five-day demand to 22 p. p. m., i. e., roughly, a 40-per cent reduction. In other instances the reduction was even greater. One p. p. m. chlorine reduced the demand to some extent.

A contact period following the application of chlorine was not required.

Gaunt and Abbott suggest that, ordinarily, 'such effluent (unchlorinated) would require dilution by the receiving body of water in a proportion of 30 volumes to 1 volume of effluent. The same effluent treated with 2 p. p. m. chlorine should require but 18 volumes of dilution to 1 volume of effluent.

Crude raw sewage and the same after separation of solids was also amenable to oxygen demand reduction by chlorine. In the clarified sewage, 8.8 p. p. m. chlorine applied caused a reduction of the five-day oxygen demand to the extent of approximately 40 per cent, i. e., 64 p. p. m. reduced to 39 p. p. m.

The poorer the quality of activated sludge effluent or other effluents, the more valuable becomes the advantageous effect produced by chlorination. Likewise, the less the volume of dilution water available, and the poorer the condition of such, the greater should be the effect of chlorination.

The above statements are, in abstract, what the investigators Gaunt and Abbott state in the article referred to. It may be, therefore, that at certain seasons when the plant performance is at low efficiency, or when the receiving stream is deficient in flow, chlorination will serve to tide over the emergency. In some instances continuous chlorination may be justified, until such time as the plant may be enlarged. It would appear that tank treatment, or partial activation, plus chlorination, may be all that is required for many years under certain circumstances.

At Houston, Tex., in a series of tests recently made by W. S. Stanley, two p. p. m. of chlorine applied to the activated sludge plant effluent were found to cause a permanent reduction of the five-day oxygen demand to the extent of 28 per cent, on the average; i. e., the demand was reduced 14 p. p. m. as a result of chlorination.

POINTS OF CHLORINE APPLICATION

Filter effluents.—When sprinkling filters constitute a part of the sewage plant chlorine should be applied to the filter effluent prior to its entrance into secondary settling tanks rather than to the effluent of such tanks.

As is apparent from the Baltimore data (1), the suspended solids leaving a sprinkling filter possess practically no immediate (24-hour) oxygen demand. As far as has been ascertained from certain tests made by the writer at Fort Worth, Tex., the settleable solids in the filter effluent possessed no chlorine demand. The supernatant liquor required no less chlorine than did the effluent containing the settleable solids.

W. S. Mahlie, chemist in charge of water and sewage plants at Fort Worth, Tex., and Edgar Whedbee, assistant engineer of the Texas State Department of Health, applied chlorine experimentally to the influent of the secondary Dorr clarifiers at the Fort Worth plant during the summer of 1926. The results of such experiments have been prepared for publication by Mahlie.

Briefly, the effects secured were:

(*a*) Considerably lessened oxygen demand of the effluent.

(*b*) Retardation and practical elimination of secondary fermentation in the clarifiers which resulted in lessened bulking up of solids and less suspended matter in the effluent.

(*c*) Elimination of the appreciable loss of nitrate content during the flow through the clarifiers.

(*d*) An over-all more desirable effluent from the standpoint of appearance, stability, and stream loading.

(*e*) A satisfactorily disinfected effluent with little if any more chlorine than would have been required by the secondary-tank effluent.

In the winter tests, the bacterial activity in the secondary tanks being slowed down, the general improvement secured by prechlorination was not nearly so marked. In any event, however, the general benefits to be derived and the utilization of the secondary settling tanks as contact tanks will result in economy in plant construction, a saving in interest and depreciation, and produce greater uniformity of plant effluent. Application of chlorine to the filter effluent ahead of secondary tanks is, therefore, warranted on several counts, even though partial disinfection only is given in order to insure a more perfect effluent and conserve the nitrification obtained through the costly sprinkling filters.

Activated sludge effluent.—Experience and results secured at San Marcos, Tex., would seem to indicate that better plant efficiency might result from two sets of sludge settling tanks, the primary tanks to have a relatively short settling period and removing the bulk of the sludge.

From the primary tanks the returned sludge might be drawn. The effluent of such tanks would contain the lighter and less thoroughly activated sludge. Chlorine applied to such effluent entering a secondary settling tank of sufficient period of detention to allow effective settling could be retained without detriment to the quality of the liquid effluent or the separated sludge. The partially sterilized sludge from the secondary tanks would constitute a part of the excess sludge to be delivered to the dewatering and drying plant or to the separate sludge-digestion units as the case might be. Experience at San Marcos indicated that sludge deposited from chlorinated effluent did not require prompt nor continuous removal in order to avoid fermentation and bulking of the sludge. The secondary-tank sludge was dried on sand beds at San Marcos.

Tank effluent or tank influent.—Where only tank treatment is given, the chlorine should be applied to the influent of the settling tanks. The many reasons for this have been set forth previously under the heading "prechlorination."

The six months of actual prechlorination at Portsmouth, Ohio, indicates a satisfactory effluent continuously. This is probably so because of the "smoothing out" effect which the tank provides in the case of a fluctuating quantity and quality of influent crude sewage. Sewage receiving excess chlorine intermingles in the tank with the sewage which may follow in suddenly increased volume and, therefore, receive deficient chlorine dosage temporarily. This general effect is due to a natural physical law, viz, that of dilution, which controls the flow through all tanks receiving a continuous but variable rate of flow of a solution.

Regardless of whether the chlorination is for the purpose of disinfection, odor control, or improvement in other functions of the tank, such as remedying foaming conditions, chlorine should be applied to the influent in most instances. If desired, arrangements can be made wherein chlorine may be applied to influent or effluent at will.

For odor control and delay of septic action alone.—Hazarding a prediction based more or less on observation of the general performance of chlorine, it seems probable that the most appropriate point of chlorine application to prevent odor nuisance, hydrogen sulphide production, destruction of mains and hydrolysis or peptization of sewage solids is the trunk sewers proper and at a point far remote from the outfall or the disposal plant.

CHLORINATION OF EFFLUENTS FROM FINE MECHANICAL SCREENS

Little can be said at this writing as to the efficiency of chlorination of effluents from mechanical (or fine) screening plants.

The State Department of Health of New Jersey, in studies covering 24-hour periods with hourly tests, but for a limited number of days, has found satisfactory disinfection is secured *provided residual chlorine is maintained*. These findings have not been published and, therefore, the writer feels a hesitancy in quoting details concerning them or in presenting actual data. In the presence of residual chlorine as indicated by the starch iodide test, some colon bacilli were found, but never more than the stipulated maximum of 100 per cubic centimeter of sewage. Tests with orthotolidine were not recorded if made.

Judging from limited results from a study under way by the Connecticut State Health Department and Board of Water Purification, when residual chlorine is present, as indicated by the orthotolidine test, the suspended solids are almost as effectively disinfected as is the watery portion of the effluent. Final conclusions as to the efficacy of chlorine in connection with fine screened effluents must be reserved until the studies at Bridgeport, Conn., and others proposed for Florida and New Rochelle, N. Y., have been completed.

The indications from Tiedeman's work and the limited studies cited above tend, however, to credit the process as capable of producing acceptable disinfection *provided residual chlorine is maintained* and the contact period is 10 minutes, or thereabouts.

FOAMING OF IMHOFF TANKS

Cohen, working at Lufkin, Tex., found prechlorination was very helpful in alleviating foaming of Imhoff tanks (3).

Having tried other means of correcting the condition, chlorination was tried. Chlorine applied to the sludge chambers proper failed to produce the desired effect. Application continuously to the crude influent sewage of at first a large dosage (approximately 20 p. p. m.), followed thereafter by a minor dosage of 6 p. p. m., and finally as little as 3 p. p. m., reduced the odors around the plant markedly and caused subsidence of foaming. Discontinuance of the chlorine resulted in foaming recommencing within a few days.

Again beginning prechlorination, during the day flow alone, resulted in reduction of foaming. So far as was recorded, there was no cessation of active digestion of solids. Assumption that prechlorination does not hinder digestion appears warranted if one may judge from the active digestion continuing at the Portsmouth, Ohio, plant after continuous prechlorination for six months and the performance of the Lufkin, Tex., plant.

Riker, of the New Jersey State Health Department, reports an instance (9) in which foaming of an Imhoff tank was corrected by application of hypochlorite of lime.

CHLORINE IN CONDITIONING ACTIVATED SLUDGE

Alum and sulphuric acid have both been serviceable in conditioning (clotting) the sludge from activated sludge plants prior to filtration on suction filters. The conditioning agents serve a dual function, viz, the reduction of the hydrogen ion concentration (pH value) to the optimum and the clotting of the colloid-like particles. Both actions are essential to rapid and efficient separation of the bulk of the water content from the sludge solids prior to the heat-drying operation and production of fertilizer.

In Chicago, Dr. F. W. Mohlman and J. R. Palmer began experiments in the conditioning of activated sludge with iron compounds in 1924.

In 1925 ferric chloride had proved to yield results far superior to other coagulants or conditioning agents. Following the successes with ferric chloride, other experiments were conducted wherein ferrous sulphate (copperas) was chlorinated. The compound formed, known as chlorinated copperas, appears to have properties little inferior to pure ferric chloride. Advantages which it possesses are that it may be prepared from two dry materials on the spot as required. The copperas is dissolved in a tank of water and thereafter gassed with chlorine. It is considerably less expensive to use and prepare than is ferric chloride. With chlorine at 5 cents per pound and copperas at 1 cent per pound, the economy of preparing chlorinated copperas places it in competition with alum on a basis of cost. In addition, consideration should be given to its greater value in that increased rapidity of filtering is effected, as compared with the use of alum or acid.

At Houston, Fugate and Stanley conducted experiments on a semiplant scale in which chlorinated copperas excelled alum and sulphur dioxide.

The economy was considerably in favor of chlorinated copperas at the time of the experimental runs in the early spring of 1926. The use of it, when compared with the use of alum, allows for a reduction in filters required for a given quantity of sludge.

COST OF SEWAGE CHLORINATION

Control of sewage chlorination in America has, for the most part, been more or less on an unscientific basis and, in most instances, on an inefficient basis so far as the economy of the process and continuous efficiency of disinfection are concerned.

At certain times during the year considerably greater quantities of chlorine may be required than at others. The plotted curve shows such variations in chlorine demand at the Huntington plant, which is discussed in Engineering News Record by Tiedeman (2) and, in addition, by the writer (10), in the February, 1927, Proceedings of the American Society of Civil Engineers.

It may be observed that the average chlorine consumption for the entire 12 months was but 9.60 p. p. m., whereas the variation was betweeen 13 and 6.5 for the entire year. Such operation on variable dosage was made feasible through use of residual chlorine control tests.

Prior to the introduction of this method of control at Huntington, the minimum of 15 p. p. m. chlorine had been specified by the New York State Department of Health, for the reason that observations had disclosed at other plants that less than such dosage would at times result in poor disinfection.

It is apparent that the saving is considerable when operating with orthotolidine-controlled variable dosage. What is equally important is that satisfactory disinfection is secured at all seasons.

Tiedeman has further shown that the chlorine demand of the night sewage is materially less than that of the day sewage. Simultaneously the quantity of flow drops with drop in chlorine demand and, therefore, further economy results if residual chlorine tests are made at more frequent intervals than once daily.

The cost of chlorination may be reduced appreciably by adjusting the dosage but twice daily, i. e., in the early morning and again in the late afternoon. Each time, of course, the dosage must be set to provide the necessary residual.

Tiedeman states:

1. "Following the general practice in the past, operation would be according to the first method (i. e., set dosage to average 15 p. p. m.) at a cost of $14.44 per million gallons and results doubtful at times of maximum chlorine demand * * *

2. "With fixed chlorine rate for each day based on quanity required to produce residual at the time of maximum chlorine demand and flow (mean maximum daily chlorine demand during year = 9.6 p. p. m.), the cost would have been $9.23 per million gallons.

3. "Chlorine rate changed at 8 a. m. and at 4 p. m. based on maximum flow and maximum chlorine demand for day flow, and on

maximum night demand and flow, respectively, the cost may be reduced to $6.59 per million gallons.

4. "Chlorine rate varied, checked (and changed hourly if necessary) to maintain 0.5 p. p. m. to 1 p. p. m. residual continuously, the cost is reduced to an average (per day for the year) to the figure $4.38 per million gallons."

NOTE.—The cost of chlorine used in the above computation was 7.5 cents per pound. With higher cost of chlorine the saving may be increased proportionally.

"In large plants treating as much as 5,000,000 gallons per day, more than $4,000 per year could be saved in chlorine cost alone, by hourly manual control of dosage on the basis of residual chlorine by the orthotolidine test. This is above the saving to be effected by tests twice daily."

From the above it is evident that, in the case of small plants, the control should be effected by at least one daily test at peak flow.

In the case of medium-sized plants, the test should be applied at least in the morning and again in the late afternoon.

For large plants (i. e., in excess of 2,000,000 gallons per day) it will most likely prove good ecnomomy to emply men to control chlorination hourly. In such event the same man can attend to other operating details and over-all increased efficiency of the plant should result.

A NEW METHOD OF CHLORINE SHIPMENT

Within the past year a new principle of shipping chlorine has been adapted to the sanitation field. It has been succesfully employed in connection with the New York City water supply for more than a year. William W. Brush, chief engineer, advises that it has proved to be more economical and in other respects more satisfactory than the older method of handling chlorine. It is believed that all of the larger plants will eventually be converted to use the new style of chlorine shipments.

Chlorine is now shipped in car lots in containers which hold 1 ton of chlorine. Fifteen such tanks or containers are shipped on a specially constructed flat car. Each is a separate unit and is readily removed from the car to be stored for future use. The car is returned with empty containers in place. Such a car is known as the multiple-unit tank car. Use of the ton container allows for replacement of 13 cylinder valve connections with but a single connection to the chlorinator.

We have recently learned, through Prof. W. F. Langlier, of the successful use of ton containers at the plants of the East Bay Water Co., of Berkeley and Oakland, Calif.

The great value of employing such shipments is the material saving in the over-all cost of the chlorine. When purchasing chlorine in 150-pound cylinders, freight must be paid on the chlorine and also on the weight of the cylinder from and to the chlorine producer's plant. For distant shipments, such as into Texas, Florida, and the South or Middle West, generally, this freight item on the cylinders is almost as great as the cost of the chlorine itself.

The great economic advantage of the ton container system is that the containers themselves travel in both directions without freight charged—i. e., the containers have been ruled a part of the car, and therefore the only freight paid is that on the chlorine transported. In addition, the carload lot price of the chlorine f. o. b. the producer's plant is approximately 30 per cent less when purchased in the ton containers, primarily because of the lower cost of handling.

As an illustration, the price of chlorine delivered to Dallas, Tex., and freight added for the returned empties varies somewhat as follows when using the current published price (1927) per pound for liquid chlorine:

Style of shipment to Dallas, Tex.	Index price
1. Carload—15 one-ton containers on multiple-unit car	$1.00
2. Carload—150-pound cylinders	1.65
3. Less than car shipments, 150-pound cylinders (contract price for more than 2,000 pounds per year)	2.56
4. Less than car shipments, 150-pound cylinders (contract price for less than 2,000 pounds per year)	2.75

It is apparent, therefore, that a municipality purchasing chlorine in carload quantities is enabled immediately to cut its chlorine bill to an appreciable extent merely by equiping itself to handle the ton containers as New York City and the East Bay Water Co. have done.

Naturally a far greater saving is possible if less than car-lot purchasers could find it expedient to purchase multiple unit car-lot shipments. The cost of chlorine would in such an instance be about 60 per cent less than is now the case.

Considering the saving effected through purchasing in ton containers (or at least car lots of 150-pound cylinders instead of less than car-lot shipments) plus the reduction of cost possible through residual chlorine-control procedure, it is apparent that the cost of sewage chlorination in the great majority of instances may be subject to a revision downward.

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SAVING INFANT LIVES IN NEW YORK CITY

One of the most productive fields of public-health endeavor, and one most definitely responsive to public-health measures, is that of infant welfare. In the last 20 years the infant mortality rate in the United States has been reduced approximately 60 per cent, largely through campaigns of education, the general safeguarding of milk supplies, and by other activities of organized health departments, such as visiting nursing and baby welfare stations.

In New York City the infant mortality rate has been reduced 27 per cent in the 10-year period 1916–1926, according to Dr. John Oberwager, of the city department of health,[1] who reports the rates by years as follows:

1916	93	1922	75
1917	89	1923	66
1918	92	1924	68
1919	82	1925	65
1920	85	1926	68
1921	71		

The average for the four years 1923–1926 is 67.

On the basis of the rate for the first three months of 1927 there will probably be another reduction this year, the rate for the first quarter this year being 66 as compared with 83 for the corresponding period of last year. This decrease is found to be due chiefly to a reduction in the communicable diseases of childhood and broncho-pneumonia. These reductions in the infant mortality rate are very significant when it is remembered that there were 125,000 births in the city during 1926.

New York City has 70 baby health stations, which had an enrollment of approximately 66,000 babies in 1926, of which number 56,000

[1] Weekly Bulletin, New York City Department of Health, May 28, 1927.

were under 1 year of age. These enrolled babies made 627,699 visits to the stations, and the nurses and their assistants made 216,311 home visits.

Doctor Oberwager states:

This large baby health station clientele, constantly kept under the close supervision of our doctors and nurses, resulted in a decrease in the morbidity and mortality not only in this enrolled group but also among the large numbers who were indirectly reached by the educational campaign conducted throughout the year.

PUBLIC-HEALTH ENGINEERING ABSTRACTS

Joint Outlet Sewer in New Jersey. Edward S. Rankin. *Public Works*, vol. 58, No. 2, February, 1927, pp. 72–73. (Abstract by E. C. Sullivan.)

A joint contract has been entered into between 11 municipalities in Essex and Union Counties, N. J., for the financing and construction of the joint outlet sanitary sewer which, when completed, will serve 14 municipalities, in whole or in part, which include portions of the cities of Newark, East Orange, and Summit. The association is entirely voluntary and is a notable example of municipal cooperation.

The project is an outgrowth of the joint sewer constructed in 1902 by six of the municipalities interested in the present work upon the same voluntary scheme of cooperation as that of the new contract recently executed. It is expected that actual construction will begin within a few months. The executive body in direct charge of the work consists of one member from each of the governing bodies of the 11 municipalities financing the project.

The construction is to include a trunk sewer some 20 miles in length, ranging in size from 12 to 81 inches in diameter. The area to be served by this sewer is about 28,000 acres, and the capacity of the sewer at the outlet is 100,000,000 gallons daily. A disposal plant will be erected consisting of mechanically operated screens, hydroseparators, and single-story sedimentation tanks, from which the sludge will be continuously removed and transported by barges to sea. Chlorination will be used when required by the State department of health. The effluent will be discharged into Arthur Kill.

Chemical Treatment of Trade Waste. Part II: Wastes from Silk Dyeing. Foster D. Snell and Donald S. Bruce. *Industrial Engineering Chemistry*, vol. 19, pp. 237–239. (Abstract by Emery J. Theriault.)

A report on a study of methods for the purification of waste from a relatively small, piece dye works, having a discharge of 100,000 gallons of waste water per day, mainly within 10 hours. Both silk, and silk and cotton goods are dyed. About 300 pounds of soap are used per day, together with bleaching powder, silicate of soda, hydrogen peroxide, and small amounts of other chemicals. The wastes are dye liquors, two bleach liquors, two boil-offs, a mercerizing liquor, and a sour. Satisfactory results were obtained when the composited wastes were treated with 5 pounds of copperas and 4 pounds of lime per 1,000 gallons. Mercerizing liquors are neutralized and mixed with the dye waste along with other miscellaneous waste liquors. "Sludge is settled in a four-hour detention basin and discharged to the sanitary sewer." The same treatment has been applied with equally satisfactory results to plants with a daily discharge up to 4,500,000 gallons. "The plant is subject to the rulings of the Passaic Valley Sewerage Commission and is, or will soon be, compelled to treat the waste in such a way that 90 per cent will be substantially colorless and harmless to fish or plant life when discharged into the river. The discharge of the remaining 10 per cent * * * is permitted provided it contains nothing which will be injurious to the structure of the sewer."

Irrigation with Denver Sewage. Charles E. Burdick. *Public Works*, vol. 58, No. 3, March, 1927, pp. 90–91. (Abstract by R. J. Faust.)

One mile below Denver's north city limits and its sewerage system outlets there exists on the Platte River, a low diverting dam and gate, the intake works of the "Burlington ditch," a 98,000-acre irrigation system. This system during the irrigation season, from April to October, is allowed surplus water only, and during the remainder of the year usually consumes the total flow of the Platte with the city's sewage. The average sewage flow is about 75 second-feet, equivalent to 55,000 acre-feet per year. Outside the irrigation season the available dilution water in the Platte is usually less than one-half second-foot per 1,000 people. Favorable health conditions exist along the ditch. Advantages of the system are: (1) Large area available for irrigation; (2) storage facilities available; (3) fertilizing value of sewage; (4) rainfall does not interfere with proper utilization of sewage on land. The disadvantages are: (1) The possibility of a nuisance; (2) the danger of transmitting a disease by irrigating certain garden crops.

A Preliminary Study of the Extent and Distribution of Sewage Pollution in the West End of Lake Erie. Prof. R. C. Osborn, Ohio State University, Director of the Survey. Mimeographed report, 6 pages text and 14 pages of detailed data. (Abstract by J. K. Hoskins.)

A preliminary survey was made of the lake pollution during August, 1926, for the Ohio Fish and Game Commission, to ascertain how far from shore sewage pollution may extend in quantity sufficient to affect fish life, either directly or by injuriously modifying feeding or breeding conditions.

Observations were made at established stations in or about harbors at Port Clinton, Toledo, Monroe, Mich., Detroit, Put-in-Bay Harbor, Sandusky, Huron, Lorain, and Cleveland. Samples at each station consisted of (*a*) bottom sediment for study of character of material and number and kinds of organisms present; (*b*) plankton, collected by a tow net from both surface and bottom; and (*c*) samples of surface and deep water for bacterial examination, dissolved oxygen content, hydrogen-ion concentration, and temperature. The results of examinations of the samples collected from each of the 48 stations are recorded in detail. While the data are admittedly sketchy, because of the short time available for the study, certain conclusions have been drawn, as follows: (1) That the general bacterial conditions of the waters of the open lake are fairly constant and normal, and that the typical sewage organisms diminish rapidly as the distance from sources of pollution increases; (2) that inclosed areas and regions in the neighborhood of larger cities and at the mouths of polluted rivers are heavily polluted with sewage; but when viewed in the light of the dissolved oxygen, plankton organisms, and other factors, the pollution has not generally reached a stage prohibitive of fish life; (3) that, from a sanitary standpoint, the pollution of the shore waters and inclosed bay areas of Lake Erie has become a serious problem, rendering these areas unfit and unsafe for recreational purposes and highly unsatisfactory as sources of municipal water supply. *Bacillus coli* was found to a greater extent at every station except far out in the open lake; (4) that much pollution occurs about the outlets from cities; (5) that such pollution is worst in its effects where it is discharged in bays and inclosed harbors; (6) that beyond the mouths of rivers and of harbor channels the pollution extends in proportion to the amount of sewage discharged; (7) that the amount present in the open lake diminishes rapidly alongshore and especially in proportion to distance from shore; (8) that the bottom in shallow water suitable for the spawning of fishes may be seriously polluted to the extent of preventing reproduction, even when the water is not sufficiently contaminated to prevent fishes from living in it; (9) that such polluted bottoms are of sufficient area to offer a distinct menace to fish reproduction, especially in Maumee Bay and vicinity; (10) that while no effort was made to determine the presence of poisonous substances from mills, factories, etc., the conditions of life in the open lake indicate clearly that there is no widespread distribution of such materials in quantities sufficient to be detrimental to fish and other organisms; (11) that the dissolved oxygen, hydrogen-ion concentration, plankton organisms, bottom samples, etc., indicate that there is as yet no serious contamination of the open lake in deeper water, or very far from sources of pollution in shallower waters alongshore; (12) that bacteriological studies indicate that sewage bacteria are widely distributed everywhere alongshore and out to a distance of several miles. This constitutes a serious sanitary menace but is not at present detrimental to fish life.

Effect of Temperature on Rate of Deoxygenation of Diluted Sewage. R. E. Greenfield and A. L. Elder. *Industrial & Engineering Chemistry*, Vol. 18, 1926, 291–294. (Abstract by J. H. Johnston, in the *Bulletin of Hygiene*, Vol. 2, No. 2, February, 1927, p. 123.)

"Dilutions of sewage of 1 and 2 per cent strength were made with fully aerated distilled water and incubated at 2°, 6°, 14°, and 20° C. in completely filled bottles under water. The dissolved oxygen was determined at the commencement and at intervals for about 50 days. From the results, curves showing the rate of deoxygenation in each case were plotted. At 14° and 20° the results were similar to those obtained by Theriault (this *Bulletin*, vol. 1, p. 597) for polluted waters and were in general agreement with the Phelps formula for calculating the rate of deoxygenation. But at 2° and 6° this was not so, owing to the slow rate of oxygen consumption, together with an initial lag during the first few days, followed by a fairly rapid rise in the rate. It was found that the growth of bacteria in the dilutions at 2° was very limited during the first four days, so that the lag phase was due to the absence of a sufficient number of organisms to effect measurable deoxygenation. The lag phase was greatest in the most dilute mixtures. The total amount of oxygen used up in the dilutions at low temperatures was about as much as that used at the higher temperatures, provided sufficient time was allowed.

"Experiments with diluted Illinois River water showed that the deoxygenation took place in two stages, which was not found with the sewage. The second stage has been attributed to nitrification, but the authors consider it is peculiar to river water, and is due to the increase of oxidizable matter arising from the death of the plankton during the experiment."

The Experimental Sullage Farm, Lyallpur. P. E. Lander. *Agric. Res. Inst. Pusa. Bull.* No. 157, 1925, 25 pp. (Abstract by G. Bertram Kershaw, in the *Bulletin of Hygiene*, Vol. 2, No. 2, February, 1927, p. 120.)

"This article describes experiments concerned with the use of sullage diluted with canal water for application to agricultural lands. The plant consists of a pair of tanks, one for canal water, the other for sullage. Both tanks discharge into a mixing tank, whence the mixed liquors are raised, by pumping, to the land. The dilutions employed are 25 per cent, 50 per cent, and 100 per cent sullage water, and canal water alone. The crops best suited for treatment with sullage were found to be green fodders, vegetables, and sugar cane. Maize throve very well, three crops being obtained between April and October, the maize being followed by winter oats. Wheat was found to be unsuitable for treatment with sullage, owing to its great tendency to become laid when its growth is forced. Underground vegetables were found to tend to crack and burst, especially turnips and carrots. Cauliflower and spinach were improved, both in condition and yield, by the application of sullage water. Sugar cane has not so far done well, although good crops have been produced on sullage at Amritsar; it requires very heavy waterings and manurings. Sugar cane follows the oat crop in rotation."

The Use of Paris Green to Kill Anopheles Larvæ (L'Emploi du Vert de Paris Pour Tuer les Larves d'Anopheles.) O. Hermann, J. Kolossow, and N. Lipin. *Centralblatt für Bacteriologie*, Vol. 98, 1926, p. 547. (Abstract by W. H. W. Komp.)

The authors mixed Paris green with dust or dry earth in the proportions 1 to 100 to 1 to 2,000, and spread the mixture on water in which were *Anopheles* larvæ, at the rate of 11 to 12 grams per square meter. Seventeen experiments were made in the laboratory and nine in the open. In the laboratory the larvæ were always killed in from two hours and a quarter to 5 hours and 40 minutes, with dilutions of 1 to 100 to 1 to 1,000. With the dilution 1 to 2,000 the action is very slow, nine-tenths of the larvae dying in 24 hours, and the remainder during the following 24 hours. In the open the results were not as good. The dilutions of 1 to 100 to 1 to 1,000 did not kill for several days, and meanwhile some of the larvæ transformed to pupæ, which were not poisoned. The larvæ of some other dipterous insects were not affected by Paris green.

To test the toxicity of Paris green, rabbits were allowed to drink water on which the mixture had been spread, over a period of two weeks. One of the animals showed at the end of a month a paralysis of the hind legs, seemingly of arsenical origin. More extended observations should be made with different species of animals, especially as Paris green appears to be a less powerful larvicide than kerosene and is not preferable for use on watering places.

Abstractor's note: The results of the authors are not in agreement with the usual experience with Paris green. It is suggested that this disagreement may be due to one or more of several causes: (1) Inferior or adulterated material, not containing the proper amount of arsenic; (2) unsuitable diluting dust, causing adherence of the poison to the particles or interfering with the ingestion of the poison by the larvæ. Field workers in Brazil reported against the use of Paris green, and subsequently found their failure due to an adulterated Paris green; the experience of W. V. King in using "foundry partings" containing 2 per cent of oil, which caused the Paris green to adhere and sink; and the abstractor's experience in using flowers of sulphur, which prevented the larvæ from getting a toxic dose, show the need of care in these respects. The United States insecticide law specifies a 50 per cent arsenious oxide in Paris green, and if such is used there should be no failures due to inferior or adulterated material.

Australian Fish as Mosquito Larvæ Destroyers. L. E. Cooling. *Health*, Commonwealth of Australia, Vol. 5, No. 1, January, 1927, pp. 11–12. (Abstract by L. L. Williams, jr.)

This article was taken from the author's notes after his death late in 1924. Larvivorous fish were described in Australia by Froggat in 1905 and by Stead in 1907. Their greatest sphere of usefulness is in artificial ponds, fountains, etc. Various species of minnows (*Galaxias*) are larvivorous in Australia, are plentiful, and have a wide distribution. The gold fish (*Carassius auratus*) is very good, but not quite as diligent as the Galaxidae.

The author describes the ideal larvivorous fish as "one that is small, capable of adjusting itself to various environments, naturally frequents the shallow waters, and able to move freely in aquatic vegetation; it must be, preferably, a top feeder, and above all it must be naturally aggressive toward mosquitoes." Throughout the world the best fish for antilarval work are of the families Cyprinodontidae and Poicilidæ. These do not occur in Australia. In Australia equally good ones are found among the Atherinidae (silversides) and the Centropomidæ.

Atlanta now Sells Excess Steam from Refuse Incinerator. H. J. Cates. *Engineering News Record.* Vol. 95, 1925, pp. 922–923. (Abstract by C. W. Hutt, in the *Bulletin of Hygiene,* Vol. 2, No. 1, January, 1927, p. 54.)

"At the Atlanta garbage and refuse incinerator nearly a pound of steam is produced for each pound of refuse burned. Thirty-six per cent of the steam is used at the works; 64 per cent is sold for use in the manufacture of coal gas.

"The author considers that better results would be obtained if the furnaces and boilers were equipped with automatic appliances, such as damper and feed-water regulators and soot blowers."

Birmingham and the Tipping of House Refuse. Anon. *Surveyor,* Vol. 69, No. 1795, June 18, 1926, pp. 569–570. (Abstract by E. B. Besselievre.)

A description is given of the new salvage works and destructor for garbage and refuse to eliminate dumping inside or outside of the city. Plant was opened April 9, 1924, on the Brookvale Road; second plant at Montague Street; and third, the Tyseley plant; closing eight dumps and three depots. New works serve an area of 8,700 acres, which contains 46,000 houses with population of 210,000, approximately. Estimated tonnage of refuse produced is 46,000 tons per annum. Collection is by means of 5-ton electric trucks, one lorry, and three containers. Complete plant includes salvage plant, destructor and buildings, clinker crushing, and grading plant. It is of concrete, constructed on Hennebique system. Refuse is weighed on 20-ton weighing machine. Trucks discharge direct to screens or, in emergency, direct to furnaces. There are two independent screens and two 15-ton receiving hoppers. Rotary screens with three-eighth inch mesh are calculated to remove 40 per cent of entire weight. Dust from screens is collected on conveyor and delivered to dump. Screens are equipped with magnetic separators for recovery of tins and magnetic materials. Tailings are elevated by bucket elevators to furnace hoppers, and are burned to provide electric energy for operating all machinery of plant. Destructor of Heenan type; two units of four cells each. Each unit has a capacity of 60 tons refuse in 24 hours burned to hard, innocuous, and vitreous clinker. Battery-driven tractor and trucks handle clinker to clinker plant. Crusher in clinker plant is of double-roll type, adjustable for size of product, protected by magnetic separator of screen type, 4 feet diameter by 18 feet long, grading crushed clinker into various sizes. Waste paper is collected from conveying belts and baled and pressed. Tins are "detinned" in special furnace and baled in one of two hydraulic presses.

Down Town Street Cleaning in Detroit. G. R. Thompson. *Public Works,* Vol. 58, No. 2, February, 1927, pp. 45–48. (Abstract by E. C. Sullivan.)

This article is concerned with changes in street cleaning in Detroit and the substitution of mechanical pick-up sweepers to replace hand sweeping. Due to the heavy automobile traffic and the liberal parking privileges, it had been felt that the use of machine sweepers might not be advisable. However, by cleaning the streets on a frequent schedule they can be kept reasonably clean, in spite of parking, by the use of machine sweepers.

A great deal of the work is done at night. In the loop section the streets are flushed one night and swept the next. The former force of "white wings" has been reduced very considerably, the men, however, being transferred to other work. "White wings" are still maintained at points of intensive pedestrian traffic, to keep such vicinities in good condition at all times.

Data as to the cost of the work and record forms are also given in the article.

Water Softening at Springfield, Illinois. Charles H. Spaulding, Superintendent of Filtration, Water Works, Springfield, Ill. *American City,* Vol. 36, No. 4, April, 1927, pp. 472–474. (Abstract by D. W. Evans.)

During the past 37 years a ground-water supply has been maintained at Springfield. It consists of 3,000 feet of infiltration galleries and wells. This water supply has been high in iron and hardness, which caused usual troubles to meters, service pipes, plumbing fixtures, and laundry. Chlorination was required to reduce bacterial content to United States Treasury Standard. No suitable surface supply was available, so that softening was resorted to.

Water from wells, galleries, or Sangamon River, if necessary, is collected in a large sump, from which it is picked up by low lift pumps to the dosing well, where lime and coagulant are added. Here it enters two parallel reaction tanks, is mechanically agitated, and mixed for 40 minutes. It then passes through two Dorr clarifiers in parallel, thence to settling basins having carbonating chambers at the outlet ends. It finally passes to eight filter units.

Two valuable features are the clarifiers for continuous removal of sludge and the lime unloading equipment for unloading of quicklime which is received in bulk. Lime solution is pumped to wet feed apparatus for dosing. Steam jets were originally used for lifting the solution, but discharge lines clogged. A centrifugal pump was substituted and has given satisfactory service.

The average cost of removing 1 p. p. m. of hardness per million gallons has varied during four months run from 10.3 to 16.4 cents, the first being obtained when ground water was used alone, whereas the latter was obtained with a dilution of 10 to 20 per cent of river water. Two tables have been included in the article setting forth the operating costs and statistics over a period of four months.

DEATHS DURING WEEK ENDED JUNE 4, 1927

Summary of information received by telegraph from industrial insurance companies for week ended June 4, 1927, and corresponding week of 1926. (From the Weekly Health Index, June 9, 1927, issued by the Bureau of the Census, Department of Commerce)

	Week ended June 4, 1927	Corresponding week 1926
Policies in force	67, 837, 137	64, 661, 646
Number of death claims	11, 089	10, 445
Death claims per 1,000 policies in force, annual rate	8. 5	8. 4

Deaths from all causes in certain large cities of the United States during the week ended June 4, 1927, infant mortality, annual death rate, and comparison with corresponding week of 1926. (From the Weekly Health Index, June 9, 1927, issued by the Bureau of the Census, Department of Commerce)

City	Week ended June 4, 1927		Annual death rate per 1,000 corresponding week 1926	Deaths under 1 year		Infant mortality rate, week ended June 4, 1927 [2]
	Total deaths	Death rate [1]		Week ended June 4, 1927	Corresponding week 1926	
Total (67 cities)	6,657	11.8	[3] 12.3	675	[3] 752	[4] 55
Akron	25			2	5	22
Albany [5]	35	15.2	10.5	3	2	63
Atlanta	92			11	6	
White	53			8	3	
Colored	39	([6])		3	3	
Baltimore [5]	179	11.4	13.9	12	19	37
White	128		12.7	7	14	27
Colored	51	([6])	20.6	5	5	78
Birmingham	71	17.2	21.5	13	13	
White	32		14.7	7	4	
Colored	39	([6])	32.0	6	9	
Boston	231	15.2	13.2	39	24	109
Bridgeport	24			3	3	56
Buffalo	149	14.1	15.0	20	25	84
Cambridge	27	11.4	12.0	6	3	107
Camden	32	12.5	12.3	4	0	69
Canton	26	12.0	13.3	3	4	71
Chicago [5]	652	11.0	10.8	70	72	61
Cincinnati	114	14.4	17.4	4	16	25
Cleveland	172	9.1	9.9	24	22	64
Columbus	73	13.1	12.4	5	6	47
Dallas	56	14.0	11.6	5	2	
White	42		11.3	4	2	
Colored	14	([6])	13.5	1	0	
Dayton	38	11.0	16.8	6	4	99
Denver	80	14.4	14.5	4	7	
Des Moines	25	8.7	10.7	2	2	33
Detroit	268	10.5	11.8	35	41	55
Duluth	22	10.0	13.4	0	1	0
El Paso	36	16.5	25.4	10	20	
Erie	28			4	8	78
Fall River [5]	28	11.0	13.9	5	6	88
Flint	31	11.3	8.8	3	5	49
Fort Worth	34	10.8	9.2	8	4	
White	22		8.9	6	4	
Colored	12	([6])	11.0	2	0	
Grand Rapids	26	8.5	10.7	5	5	73
Houston	69			8	13	
White	50			7	7	
Colored	19	([6])		1	6	
Indianapolis	74	10.3	14.5	6	11	47
White	67		13.9	4	7	36
Colored	7	([6])	19.0	2	4	122
Jersey City	60	9.7	9.7	4	11	30
Kansas City, Kans	24	10.7	12.5	1	1	19
White	19		9.2	1	0	22
Colored	5	([6])	28.0	0	1	0
Kansas City, Mo	105	14.3	13.1	8	9	
Knoxville	40	20.4		1		
White	31			1		
Colored	9	([6])		0		
Los Angeles	243			25	18	72
Louisville	67	10.9	15.3	3	7	28
White	48		12.8	3	6	29
Colored	19	([6])	28.8	0	1	0
Lowell	34	16.1	14.7	4	1	77
Lynn	14	7.0	8.0	1	1	26
Memphis	52	15.1	13.8	6	4	
White	24		9.6	2	0	
Colored	28	([6])	21.5	4	4	
Milwaukee	127	12.6	10.3	10	17	47
Minneapolis	76	9.0	10.0	7	14	39
Nashville [5]	48	18.1	15.2	1	8	
White	32		12.8	0	5	
Colored	16	([6])	21.4	1	3	

(Footnotes at end of table)

Deaths from all causes in certain large cities of the United States during the week ended June 4, 1927, infant mortality, annual death rate, and comparison with corresponding week of 1926. (From the Weekly Health Index, June 9, 1927, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended June 4, 1927		Annual death rate per 1,000 corresponding week 1926	Deaths under 1 year		Infant mortality rate, week ended June 4, 1927 [2]
	Total deaths	Death rate [1]		Week ended June 4, 1927	Corresponding week 1926	
New Bedford	20	8.7	18.3	2	11	35
New Haven	23	6.5	13.2	1	6	14
New Orleans	145	17.8	15.8	20	6	
White	88		11.1	10	2	
Colored	57	(6)	29.2	10	4	
New York	1,335	11.7	11.9	119	143	49
Bronx Borough	162	9.1	9.7	6	13	19
Brooklyn Borough	435	10.0	10.6	44	49	46
Manhattan Borough	570	16.4	16.2	53	69	62
Queens Borough	127	8.2	7.1	11	9	47
Richmond Borough	41	14.5	18.5	5	3	93
Newark, N. J.	75	8.4	9.2	5	8	25
Oakland	53	10.4	8.0	3	5	35
Oklahoma City	22			2	0	
Omaha	54	12.9	11.6	8	8	89
Paterson	26	9.4	15.7	2	4	35
Philadelphia	422	10.8	12.0	48	39	64
Pittsburgh	183	14.8	13.3	19	14	66
Portland, Oreg	68			4	5	42
Providence	65	12.1	13.5	14	9	119
Richmond	50	13.6	13.5	5	2	66
White	28		12.1	2	2	40
Colored	22	(6)	17.1	3	0	114
Rochester	66	10.6	13.8	8	9	67
St. Louis	196	12.2	11.6	9	14	
St. Paul	45	9.4	11.4	1	1	9
Salt Lake City [5]	22	8.4	11.0	2	3	30
San Antonio	76	18.8	13.0	22	14	
San Diego	38	17.2	20.9	3	3	64
San Francisco	169	15.3	13.2	5	8	31
Schenectady	16	9.0	9.5	2	5	60
Seattle	82			4	3	42
Somerville	11	5.6	10.4	1	3	36
Spokane	23	11.0	16.7	1	5	25
Springfield, Mass	25	8.9	12.9	2	1	31
Syracuse	42	11.1	13.2	2	6	26
Tacoma	16	7.8	11.8	1	4	24
Toledo	70	12.0	10.6	7	4	67
Trenton	33	12.6	15.6	3	2	52
Washington, D. C	118	11.4	14.4	5	12	29
White	74		10.6	3	6	25
Colored	44	(6)	25.7	2	6	37
Waterbury	17			0	4	0
Wilmington, Del	22	9.1	13.5	4	1	99
Worcester	54	14.4	13.0	6	5	72
Yonkers	16	7.0	12.1	3	4	68
Youngstown	22	6.8	8.5	4	6	56

[1] Annual rate per 1,000 population.
[2] Deaths under 1 year per 1,000 births. Cities left blank are not in the registration area for births.
[3] Data for 66 cities.
[4] Data for 62 cities.
[5] Deaths for week ended Friday, June 3, 1927.
[6] In the cities for which deaths are shown by color, the colored population in 1920 constituted the following percentages of the total population: Atlanta 31, Baltimore 15, Birmingham 39, Dallas 15, Fort Worth 14, Houston 25, Indianapolis 11, Kansas City, Kans., 14, Knoxville 15, Louisville 17, Memphis 38, Nashville 30, New Orleans 26, Richmond 32, and Washington, D. C., 25.

PREVALENCE OF DISEASE

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

UNITED STATES

CURRENT WEEKLY STATE REPORTS

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

Reports for Week Ended June 11, 1927

DIPHTHERIA

	Cases
Alabama	5
Arizona	9
Arkansas	5
California	113
Colorado	80
Connecticut	31
Delaware	1
Florida	17
Georgia	7
Illinois	87
Indiana	30
Iowa [1]	21
Kansas	5
Louisiana	11
Maine	3
Maryland [1]	62
Massachusetts	88
Michigan	82
Minnesota	23
Mississippi	6
Missouri [2]	24
Nebraska	9
New Jersey	112
New Mexico	2
New York [3]	86
North Carolina	13
Oklahoma [4]	7
Oregon	5
Pennsylvania	162
Rhode Island	6
South Carolina	6
South Dakota	5
Tennessee	5
Texas	17
Utah [1]	7
Vermont	2
Washington	6
West Virginia	12
Wisconsin	26

INFLUENZA

	Cases
Alabama	6
Arizona	2
Arkansas	17
California	16
Colorado	1
Connecticut	2
Florida	29
Georgia	27
Illinois	11
Indiana	2
Louisiana	18
Maine	10
Maryland [1]	3
Massachusetts	1
Michigan	4
Minnesota	2
New Jersey	4
Oklahoma [4]	17
Oregon	7
South Carolina	183
Tennessee	3
Texas	34
West Virginia	3
Wisconsin	21

MEASLES

	Cases
Alabama	221
Arizona	105
Arkansas	51
California	649
Colorado	129
Connecticut	67
Delaware	5
Florida	49
Georgia	43
Idaho	23
Illinois	532
Indiana	77
Iowa [1]	135

[1] Week ended Friday.
[2] Exclusive of Kansas City.
[3] Exclusive of New York City.
[4] Exclusive of Oklahoma City and Tulsa.

MEASLES—continued

	Cases
Kansas	414
Louisiana	70
Maine	115
Maryland [1]	13
Massachusetts	475
Michigan	204
Minnesota	81
Missouri [2]	85
Montana	16
Nebraska	100
New Jersey	69
New Mexico	85
New York [3]	383
North Carolina	1,404
Oklahoma [4]	272
Oregon	183
Pennsylvania	474
Rhode Island	1
South Carolina	239
South Dakota	39
Tennessee	58
Texas	294
Utah [1]	9
Vermont	57
Washington	352
West Virginia	210
Wisconsin	797
Wyoming	55

MENINGOCOCCUS MENINGITIS

Alabama	1
California	5
Colorado	1
Illinois	9
Iowa [1]	1
Kansas	2
Maryland [1]	1
Massachusetts	4
Michigan	5
Minnesota	2
Missouri [2]	1
Montana	2
New Jersey	2
New York [3]	2
Oregon	1
Pennsylvania	2
Washington	3
West Virginia	1
Wisconsin	20

POLIOMYELITIS

Alabama	1
Arizona	5
Arkansas	2
California	4
Florida	1
Kansas	1
Louisiana	2
Massachusetts	4
Michigan	1
New Jersey	3
New York [3]	1
Oklahoma [4]	1
Pennsylvania	1
Rhode Island	1
Texas	2

SCARLET FEVER

	Cases
Alabama	6
Arizona	27
Arkansas	10
California	141
Colorado	45
Connecticut	89
Delaware	5
Florida	5
Georgia	9
Idaho	2
Illinois	181
Indiana	109
Iowa [1]	26
Kansas	27
Louisiana	3
Maine	24
Maryland [1]	44
Massachusetts	389
Michigan	190
Minnesota	125
Mississippi	6
Missouri [2]	28
Montana	17
Nebraska	27
New Jersey	212
New Mexico	4
New York [3]	203
North Carolina	6
Oklahoma [4]	24
Oregon	9
Pennsylvania	321
Rhode Island	12
South Carolina	2
South Dakota	10
Tennessee	2
Texas	7
Utah [1]	26
Washington	36
West Virginia	46
Wisconsin	165
Wyoming	8

SMALLPOX

Alabama	41
Arkansas	1
California	20
Colorado	1
Florida	44
Georgia	17
Idaho	3
Illinois	3
Indiana	134
Iowa [1]	6
Kansas	7
Louisiana	6
Michigan	59
Minnesota	4
Mississippi	1
Missouri [2]	14
Montana	14
Nebraska	11
New York [3]	2
North Carolina	26
Oklahoma [4]	44

[1] Week ended Friday.
[2] Exclusive of Kansas City.
[3] Exclusive of New York City.
[4] Exclusive of Oklahoma City and Tulsa.

SMALLPOX—continued

	Cases
Oregon	8
Pennsylvania	1
South Carolina	14
South Dakota	3
Tennessee	12
Texas	49
Utah [1]	3
Virginia	1
Washington	19
West Virginia	30
Wisconsin	26
Wyoming	1

TYPHOID FEVER

	Cases
Alabama	45
Arizona	3
Arkansas	22
California	15
Colorado	7
Connecticut	2
Delaware	2
Florida	19
Georgia	62
Idaho	2
Illinois	15
Indiana	4
Iowa [1]	2
Kansas	4
Louisiana	17
Maine	2
Maryland [1]	9
Massachusetts	6
Michigan	7
Minnesota	6
Mississippi	24
Missouri [2]	6
Montana	2
New Jersey	3
New Mexico	1
New York [3]	10
North Carolina	19
Oklahoma [4]	35
Pennsylvania	17
South Carolina	134
South Dakota	7
Tennessee	32
Texas	34
Washington	4
West Virginia	13
Wisconsin	3

Reports for Week Ended June 4, 1927

DIPHTHERIA

	Cases
Alabama	24
California	117
Delaware	3
District of Columbia	16
Florida	11
Georgia	10
Indiana	23
Minnesota	19
Mississippi	6
Missouri [2]	27
Nebraska	5
New Mexico	5
North Dakota	2
Oklahoma [4]	7
Rhode Island	10
South Carolina	9
South Dakota	2
Tennessee	5
Wisconsin	160
Wyoming	3

INFLUENZA

	Cases
Alabama	15
California	12
District of Columbia	2
Florida	4
Georgia	34
Indiana	8
Minnesota	2
Oklahoma [4]	39
South Carolina	289
Tennessee	24
Wisconsin	14

MEASLES

	Cases
Alabama	268
California	927
Delaware	8
District of Columbia	4
Florida	66
Georgia	129
Indiana	174
Minnesota	83
Missouri [2]	73
Nebraska	116
New Mexico	78
North Dakota	20
Oklahoma [4]	238
Rhode Island	1
South Carolina	213
South Dakota	72
Tennessee	82
Wisconsin	938
Wyoming	65

MENINGOCOCCUS MENINGITIS

	Cases
Alabama	1
California	8
Georgia	1
Minnesota	3
Mississippi	1
Tennessee	1
Wisconsin	9

POLIOMYELITIS

	Cases
California	7
Nebraska	1
Oklahoma [4]	1
South Carolina	2
Wisconsin	2

[1] Week ended Friday.
[2] Exclusive of Kansas City.
[3] Exclusive of New York City.
[4] Exclusive of Oklahoma City and Tulsa.

SCARLET FEVER

	Cases
Alabama	6
California	164
Delaware	5
District of Columbia	10
Florida	6
Georgia	11
Indiana	136
Minnesota	157
Mississippi	5
Missouri [2]	48
Nebraska	28
New Mexico	8
North Dakota	36
Oklahoma [4]	23
Rhode Island	13
South Carolina	3
South Dakota	23
Tennessee	9
Wisconsin	116
Wyoming	19

SMALLPOX

	Cases
Alabama	29
California	16
District of Columbia	2
Florida	70
Georgia	23
Indiana	181
Minnesota	1
Mississippi	4
Missouri [2]	14
Nebraska	13
New Mexico	2
North Dakota	1
Oklahoma [4]	31
South Carolina	12
South Dakota	6
Tennessee	9
Wisconsin	21
Wyoming	3

TYPHOID FEVER

	Cases
Alabama	39
California	9
District of Columbia	1
Florida	21
Georgia	65
Indiana	5
Minnesota	7
Mississippi	11
Missouri [2]	6
New Mexico	1
North Dakota	1
Oklahoma [4]	35
South Carolina	73
Tennessee	22

[2] Exclusive of Kansas City.

[4] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

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

State	Cerebrospinal meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
April, 1927										
California	38	493	141	4	11,259	5	7	831	154	47
Hawaii Territory	1	30	28		255		3	21	6	13
May, 1927										
Arizona		5	1		223		6	54	1	8
Connecticut	3	103	11	1	215		1	390	0	2
Florida	6	47	38	29	409	10	1	27	185	66
Massachusetts	9	336	38		1,761		7	1,811	6	27
Nebraska		12	5		1,017		1	111	30	4
Vermont		4			594		0	29	0	0

April, 1927

	Cases
Chicken pox:	
California	2,091
Hawaii Territory	40
Botulism:	
California	1
Conjunctivitis (follicular):	
Hawaii	62
Dysentery (amebic):	
California	6
Hawaii Territory	1
Dysentery (bacillary):	
California	2

April, 1927—Continued

	Cases
German measles:	
California	486
Hookworm disease:	
California	1
Hawaii Territory	1
Leprosy:	
California	1
Hawaii Territory	8
Lethargic encephalitis:	
California	13
Mumps:	
California	1,057

April, 1927—Continued

	Cases
Paratyphoid fever:	
California	5
Hawaii Territory	1
Rabies in animals:	
California	36
Tetanus:	
California	3
Hawaii Territory	2
Trachoma:	
California	43
Hawaii Territory	10
Trichinosis:	
California	19
Whooping cough:	
California	742
Hawaii Territory	6

May, 1927

	Cases
Anthrax:	
Massachusetts	1
Chicken pox:	
Arizona	33
Connecticut	502
Florida	96
Massachusetts	954
Nebraska	63
Vermont	72
Conjunctivitis:	
Connecticut	2
Dukes fourth disease:	
Arizona	1
Dysentery (amebic):	
Connecticut	1
Dysentery:	
Florida	7
German measles:	
Massachusetts	80
Nebraska	89
Hookworm disease:	
Florida	208

May, 1927—Continued

	Cases
Lead poisoning:	
Massachusetts	2
Lethargic encephalitis:	
Connecticut	1
Massachusetts	8
Mumps:	
Arizona	17
Connecticut	211
Florida	32
Massachusetts	1,610
Nebraska	128
Vermont	231
Ophthalmia neonatorum:	
Connecticut	2
Massachusetts	125
Rabies in animals:	
Connecticut	9
Vermont	1
Septic sore throat:	
Connecticut	10
Massachusetts	14
Nebraska	3
Tetanus:	
Florida	8
Massachusetts	1
Nebraska	1
Trachoma:	
Arizona	5
Massachusetts	5
Typhus fever:	
Connecticut	1
Florida	1
Whooping cough:	
Arizona	14
Connecticut	163
Florida	125
Massachusetts	474
Nebraska	44
Vermont	79

Number of Cases of Certain Communicable Diseases Reported for the Month of March, 1927, by State Health Officers

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid fever	Whooping cough
Alabama	149	139	886	201	66	197	521	74	231
Arizona	107	10	271	13	92	-------	152	9	6
Arkansas	170	28	542	160	65	19	[1] 46	45	277
California	3,477	750	18,203	1,615	1,210	111	1,059	56	930
Colorado	287	70	4,547	94	954	49	103	6	46
Connecticut	501	123	600	198	538	0	136	2	220
Delaware	21	7	52	7	138	0	[1] 26	0	16
District of Columbia	313	117	22	-------	111	0	124	6	71
Florida	261	120	591	60	61	187	149	54	74
Georgia	239	61	570	114	66	348	70	16	246
Idaho	-------	23	-------	-------	121	53	-------	2	-------
Illinois	1,649	540	11,126	2,763	1,626	213	1,329	39	1,015
Indiana	736	131	940	6	946	631	135	10	225
Iowa	224	93	3,284	171	377	115	58	25	99
Kansas	575	55	4,803	290	776	188	192	7	252
Kentucky [2]	-------	-------	-------	-------	-------	-------	-------	-------	-------
Louisiana	51	99	603	100	34	41	[1] 114	48	62
Maine	130	15	710	70	124	1	23	13	177
Maryland	613	214	241	118	365	2	218	32	431
Massachusetts	1,167	428	1,297	2,027	2,517	0	670	44	760
Michigan	1,560	441	1,278	1,170	1,639	189	419	39	611
Minnesota	784	147	1,182	-------	1,252	8	292	24	118
Mississippi	983	61	3,109	741	61	25	299	70	1,874
Missouri	387	193	991	315	579	332	207	9	224
Montana	126	24	25	96	304	86	21	5	8
Nebraska	685	77	2,255	616	773	294	-------	18	250
Nevada [3]	-------	-------	-------	-------	-------	-------	-------	-------	-------

[1] Pulmonary. [2] Reports received weekly. [3] Reports received annually.

Number of Cases of Certain Communicable Diseases Reported for the Month of March, 1927, by State Health Officers—Continued

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid fever	Whooping cough
New Hampshire [4]									
New Jersey	1,393	478	240		1,687	0	544	15	1,053
New Mexico	181	32	268	173	60	23	103	3	38
New York	3,466	1,830	3,480	4,863	5,767	53	1,876	91	1,584
North Carolina	754	125	2,211		149	260		21	3,526
North Dakota	55	15	918	27	312	13	11	4	22
Ohio [4]									
Oklahoma [5]	115	61	969	80	205	190	95	66	68
Oregon	148	61	543	81	253	90	44	10	39
Pennsylvania	3,419	883	3,619	2,623	2,999	2	628	70	1,178
Rhode Island	80	53	11	36	160	0	22	0	63
South Carolina	436	130	386	7	31	90	200	18	489
South Dakota	73	17	1,168	32	416	73	16	4	54
Tennessee	270	50	739	47	196	95	169	62	392
Texas [4]									
Utah [2]									
Vermont	117	8	528	317	60	0	[1] 17	0	96
Virginia	897	115	3,533		186	80	[1] 75	32	2,134
Washington	527	80	1,558	607	458	242	197	20	194
West Virginia	302	55	798		140	173	79	24	457
Wisconsin	1,014	187	3,128	1,071	764	29	184	15	539
Wyoming	41	3	261	116	134	14	4	0	1

Case Rates per 1,000 Population (Annual Basis) for the Month of March, 1927

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid fever	Whooping cough
Alabama	0.69	0.64	4.09	0.93	0.30	0.91	2.41	0.34	1.07
Arizona	2.74	.26	6.95	.33	2.36		3.90	.23	.15
Arkansas	1.04	.17	3.32	.98	.40	.12	[1] .28	.28	1.70
California	9.23	1.99	48.35	4.29	3.21	.29	2.81	.15	2.47
Colorado	3.15	.77	49.85	1.03	10.46	.54	1.13	.07	.50
Connecticut	3.61	.89	4.32	1.43	3.87	.00	.98	.01	1.58
Delaware	1.02	.34	2.52	.34	6.69	.00	[1] 1.26	.00	.78
District of Columbia	6.82	2.55	.48		2.42	.00	2.70	.13	1.55
Florida	2.25	1.04	5.11	.52	.53	1.62	1.29	.47	.64
Georgia	.89	.23	2.12	.42	.25	1.29	.26	.06	.91
Idaho		.51			2.67	1.17		.04	
Illinois	2.66	.87	17.96	4.46	2.62	.34	2.15	.06	1.64
Indiana	2.75	.49	3.51	.02	3.54	2.36	.50	.04	.84
Iowa	1.09	.45	15.94	.83	1.83	.56	.28	.12	.48
Kansas	3.70	.35	30.94	1.87	5.00	1.21	1.24	.05	1.62
Kentucky [2]									
Louisiana	.31	.60	3.67	.61	.21	.25	[1] .60	.29	.38
Maine	1.93	.22	10.54	1.04	1.84	.01	.34	.19	2.63
Maryland	4.52	1.58	1.78	.87	2.69	.01	1.61	.24	3.18
Massachusetts	3.24	1.19	3.60	5.63	6.99	.00	1.86	.12	2.11
Michigan	4.09	1.16	3.35	3.07	4.30	.50	1.10	.10	1.60
Minnesota	3.44	.64	5.18		5.49	.04	1.28	.11	.52
Mississippi	6.46	.40	20.44	4.87	.40	.16	1.97	.46	12.32
Missouri	1.30	.65	3.32	1.06	1.94	1.11	.69	.03	.75
Montana	2.08	.40	.41	1.58	5.01	1.42	.35	.08	.13
Nebraska	5.78	.65	19.02	5.20	6.52	2.48		.15	2.11
Nevada [3]									
New Hampshire [4]									
New Jersey	4.38	1.50	.75		5.30	.00	1.71	.05	3.31
New Mexico	5.44	.96	8.05	5.20	1.80	.69	3.09	.09	1.14
New York	3.57	1.89	3.59	5.01	5.88	.05	1.93	.09	1.63
North Carolina	3.06	.51	8.99		.61	1.06		.09	14.33
North Dakota	1.01	.28	16.86	.50	5.73	.24	.20	.07	.40
Ohio [4]									
Oklahoma [5]	.64	.34	5.37	.44	1.14	1.05	.53	.37	.38
Oregon	1.96	.81	7.18	1.07	3.35	1.19	.58	.13	.52
Pennsylvania	4.14	1.07	4.38	3.17	3.63	.00	.76	.08	1.43
Rhode Island	1.34	.89	.18	.60	2.68	.00	.37		1.05
South Carolina	2.78	.83	2.46	.04	.20	.57	1.28	.11	3.12
South Dakota	1.23	.29	19.76	.54	7.04	1.23	.27	.07	.91
Tennessee	1.28	.24	3.50	.22	.93	.45	.80	.29	1.86
Texas [4]									
Utah [2]									
Vermont	3.91	.27	17.64	10.59	2.00	.00	[1] .57	.00	3.21
Virginia	4.15	.53	16.34		.86	.37	[1] .35	.15	9.87
Washington	3.97	.60	11.74	4.58	3.45	1.82	1.48	.15	1.46
West Virginia	2.10	.38	5.54		.97	1.20	.55	.17	3.17
Wisconsin	4.09	.75	12.62	4.32	3.08	.12	.74	.06	2.17
Wyoming	2.00	.15	12.75	5.67	6.55	.68	.20	.00	.05

[1] Pulmonary. [2] Reports received weekly. [3] Reports received annually.
[4] Reports not received at time of going to press. [5] Exclusive of Oklahoma City and Tulsa.

PLAGUE-PREVENTION WORK IN CALIFORNIA

Los Angeles.—The rodent division of the Los Angeles Department of Health reports that for the five weeks from April 17 to May 21, 1927, 1,839 rats and 1,699 mice were collected. None were found plague infected during this period, the last plague infection being found on March 23, 1927.

San Francisco.—During the period from March 27 to May 28, 1927, 7,895 rodents were received and 6,779 examined. None were found plague infected. The plague-suppression work is being carried on in the counties of Alameda, Contra Costa, San Mateo, and San Francisco.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 99 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 30,700,000. The estimated population of the 93 cities reporting deaths is more than 30,000,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended May 28, 1927, and May 29, 1926

	1927	1926	Estimated expectancy
Cases reported			
Diphtheria:			
40 States	1,564	1,120	
99 cities	1,015	711	813
Measles:			
37 States	10,543	19,423	
99 cities	3,257	7,360	
Poliomyelitis:			
41 States	18	16	
Scarlet fever:			
39 States	3,746	3,408	
99 cities	1,737	1,596	1,032
Smallpox:			
39 States	628	511	
99 cities	171	109	125
Typhoid fever:			
40 States	370	243	
99 cities	55	56	62
Deaths reported			
Influenza and pneumonia:			
93 cities	624	742	
Smallpox:			
93 cities	0	3	
Los Angeles	0	3	

City reports for week ended May 28, 1927

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

If reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1918 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviations from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Population July 1, 1925, estimated	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
			Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND									
Maine:									
Portland	75,333	6	1	0	0	1	1	1	1
New Hampshire:									
Concord	22,546	0	0	0	0	0	9	0	1
Manchester	83,097	0	1	1	0	0	3	0	0
Nashua	29,723	0	0	0	0	0	0	0	0
Vermont:									
Barre	10,008	1	0	1	0	0	1	0	0
Burlington	24,089	1	0	0	0	0	21	0	1
Massachusetts:									
Boston	779,620	58	46	37	1	0	152	53	29
Fall River	128,993	3	3	0	0	0	13	2	2
Springfield	142,065	2	2	10	0	0	2	8	1
Worcester	190,757	24	3	5	2	1	0	3	6
Rhode Island:									
Pawtucket	69,760	3	1	1	0	0	0	1	1
Providence	267,918	0	7	7	0	0	1	0	7
Connecticut:									
Bridgeport	(1)	1	5	4	0	0	5	4	1
Hartford	160,197	1	5	1	0	0	2	7	9
New Haven	178,927	18	2	3	0	2	1	3	4
MIDDLE ATLANTIC									
New York:									
Buffalo	538,016	17	9	7	--------	2	7	10	7
New York	5,873,356	228	232	366	16	8	83	218	153
Rochester	316,786	9	9	6	--------	0	25	5	3
Syracuse	182,003	19	4	1	--------	0	308	8	3
New Jersey:									
Camden	128,642	3	4	10	0	0	1	1	1
Newark	452,513	110	13	6	5	0	9	117	11
Trenton	132,020	0	3	3	0	0	1	1	3
Pennsylvania:									
Philadelphia	1,979,364	80	64	47	--------	2	55	124	32
Pittsburgh	631,563	64	15	28	--------	4	141	11	19
Reading	112,707	6	2	0	--------	0	111	21	4
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	409,333	9	7	3	0	0	3	10	10
Cleveland	936,485	131	19	58	0	0	4	80	16
Columbus	279,836	14	3	5	0	0	2	0	3
Toledo	287,380	106	4	3	1	1	14	4	9
Indiana:									
Fort Wayne	97,846	0	2	3	0	0	8	0	1
Indianapolis	358,819	36	4	5	0	0	26	44	6
South Bend	80,091	5	1	0	0	0	5	0	0
Terre Haute	71,071	1	0	0	0	0	13	0	0
Illinois:									
Chicago	2,995,239	113	78	81	12	3	227	150	57
Peoria	81,564	9	1	0	0	0	2	0	2
Springfield	63,923	5	0	2	1	1	0	4	0

[1] No estimate made.

City reports for week ended May 28, 1927—Continued

Division, State, and city	Population July 1, 1925, estimated	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
			Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued									
Michigan:									
Detroit	1,245,824	97	46	42	5	2	15	125	26
Flint	130 316	20	3	6	0	0	18	2	1
Grand Rapids	153,698	5	2	0	0	0	25	2	0
Wisconsin:									
Kenosha	50,891	32	1	0	0	0	7	35	0
Madison	46,385		0						
Milwaukee	509,192	73	12	12	0	0	189	122	6
Racine	67,707	11	0	0	0	0	12	25	0
Superior	39,671	3	1	0	0	0	4	0	2
WEST NORTH CENTRAL									
Minnesota:									
Duluth	110,502	10	0	0	0	0	17	3	1
Minneapolis	425,435	101	14	9	0	2	5	0	10
St. Paul	246,001	33	14	4	0	0	21	0	11
Iowa:									
Davenport	52,469	1	0	0	0		1	1	
Des Moines	141,441	0	3	0	0		1	0	1
Sioux City	76,411	1	1	1	0		39	8	
Waterloo	36,771	1	0	0	0		0	0	
Missouri:									
Kansas City	367,481	25	5	5	0	3	53	5	15
St. Joseph	78,342	0	1	1	0	0	9	0	1
St. Louis	821,543	18	38	23	0	1	31	49	
North Dakota:									
Fargo	26,403	0	0	0	0	0	3	0	0
Grand Forks	14,811	0	1	0	0		0	0	
South Dakota:									
Aberdeen	15,036	0	0	0	0		1	0	
Sioux Falls	30,127	0	0	0	0		68	0	
Nebraska:									
Lincoln	60,941	10	1	0	0	0	77	8	0
Omaha	211,768	9	2	0	0	0	35	12	2
Kansas:									
Topeka	55,411	0	1	1	0	0	83	0	1
Wichita	88,367	17	1	2	0	0	34	0	1
SOUTH ATLANTIC									
Delaware:									
Wilmington	122,049	0	1	0	0	0	1	0	2
Maryland:									
Baltimore	796,296	90	19	39	5	1	7	13	20
Cumberland	33,741	0	0	1	0	0	0	1	1
Frederick	12,035	0	0	0	0	0	0	1	0
District of Columbia:									
Washington	497,906	26	10	26	2	2	10	0	8
Virginia:									
Lynchburg	30,395	8	1	0	0	0	9	1	1
Norfolk	(1)	6	1	0	0	0	163	2	0
Richmond	186,403	2	1	4	0	0	88	3	3
Roanoke	58,208	5	0	4	0	0	2	0	0
West Virginia:									
Charleston	49,019	2	0	0	0	0	17	0	2
Wheeling	56,208	1	0	1	0	0	11	0	3
North Carolina:									
Raleigh	30,371	2	0	0	0	0	64	0	1
Wilmington	37,061	0	0	0	0	0	99	9	2
Winston-Salem	69,031	0	1	0	0	0	162	31	1
South Carolina:									
Charleston	73,125	1	0	0	43	0	17	0	0
Columbia	41,225	1	0	0	0		12	2	4
Greenville	27,311	0	0	0	0	0	2	1	0
Georgia:									
Atlanta	(1)	3	1	2	4	3	16	4	5
Brunswick	16,809	0	0	0	0	0	0	13	0
Savannah	93,134	0	0	1	5	1	14	1	1

[1] No estimate made.

City reports for week ended May 28, 1927—Continued

Division, State, and city	Population July 1, 1925, estimated	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
			Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
SOUTH ATLANTIC—con.									
Florida:									
Miami	69,754	0	4	1	1	0	4	2	1
St. Petersburg	26,847	-------	0	-------	-------	0	-------	-------	0
Tampa	94,743	1	0	2	0	0	59	0	2
EAST SOUTH CENTRAL									
Kentucky:									
Covington	58,309	0	0	1	0	0	0	0	1
Louisville	305,935	5	3	4	0	1	5	8	3
Tennessee:									
Memphis	174,533	4	1	0	0	2	23	4	2
Nashville	136,220	0	0	0	0	1	2	2	0
Alabama:									
Birmingham	205,670	2	0	12	0	0	23	2	5
Mobile	65,955	0	1	1	0	1	0	0	1
Montgomery	46,481	0	0	1	0	0	10	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Fort Smith	31,643	0	0	0	0	-------	2	0	1
Little Rock	74,216	0	0	0	0	0	18	0	0
Louisiana:									
New Orleans	414,493	1	6	11	4	5	7	0	10
Shreveport	57,857	0	0	1	0	0	9	1	1
Oklahoma:									
Oklahoma City	(1)	2	1	0	4	0	0	0	0
Tulsa	124,478	6	-------	1	0	-------	21	18	-------
Texas:									
Dallas	194,450	5	3	1	1	1	65	1	4
Galveston	48,375	0	0	0	0	0	0	0	0
Houston	164,954	0	3	5	0	0	5	0	2
San Antonio	198,069	0	1	2	0	0	5	2	4
MOUNTAIN									
Montana:									
Billings	17,971	5	0	0	0	0	3	0	0
Great Falls	29,883	7	1	0	0	0	13	0	0
Helena	12,037	0	0	0	0	0	0	0	0
Missoula	12,668	0	0	0	0	0	0	0	0
Idaho:									
Boise	23,042	2	0	0	0	0	0	0	0
Colorado:									
Denver	280,911	15	10	9	-------	1	30	0	2
Pueblo	43,787	3	1	0	0	0	70	0	1
New Mexico:									
Albuquerque	21,000	2	1	1	0	0	9	11	0
Utah:									
Salt Lake City	130,948	24	3	7	0	0	1	1	1
Nevada:									
Reno	12,665	0	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Seattle	(1)	41	5	0	0	-------	158	22	-------
Spokane	108,897	4	2	1	0	-------	3	0	-------
Tacoma	104,455	8	1	0	0	0	61	0	1
Oregon:									
Portland	282,383	8	5	4	0	0	157	3	4
California:									
Los Angeles	(1)	30	36	53	12	0	137	14	22
Sacramento	72,260	16	3	3	0	0	7	7	3
San Francisco	557,530	66	18	18	0	1	40	80	3

[1] No estimate made.

City reports for week ended May 28, 1927—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
NEW ENGLAND											
Maine:											
Portland	2	2	0	0	0	0	1	1	0	3	17
New Hampshire:											
Concord	1	0	0	0	0	0	0	0	0	0	4
Manchester	1	2	0	0	0	0	0	0	0	0	12
Nashua	0	1	0	0	0	0	0	0	0	0	6
Vermont:											
Barre	0	0	0	0	0	1	0	0	0	0	3
Burlington	0	0	0	0	0	0	0	0	0	1	7
Massachusetts:											
Boston	55	99	0	0	0	10	2	1	0	6	204
Fall River	3	5	0	0	0	3	1	0	0	0	34
Springfield	5	8	0	0	0	2	0	0	0	11	20
Worcester	8	7	0	0	0	4	0	0	1	8	67
Rhode Island:											
Pawtucket	1	2	0	0	0	0	0	0	0	0	16
Providence	8	12	0	0	0	2	0	1	0	2	68
Connecticut:											
Bridgeport	8	6	0	0	0	2	0	0	0	0	23
Hartford	3	11	0	0	0	1	1	1	0	6	38
New Haven	5	5	0	0	0	3	1	0	0	1	49
MIDDLE ATLANTIC											
New York:											
Buffalo	17	24	0	0	0	0	0	0	0	12	141
New York	226	533	1	0	0	[1] 115	10	6	0	85	1,342
Rochester	12	11	0	0	0	6	0	0	0	3	84
Syracuse	8	3	0	0	0	2	0	0	0	8	47
New Jersey:											
Camden	5	3	0	0	0	1	0	1	0	0	37
Newark	20	30	0	0	0	8	0	0	0	33	94
Trenton	2	0	0	0	0	3	0	0	0	1	38
Pennsylvania:											
Philadelphia	75	107	1	0	0	36	5	2	2	21	454
Pittsburgh	29	22	1	0	0	9	0	3	0	18	184
Reading	2	5	0	0	0	1	0	0	0	4	35
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	12	37	2	1	0	12	0	4	0	0	109
Cleveland	28	49	1	0	0	20	1	2	0	33	185
Columbus	9	10	3	1	0	5	0	0	0	17	61
Toledo	10	4	1	0	0	10	0	1	0	19	89
Indiana:											
Fort Wayne	3	3	2	8	0	0	0	0	0	7	23
Indianapolis	9	17	14	58	0	5	1	0	0	23	91
South Bend	3	0	0	2	0	2	0	0	0	0	8
Terre Haute	3	1	1	3	0	1	0	0	0	1	29
Illinois:											
Chicago	103	114	2	1	0	53	3	4	1	85	743
Peoria	2	1	0	0	0	1	0	0	0	1	16
Springfield	2	6	0	0	0	1	0	0	0	0	20
Michigan:											
Detroit	68	110	2	0	0	26	3	0	0	74	320
Flint	5	31	1	0	0	0	0	0	0	2	29
Grand Rapids	6	7	0	0	0	0	0	1	0	7	36
Wisconsin:											
Kenosha	2	3	0	0	0	0	0	0	0	2	4
Madison	2	-----	0	-----	-----	-----	0	-----	-----	-----	-----
Milwaukee	18	47	1	0	0	8	0	0	0	27	115
Racine	4	5	1	0	0	2	0	0	0	18	10
Superior	2	12	2	0	0	0	1	0	0	0	5
WEST NORTH CENTRAL											
Minnesota:											
Duluth	5	4	2	0	0	3	1	0	0	2	25
Minneapolis	30	33	9	0	0	2	1	0	0	1	93
St. Paul	21	16	4	0	0	2	1	0	0	5	64

[1] Pulmonary tuberculosis only.

City reports for week ended May 28, 1927—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 NORTH CENTRAL—con.											
Iowa:											
Davenport	0	1	4	0	--------	-------	0	0	--------	0	--------
Des Moines	6	13	3	1	--------	-------	0	0	--------	0	--------
Sioux City	2	4	2	1	--------	-------	0	0	--------	5	--------
Waterloo	2	4	0	0	--------	-------	0	0	--------	2	--------
Missouri:											
Kansas City	7	12	1	5	0	10	1	2	0	31	118
St. Joseph	1	5	1	4	0	2	0	0	0	1	21
St. Louis	27	31	4	2	0	10	1	0	0	47	278
North Dakota:											
Fargo	0	2	0	0	0	0	0	0	0	0	4
Grand Forks	0	1	0	0	--------	-------	0	0	--------	0	--------
South Dakota:											
Aberdeen	3	1	0	0	--------	-------	0	0	--------	6	--------
Sioux Falls	1	2	0	0	--------	-------	0	0	--------	0	--------
Nebraska:											
Lincoln	1	0	0	0	0	0	0	0	0	2	9
Omaha	4	7	7	2	0	4	0	0	0	0	45
Kansas:											
Topeka	2	2	1	7	0	1	0	0	0	22	--------
Wichita	2	4	2	0	0	1	0	0	0	2	20
SOUTH ATLANTIC											
Delaware:											
Wilmington	4	4	0	0	0	0	0	0	0	1	22
Maryland:											
Baltimore	32	33	1	0	0	16	3	0	0	55	184
Cumberland	1	0	0	0	0	0	0	0	0	0	10
Frederick	0	1	0	0	0	0	0	0	0	0	2
District of Columbia:											
Washington	19	15	2	1	0	13	2	1	0	13	117
Virginia:											
Lynchburg	0	0	0	0	0	3	0	0	0	6	13
Norfolk	1	7	1	0	0	4	0	0	0	7	--------
Richmond	2	1	0	0	0	7	0	1	0	2	51
Roanoke	1	0	0	5	0	0	0	0	0	2	11
West Virginia:											
Charleston	0	0	0	0	0	1	0	1	0	15	12
Wheeling	2	0	0	0	0	1	1	0	0	3	18
North Carolina:											
Raleigh	0	0	0	0	0	1	0	0	0	12	10
Wilmington	0	1	0	0	0	1	0	0	0	21	11
Winston-Salem	1	0	3	0	0	6	0	0	0	25	30
South Carolina:											
Charleston	1	0	1	1	0	1	1	1	0	7	19
Columbia	0	0	0	0	--------	-------	1	0	--------	21	22
Greenville	0	0	0	0	0	0	0	0	0	0	4
Georgia:											
Atlanta	3	2	5	9	0	7	1	2	0	11	75
Brunswick	0	1	0	1	0	0	1	0	0	0	8
Savannah	0	0	0	5	0	5	1	2	1	2	30
Florida:											
Miami	0	0	--------	0	0	4	2	1	0	18	38
St. Petersburg	0	--------	0	--------	0	0	0	--------	0	--------	10
Tampa	1	2	0	0	0	0	0	2	1	0	18
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	0	1	0	0	1	0	0	0	0	--------
Louisville	5	13	1	3	0	4	1	0	0	26	71
Tennessee:											
Memphis	4	12	1	5	0	4	1	0	0	24	59
Nashville	3	0	1	0	0	5	1	0	1	6	49
Alabama:											
Birmingham	1	1	8	3	0	2	2	4	0	5	61
Mobile	0	0	1	0	0	1	1	0	1	2	21
Montgomery	0	1	1	1	0	0	0	2	0	0	14

City reports for week ended May 28, 1927—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	1	0	0	0	--------	-------	0	0	--------	0	6
Little Rock	1	1	0	0	0	0	1	3	0	1	--------
Louisiana:											
New Orleans	3	2	2	0	0	28	3	1	0	23	176
Shreveport	0	1	1	1	0	4	0	0	0	0	31
Oklahoma:											
Oklahoma City	1	0	4	2	0	4	0	0	0	3	27
Tulsa	1	4	--------	1	--------	-------	-------	0	--------	2	--------
Texas:											
Dallas	2	1	3	5	0	2	1	1	0	1	55
Galveston	0	0	0	0	0	1	1	0	0	0	13
Houston	2	0	1	0	0	1	0	0	0	0	45
San Antonio	0	1	0	1	0	12	0	1	0	0	66
MOUNTAIN											
Montana:											
Billings	1	0	0	0	0	0	0	0	0	2	2
Great Falls	1	4	1	0	0	1	0	1	0	0	4
Helena	0	0	0	0	0	0	0	0	0	0	4
Missoula	0	0	0	0	0	0	0	0	0	0	2
Idaho:											
Boise	0	1	1	0	0	0	0	0	0	0	4
Colorado:											
Denver	11	48	1	0	0	8	1	0	0	3	67
Pueblo	1	38	0	1	0	3	1	1	0	0	11
New Mexico:											
Albuquerque	0	1	0	0	0	4	0	0	0	0	7
Utah:											
Salt Lake City	2	9	0	2	0	1	1	0	0	15	27
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	3
PACIFIC											
Washington:											
Seattle	10	6	4	1	--------	-------	0	0	--------	29	--------
Spokane	4	15	3	18	--------	-------	0	0	--------	2	--------
Tacoma	3	11	3	7	0	1	0	0	0	0	19
Oregon:											
Portland	7	3	7	3	0	3	1	1	1	3	73
California:											
Los Angeles	23	27	7	0	0	24	1	0	0	17	221
Sacramento	1	0	1	5	0	6	1	1	0	0	--------
San Francisco	14	21	2	1	0	7	0	2	0	22	--------

Division, State, and city	Cerebrospinal meningitis: Cases	Cerebrospinal meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Massachusetts:									
Fall River	0	0	1	1	0	0	0	0	0
Rhode Island:									
Providence	0	1	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
New York	6	2	8	5	0	0	1	0	0
New Jersey:									
Newark	1	0	0	0	0	0	0	0	0
Pennsylvania:[1]									
Philadelphia	0	1	0	0	1	1	0	0	0

[1] Rabies (human): 2 deaths at Pittsburgh, Pa.

City reports for week ended May 28, 1927—Continued

Division, State, and city	Cerebrospinal meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cleveland	1	0	0	0	0	0	0	0	0
Illinois:									
Chicago	3	4	0	0	0	0	1	0	0
Michigan:									
Detroit	1	1	0	0	0	0	0	0	0
Flint	1	0	0	0	0	0	0	0	0
Wisconsin:									
Milwaukee	5	2	1	0	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
St. Paul	0	0	0	0	0	0	0	1	0
Missouri:									
Kansas City	4	1	0	0	0	0	0	0	0
Nebraska:									
Omaha	0	0	0	0	0	0	0	1	0
Kansas:									
Wichita	1	0	0	0	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	0	0	0	1	0	0	0	0	0
Frederick	1	0	0	0	0	0	0	0	0
District of Columbia:									
Washington	1	1	0	0	0	0	0	0	0
Virginia:									
Norfolk	0	0	0	0	1	0	0	0	0
Richmond	0	0	0	1	0	0	0	1	0
South Carolina:									
Charleston[1]	0	0	0	0	5	0	0	0	0
Columbia	0	0	0	0	0	1	0	0	0
Georgia:									
Brunswick	0	0	0	0	0	1	0	1	0
Savannah	0	0	0	0	2	1	0	0	0
Florida:									
Miami	0	0	0	0	2	0	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	0	0	0	0	1	0	0	0	0
Nashville	1	0	0	0	3	3	0	0	0
Alabama:									
Birmingham	0	0	0	0	1	0	0	0	0
Mobile	0	0	0	0	1	1	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	1	0	0	0	0
Louisiana:									
New Orleans	1	0	0	0	0	0	0	1	0
Shreveport	0	0	0	0	0	2	0	0	0
Texas:									
Dallas	0	0	0	0	3	2	0	0	0
Houston	0	0	0	0	0	1	0	0	0
PACIFIC									
Washington:									
Seattle	1		0		0		0	0	
Spokane	3		0		0		0	0	
Oregon:									
Portland	2	0	0	0	0	0	0	0	0
California:									
Los Angeles	3	1	0	1	0	0	1	0	0
Sacramento	2	1	0	0	0	0	0	0	0
San Francisco	0	1	1	3	0	0	0	0	0

[1] Dengue: 3 cases at Charleston, S. C.

The following table gives the rates per 100,000 population for 101 cities for the five-week period ended May 28, 1927, compared with those for a like period ended May 29, 1926. The population figures used in computing the rates are approximate estimates as of July 1, 1926 and 1927, respectively, authoritative figures for many of the cities not being available. The 101 cities reporting cases had estimated aggregate populations of approximately 30,440,000 in 1926 and 30,960,000 in 1927. The 95 cities reporting deaths had nearly 29,780,000 estimated population in 1926 and nearly 30,290,000 in 1927. The number of cities included in each group and the estimated aggregate populations are shown in a separate table below:

Summary of weekly reports from cities, April 24 to May 28, 1927—Annual rates per 100,000 population, compared with rates for the corresponding period of 1926 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	May 1, 1926	Apr. 30, 1927	May 8, 1926	May 7, 1927	May 15, 1926	May 14, 1927	May 22, 1926	May 21, 1927	May 29, 1926	May 28, 1927
101 cities	110	171	115	183	121	175	118	[2] 174	122	[3] 172
New England	83	95	106	130	87	104	78	153	80	[4] 171
Middle Atlantic	114	243	126	273	135	282	138	268	145	234
East North Central	98	138	89	160	96	132	117	[2] 161	108	146
West North Central	204	159	198	131	202	135	147	105	165	91
South Atlantic	67	105	75	120	76	116	71	111	95	145
East South Central	72	76	62	76	52	82	36	36	41	97
West South Central	56	180	60	143	82	113	47	50	64	84
Mountain	118	99	146	153	182	99	128	108	128	144
Pacific	153	188	177	110	174	94	163	105	158	196

MEASLES CASE RATES

101 cities	1,708	640	1,713	699	1,565	605	1,433	[2] 620	1,282	[3] 552
New England	1,526	323	1,710	269	1,196	346	1,073	416	1,061	[4] 464
Middle Atlantic	1,420	281	1,432	213	1,200	298	1,135	324	957	366
East North Central	1,488	638	1,456	568	1,373	453	1,374	[2] 487	1,254	[2] 370
West North Central	4,060	1,229	4,511	1,527	4,181	935	3,465	955	3,086	655
South Atlantic	2,507	1,022	1,926	1,583	1,917	1,553	1,645	1,544	1,529	1,364
East South Central	2,875	377	3,237	520	3,449	346	2,989	357	2,368	321
West South Central	159	935	125	889	155	575	142	629	112	466
Mountain	866	1,546	884	1,636	1,394	1,304	1,385	908	1,303	1,052
Pacific	664	1,532	656	1,605	675	1,262	688	1,217	798	1,063

SCARLET FEVER CASE RATES

101 cities	292	388	294	360	326	341	308	[2] 310	274	[3] 295
New England	281	402	222	392	311	439	288	432	257	[4] 386
Middle Atlantic	221	448	217	541	249	475	256	416	212	364
East North Central	290	282	310	283	356	290	342	[2] 268	339	[2] 302
West North Central	879	334	940	272	871	320	720	288	700	246
South Atlantic	216	194	175	129	220	149	194	101	158	121
East South Central	171	194	186	183	202	153	176	132	171	138
West South Central	146	34	176	59	155	21	172	34	116	25
Mountain	219	953	137	1,007	246	728	173	989	100	899
Pacific	204	199	206	212	257	202	292	168	179	209

[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, 1926 and 1927, respectively.
[2] Madison, Wis., not included.
[3] Hartford, Conn., and Madison, Wis., not included.
[4] Hartford, Conn., not included.

Summary of weekly reports from cities, April 24 to May 28, 1927—Annual rates per 100,000 population, compared with rates for the corresponding period of 1926—Continued

SMALLPOX CASE RATES

	Week ended—									
	May 1, 1926	Apr. 30, 1927	May 8, 1926	May 7, 1927	May 15, 1926	May 14, 1927	May 22, 1926	May 21, 1927	May 29, 1926	May 28, 1927
101 cities	26	21	26	22	26	21	19	[2] 26	19	[3] 29
New England	0	0	0	0	0	0	0	0	0	[4] 0
Middle Atlantic	0	0	0	0	0	0	0	0	1	0
East North Central	19	33	22	28	20	20	18	[2] 38	13	[2] 50
West North Central	30	26	58	24	26	26	28	45	44	42
South Atlantic	28	20	30	36	39	38	24	36	28	40
East South Central	98	66	72	56	119	56	62	76	62	61
West South Central	146	25	159	34	116	50	95	17	59	29
Mountain	36	9	36	36	55	9	18	45	36	27
Pacific	102	65	56	73	67	92	51	71	32	84

TYPHOID FEVER CASE RATES

	May 1, 1926	Apr. 30, 1927	May 8, 1926	May 7, 1927	May 15, 1926	May 14, 1927	May 22, 1926	May 21, 1927	May 29, 1926	May 28, 1927
101 cities	9	8	8	9	8	8	11	[2] 10	10	[3] 9
New England	5	5	9	2	4	5	9	5	7	[4] 8
Middle Atlantic	6	5	7	10	10	5	7	6	5	6
East North Central	4	6	4	6	5	3	5	[2] 5	9	[2] 7
West North Central	6	4	6	2	2	2	8	6	4	4
South Atlantic	19	16	12	18	4	9	32	13	26	18
East South Central	21	31	16	15	0	66	10	56	31	31
West South Central	17	13	17	38	43	25	26	46	12	25
Mountain	18	9	0	18	9	9	9	9	0	18
Pacific	27	18	11	3	8	10	19	10	11	8

INFLUENZA DEATH RATES

	May 1, 1926	Apr. 30, 1927	May 8, 1926	May 7, 1927	May 15, 1926	May 14, 1927	May 22, 1926	May 21, 1927	May 29, 1926	May 28, 1927
95 cities	23	18	25	18	16	18	15	[2] 12	12	[3] 9
New England	35	7	14	5	5	14	12	14	9	[4] 10
Middle Atlantic	27	21	22	15	17	14	16	10	11	8
East North Central	46	10	29	7	18	10	18	[2] 12	11	[2] 4
West North Central	17	12	13	8	6	4	8	8	13	12
South Atlantic	28	29	19	17	17	24	11	11	11	13
East South Central	98	36	98	41	31	21	36	41	26	25
West South Central	26	47	44	13	26	13	22	26	9	26
Mountain	9	9	18	9	18	9	0	9	9	9
Pacific	11	21	4	21	4	7	4	0	11	8

PNEUMONIA DEATH RATES

	May 1, 1926	Apr. 30, 1927	May 8, 1926	May 7, 1927	May 15, 1926	May 14, 1927	May 22, 1926	May 21, 1927	May 29, 1926	May 28, 1927
95 cities	177	144	163	131	150	123	141	[2] 109	119	[3] 99
New England	210	183	170	139	165	144	144	100	123	[4] 133
Middle Atlantic	219	169	175	167	166	151	173	119	145	116
East North Central	152	128	178	122	147	99	133	[2] 104	106	[2] 86
West North Central	108	56	122	69	82	71	95	58	84	87
South Atlantic	178	156	170	114	188	126	149	145	110	86
East South Central	233	127	222	143	181	122	171	107	171	61
West South Central	150	125	110	112	128	184	84	103	102	90
Mountain	118	180	82	99	91	54	82	63	91	36
Pacific	74	117	78	79	92	114	53	121	64	100

[2] Madison, Wis., not included.
[3] Hartford, Conn., and Madison, Wis., not included.
[4] Hartford, Conn., not included.

Number of cities included in summary of weekly reports, and aggregate population of cities in each group, approximated as of July 1, 1926 and 1927, respectively

Group of cities	Number of cities reporting cases	Number of cities reporting deaths	Aggregate population of cities reporting cases		Aggregate population of cities reporting deaths	
			1926	1927	1926	1927
Total	101	95	30,438,500	30,960,600	29,778,400	30,280,800
New England	12	12	2,211,000	2,245,900	2,211,000	2,245,900
Middle Atlantic	10	10	10,457,000	10,567,000	10,457,000	10,567,000
East North Central	16	16	7,644,900	7,804,500	7,644,900	7,804,500
West North Central	12	10	2,585,500	2,626,600	2,470,600	2,510,000
South Atlantic	21	20	2,799,500	2,878,100	2,757,700	2,835,700
East South Central	7	7	1,008,300	1,023,500	1,008,300	1,023,500
West South Central	8	7	1,213,800	1,243,300	1,181,500	1,210,400
Mountain	9	9	572,100	580,000	572,100	580,000
Pacific	6	4	1,946,400	1,991,700	1,475,300	1,512,800

FOREIGN AND INSULAR

THE FAR EAST

Report for week ended May 14, 1927.—The following report for the week ended May 14, 1927, was transmitted by the eastern bureau of the health section of the secretariat of the League of Nations, located at Singapore, to the headquarters at Geneva:

Maritime towns	Plague		Cholera		Smallpox	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
British India:						
Vizagapatam	0	0	0	0	2	2
Bombay	----	23	----	0	58	33
Calcutta	----	0	----	85	64	47
Rangoon	----	3	----	1	14	5
Bassein	----	3	----	1	0	0
Madras	----	0	----	0	4	0
Negapatam	----	0	----	9	0	0
Moulmein	----	0	----	0	1	0
Straits Settlements:						
Singapore	0	0	0	0	2	0

Maritime towns	Plague		Cholera		Smallpox	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Dutch East Indies:						
Surabaya	0	0	0	0	1	0
Siam: Bangkok	1	1	4	1	2	1
French Indo-China:						
Saigon and Cholon	0	0	26	18	0	0
Haiphong	0	0	285	242	0	0
China:						
Canton	0	0	0	0	12	0
Shanghai	0	0	0	0	----	2
Hong Kong	0	0	0	0	4	2

Telegraphic reports from the following maritime towns indicated that no case of plague, cholera, or smallpox was reported during the week:

ASIA

Arabia.—Jeddah, Perim, Aden.

Iraq.—Basra.

Persia.—Mohammerah, Bender-Abbas, Bushire, Lingah.

British India.—Chittagong, Cochin, Tuticorin, Karachi.

Portuguese India.—Nova Goa.

Federated Malay States.—Port Swettenham.

Straits Settlements.—Penang.

Dutch East Indies.—Batavia, Sabang, Belawan-Deli, Pontianak, Semarang, Menado, Banjermasin, Cheribon, Palembang, Makassar, Balikpapan, Tarakan, Padang.

Sarawak.—Kuching.

British North Borneo.—Sandakan, Jesselton, Kudat, Tawao.

Portuguese Timor.—Dilly.

French Indo-China.—Tourane.

Philippine Islands.—Manila, Iloilo, Jolo, Cebu, Zamboanga.

China.—Amoy, Tientsin.

Macao.

Formosa.—Keelung, Takao.

Chosen.—Chemulpo, Fusan.

Manchuria.—Yingkow, Antung, Changchun, Harbin, Mukden.

ASIA—continued

Kwantung.—Port Arthur, Dairen.

Japan.—Yokohama, Nagasaki, Niigata, Shimonoseki, Moji, Tsuruga, Kobe, Osaka, Hakodate.

AUSTRALASIA AND OCEANIA

Australia.—Adelaide, Melbourne, Sydney, Brisbane, Rockhampton, Townsville, Port Darwin, Broome, Fremantle, Carnarvon, Thursday Island, Cairns.

New Guinea.—Port Moresby.

New Britain Mandated Territory.—Rabaul and Kokopo.

New Zealand.—Auckland, Wellington, Christchurch, Invercargill, Dunedin.

Samoa.—Apia.

New Caledonia.—Noumea.

Fiji.—Suva.

Hawaii.—Honolulu.

Society Islands.—Papeete.

AFRICA

Egypt.—Port Said, Suez, Alexandria.

Anglo-Egyptian Sudan.—Port Sudan, Suakin.

Eritrea.—Massaua.

AFRICA—continued

French Somaliland.—Djibouti.
British Somaliland.—Berbera.
Italian Somaliland.—Mogadiscio.
Zanzibar.—Zanzibar.
Kenya.—Mombasa.
Tanganyika.—Dar-es-Salaam.
Seychelles.—Victoria.
Portuguese East Africa.—Mozambique, Beira, Lourenço-Marques.

AFRICA—continued

Union of South Africa.—East London, Port Elizabeth, Cape Town, Durban.
Reunion.—Saint Denis.
Mauritius.—Port Louis.
Madagascar.—Majunga, Tamatave, Diego-Suares.

AMERICA

Panama.—Colon, Panama.

Reports had not been received in time for publication from:

Arabia.—Kamaran.
Dutch East Indies.—Samarinda.
Union of Socialist Soviet Republics.—Vladivostok.
Ceylon.—Colombo.

Belated information:

Week ended May 7: *Pondicherry*, two fatal smallpox cases; *Karika*[1] and *Padang*, nil.

Other Epidemiological Information

A telegraphic report from the Australian Health Service, dated May 13, states that 11 cases of measles occurred on the island of Vanikoro (in the Santa Cruz Islands, north of the New Hebrides).

CANADA

Communicable diseases—Week ended May 28, 1927.—The Canadian Ministry of Health reports cases of certain communicable diseases from seven Provinces of Canada for the week ended May 28, 1927, as follows:

Disease	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	Total
Cerebrospinal meningitis				1				1
Influenza	8			8				16
Smallpox				13	1	9		23
Typhoid fever	2	3	499	4		1		509

Communicable diseases—Quebec—Week ended June 4, 1927.—The Bureau of Health of the Province of Quebec reports cases of certain communicable diseases for the week ended June 4, 1927, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Scarlet fever	64
Chicken pox	22	Smallpox	1
Diphtheria	39	Tuberculosis	20
German measles	25	Typhoid fever	273
Influenza	2	Whooping cough	17
Measles	70		

Typhoid fever—Montreal—May 22–June 4, 1927.—During the week ended May 28, 1927, 353 cases of typhoid fever were reported at Montreal, Quebec, Canada, with 38 deaths. During the week ended June 4, 1927, there were 239 cases of typhoid fever and 37 deaths from this disease. The totals from February 27 to June 4 were 4,438 cases and 369 deaths. (Earlier reports were published in the Public Health Reports, June 3, 1927, p. 1542, and May 13, 1927, p. 1340.)

CUBA

Communicable diseases—Habana—May, 1927.—During the month of May, 1927, communicable diseases were reported in Habana, Cuba, as follows:

Disease	New cases	Deaths	Remaining under treatment May 31, 1927	Disease	New cases	Deaths	Remaining under treatment May 31, 1927
Beriberi			2	Malaria [1]	22		35
Chicken pox	36		37	Measles	44		40
Diphtheria	6		9	Scarlet fever	2		4
Filariasis			1	Paratyphoid fever	2		5
Leprosy			12	Typhoid fever [1]	30	6	29

[1] Many of these cases from the interior.

HAWAII

Plague—Honokaa—May 23, 1927.—The occurrence of a fatal case of plague was reported, May 23, 1927, at Honokaa, Hawaii.

LATVIA

Communicable diseases—March, 1927.—During the month of March, 1927, communicable diseases were reported in the Republic of Latvia as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	5	Paratyphoid fever	2
Chicken pox	4	Puerperal fever	8
Diphtheria	79	Scarlet fever	419
Erysipelas	21	Tetanus	2
Influenza	2,586	Trachoma	27
Leprosy	4	Typhoid fever	54
Measles	557	Typhus fever	1
Mumps	4	Whooping cough	134

Population, 1,900,000.

MALTA

Communicable diseases—April, 1927.—During the month of April, 1927, communicable diseases were reported in the Island of Malta, as follows:

Disease	Cases	Disease	Cases
Bronchopneumonia	[1] 3	Pneumonia	[2] 9
Chicken pox	10	Scarlet fever	3
Diphtheria	5	Trachoma	79
Erysipelas	2	Tuberculosis	23
Influenza	18	Typhoid fever	46
Lethargic encephalitis	2	Whooping cough	163
Malta fever	45		

[1] With influenza, 1 case.
[2] With influenza, 2 cases.

Population: Civil, 227,440 (estimated).

UNION OF SOUTH AFRICA

Typhus fever—March, 1927.—During the month of March, 1927, 54 cases of typhus fever with 8 deaths, were reported in the colored or native population. The occurrence was distributed according to locality, as follows: *Cape Province*, 24 cases; *Natal*, 1 case; *Orange Free State*, 26 cases; *Transvaal*, 3 cases. In addition 5 cases were reported in the European population.

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

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.

Reports Received During Week Ended June 17, 1927 [1]

CHOLERA

Place	Date	Cases	Deaths	Remarks
French Settlements in India	Mar. 6-19	5	3	
India:				
Bombay	Apr. 24-30	4	2	
Calcutta	do	136	121	
Rangoon	do	2	2	
Indo-China (French)	Mar. 21-31	227		
Saigon	Apr. 10-29	82	69	
Siam				Apr. 1-23, 1927: Cases, 348; deaths, 245.
Do	Apr. 17-23	71	46	
Bangkok	do	9	6	

PLAGUE

Place	Date	Cases	Deaths	Remarks
Ceylon:				
Colombo	Apr. 24-30	4	3	
Greece:				
Athens and Piraeus	Apr. 1-30	3		
India:				
Bombay	Apr. 24-30	18	13	
Calcutta	do	1	1	
Madras Presidency	Apr. 10-16	3	4	
Rangoon	Apr. 24-30	3	3	
Indo-China (French)	Mar. 1-31			Cases, 4.
Java:				
Batavia	Apr. 24-30	10	9	Province.
East Java and Madura	Apr. 10-16	11	10	
Nigeria	Feb. 1-28	12	12	
Siam	Apr. 24-30	3	2	
Straits Settlements:				
Singapore	Apr. 2-9	3		
Tunisia	Mar. 1-Apr. 30	35		
Turkey:				
Constantinople	Apr. 3-9	1		

SMALLPOX

Place	Date	Cases	Deaths	Remarks
Algeria	Mar. 21-Apr. 30	211		
Arabia:				
Aden	May 1-7		1	Imported.
Brazil:				
Rio de Janeiro	Apr. 24-30	2		
British South Africa:				
Northern Rhodesia	Apr. 16-22	3		Native.
Canada:				
Alberta—				
Calgary	May 8-14	1		
British Columbia:				
Vancouver	May 16-22	1		
Manitoba	May 22-28	1		
Winnipeg	do	1		

[1] From medical officers of the Public Health Service, American consuls, and other sources.

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

Reports Received During Week Ended June 17, 1927—Continued

SMALLPOX—Continued

Place	Date	Cases	Deaths	Remarks
Canada—Continued.				
Ontario	May 22-28	18		
Toronto	May 29-June 4	7		
Quebec	May 22-28	1		
Saskatchewan	do	9		
China:				
Hong Kong	Apr. 24-30	1	2	
Swatow	do			Prevalent.
Tientsin	do	2		
France	Mar. 1-31	62		
Paris	May 1-10	7	2	
French Settlements in India	Feb. 20-Mar. 19	68	32	
Great Britain:				
England and Wales	May 1-21	921		
London	May 8-14	2	1	
Manchester	May 15-21	1		
Scotland—				
Dundee	do	1		
Greece:				
Athens and Piraeus	Apr. 1-30	7	1	
Guatemala:				
Guatemala City	do		13	
India:				
Bombay	Apr. 24-30	77	32	
Calcutta	do	86	71	
Karachi	May 1-7	1		
Madras	do	8		
Rangoon	Apr. 24-30	36	6	
Indo-China (French):				
Saigon	Apr. 23-29	1		
Italy	Feb. 27-Apr. 9	3		
Japan	Feb. 27-Apr. 2	34		
Java:				
Batavia	Apr. 24-30	1		Province.
East Java and Madura	Apr. 10-16	1		
Mexico	Jan. 1-31		139	
San Luis Potosi	May 15-28		2	
Morocco	Jan. 1-Mar. 31	269		
Nigeria	Feb. 1-28	299	59	
Poland	Mar. 6-Apr. 9	13		
Portugal:				
Lisbon	Jan. 30-May 7		5	
Siam				Apr. 1-23, 1927: Cases, 21; deaths, 9.
Do	Apr. 17-23	6	2	
Bangkok	do	2	2	
Straits Settlements:				
Singapore	Mar. 27-Apr. 2	1	1	
Tunisia	Mar. 21-Apr. 20	3		
Venezuela:				
Maracaibo	Mar. 8-14		2	

TYPHUS FEVER

Algeria	Mar. 21-Apr. 30	214	3	
Argentina:				
Rosario	Apr. 24-May 7		3	
Chile:				
Antofagasta	do	2		
France	Mar. 1-31	5		
Greece:				
Athens and Piraeus	Apr. 1-30	5	1	
Italy	Feb. 27-Apr. 9	1		
Latvia	Mar. 1-31	1		
Mexico	Jan. 1-31		35	
Morocco	Jan. 1-Mar. 31	499		
Poland	Mar. 13-Apr. 9	554	45	
Rumania	Feb. 1-Mar. 31	994	98	
Tunisia	Mar. 21-Apr. 20	57		
Union of South Africa				March, 1927: Cases, 54; deaths, 8. In native population. European population—5 cases Colored.
Cape Province	Mar. 1-31	24	2	
Natal	do	1		
Orange Free State	do	26	6	
Transvaal	do	3		

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

Reports Received from January 1 to June 10, 1927[1]

CHOLERA

Place	Date	Cases	Deaths	Remarks
China:				
Canton	Nov. 1-30	10	3	
Chungking	Nov. 14-20			Present.
Do	Jan. 2-Mar. 19			Do.
Tsingtao	Nov. 14-Dec. 11			Do.
Chosen	Sept. 1-Oct. 31	252	159	
French Settlements in India	Aug. 29-Dec. 18	131	97	
Do	Jan. 2-Mar. 5	20	15	
India	Oct. 10-Jan. 1			Cases, 20,298; deaths, 13,507.
Do	Jan. 2-Mar. 26			Cases, 35,697; deaths, 19,189.
Bombay	Jan. 9-Apr. 23	8	3	
Calcutta	Oct. 31-Jan. 1	385	313	
Do	Jan. 2-Apr. 23	1,158	865	
Madras	Dec. 26-Jan. 1	2	2	
Do	Jan. 2-Apr. 16	13	10	
Rangoon	Nov. 21-Jan. 1	11	7	
Do	Jan. 2-Apr. 16	68	56	
Indo-China	July 1-Dec. 31			Cases, 8,508.
Do	Jan. 1-Mar. 20	772		
Saigon	Oct. 31-Nov. 13	22	2	
Do	Mar. 27-Apr. 9	14	12	Including area of 100 surrounding kilometers.
Japan:				
Hiogo	Nov. 14-20	3		
Philippine Islands:				
Manila	Oct. 31-Nov. 6	1		
Russia	Aug. 1-Sept. 30	8		
Siam	Apr. 1-Jan. 1			Cases, 7,847; deaths, 5,164.
Do	Jan. 2-Apr. 16			Cases, 839; deaths, 594.
Bangkok	Oct. 31-Jan. 1	16	5	
Do	Jan. 9-Apr. 16	165	109	
Straits Settlements	July 25-Oct. 16		60	
Singapore	Nov. 21-Jan. 1	14	8	
Do	Feb. 6-12	1		

PLAGUE

Place	Date	Cases	Deaths	Remarks
Algeria:				
Algiers	Reported Nov. 16	1		
Bona	Jan. 11-19	3	2	
Oran	Nov. 21-Dec. 10	32	22	
Tarafaraoui	Nov. 1-Dec. 9	10	9	Near Oran.
Angola:				
Benguela district	Oct. 1-Dec. 31	17	10	
Do	Jan. 19-Mar. 15	6		At Cavaco.
Cuanza Norte district	Dec. 1-31	18	10	
Mossamedes district	Dec. 16-31	10		
Do	Jan. 19-Feb. 28	8		
Port Alexander	Feb. 9-Mar. 15	2	2	
Argentina	Jan. 9-15	5		
Azores:				
Ponta Delgada	Apr. 17-23	1		
St. Michaels Island—Furnas	Nov. 3-17	4	1	27 miles distant from port.
Brazil:				
Porto Alegre	Jan. 1-31	4	2	
Rio de Janeiro	Nov. 28-Dec. 4	2	2	
Do	Dec. 26-Jan. 1	1	1	On vessel in harbor.
Do	Jan. 2-8	1		
Sao Paulo	Nov. 1-14	1	1	
British East Africa:				
Kenya—				
Kisumu	Jan. 16-22	1	1	
Mombasa	Feb. 27-Mar. 19	7	7	
Tanganyika Territory	Nov. 21-Dec. 18		12	
Do	Mar. 27-Apr. 9		18	
Uganda	Sept. 1-Oct. 31	162	152	
Canary Islands:				
Atarfe	Dec. 20	1	1	Vicinity of Las Palmas.
Las Palmas	Jan. 8-Feb. 12	2		
San Miguel	do	1		Vicinity of Santa Cruz de Teneriffe.

[1] From medical officers of the Public Health Service, American consuls, and other sources.

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

Reports Received from January 1 to June 10, 1927—Continued

PLAGUE—Continued

Place	Date	Cases	Deaths	Remarks
Celebes:				
Makassar	Dec. 22			Outbreak.
Ceylon:				
Colombo	Nov. 14-Dec. 11	3	1	2 plague rodents.
Do	Jan. 2-Apr. 23	55	31	14 plague rodents.
China:				
Mongolia	Reported Dec. 21	500		
Nanking	Oct. 31-Dec. 18			Present.
Do	Feb. 6-Mar. 5			Do.
Ecuador:				
Guayaquil	Nov. 1-Dec. 31	26	8	Rats taken, 50,615; found infected, 184.
Do	Jan. 1-Apr. 30	87	24	Rats taken, 94,582; found infected, 311.
Egypt	Jan. 1-Dec. 9			Cases, 149.
Do	Jan. 1-Apr. 22			Cases, 30.
Alexandria	Nov. 19-Dec. 2	2		
Do	Apr. 2-15	3	1	
Beni Souef Province	Apr. 30-May 7	5	1	
Charkia Province	Jan. 5	1	1	At Zagazig (Tel el Kebir).
Gharbia Province	Jan. 4	1	1	
Do	Apr. 29	1		
Guerga district	Apr. 5-May 7	16	8	
Kafr el Sheikh	Dec. 3-9	2		
Marsa Matrah	Dec. 23-29	10		
Do	Jan. 27	1		
Port Said	Mar. 12-May 7	3	2	
Tanta district	Nov. 19-Dec. 20	3		
Greece:				
Athens and Piraeus	Nov. 1-Dec. 31	19	5	
Do	Jan. 1-Mar. 31	24	3	
Patras	Nov. 28-Dec. 4		1	
Pravi	Nov. 27	1	1	Province of Drama-Kavalla.
India	Oct. 10-Jan. 1			Cases, 16,162; deaths, 9,905.
Do	Jan. 2-Apr. 2			Cases, 26,380; deaths, 17,810.
Bombay	Nov. 21-27	1	1	
Do	Jan. 16-Apr. 23	60	55	
Calcutta	Apr. 17-23	1		
Madras	Jan. 31-Jan. 1	581	324	
Do	Jan. 2-Apr. 9	1,036	603	
Rangoon	Nov. 14-Dec. 25	11	9	
Do	Jan. 2-Apr. 16	60	56	Rats found plague infected, 12.
Indo-China	July 1-Dec. 31			Cases, 52; deaths, 34.
Do	Jan. 1-Feb. 28	15		
Province—				
Cambodia	do	10	10	
Cochin-China	do	14	9	
Kwang-Chow-Wan	do	10		
Iraq:				
Baghdad	Jan. 23-Mar. 12	4	1	
Java:				
Batavia	Nov. 7-Jan. 1	91	90	Province.
Do	Jan. 2-Apr. 23	273	266	Do.
East Java and Madura	Oct. 24-Jan. 1	17	17	
Do	Jan. 2-Apr. 2	31	32	
Probolingo District	Jan. 7			Outbreak at Ngadas.
Samarang	do			Seaport. Present.
Madagascar:				
Province—				
Ambositra	Dec. 16-31	10	10	
Do	Jan. 1-Mar. 15	65	63	
Analalava	Oct. 16-31	1	1	
Antisirabe	Dec. 16-21	2	2	
Do	Jan. 1-Mar. 15	82	82	
Diego-Suarez	Jan. 1-31	7	7	
Itasy	Oct. 16-Dec. 31	39	39	
Do	Jan. 1-Mar. 15	170	156	
Maevatanana	Oct. 16-31	10	10	
Majunga	do	3	1	
Moramanga	Oct. 16-Dec. 31	92	67	
Do	Jan. 1-Mar. 15	69	61	
Tamatave	Oct. 16-Dec 31	107	69	
Tananarive	do			Cases, 533; deaths, 497.
Do	Jan. 1-Mar. 15	500	479	
Town—				
Tamatave	Nov. 16-30	2		
Tananarive	Oct. 16-Dec. 31	48	47	
Do	Jan. 1-Feb. 15	19	18	

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

Reports Received from January 1 to June 10, 1927—Continued

PLAGUE—Continued

Place	Date	Cases	Deaths	Remarks
Mauritius:				
Plaines Wilhems	Oct. 1-Nov. 30	3	3	
Pamplemousses	Dec. 1-31	3	3	
Port Louis	Oct. 1-Dec. 31	30	35	
Do	Jan. 1-Feb. 28	6	4	
Nigeria	Aug. 1-Dec. 21	1,066	967	
Do	Jan. 1-31	42	42	
Peru	Nov. 1-Dec. 31			Cases, 90; deaths, 26.
Do	Jan. 1-Mar. 31	92	23	
Department—				
Ancash	Dec. 1-31	6	6	
Do	Jan. 1-Mar. 31	3		
Cajamarca	do	36	6	
Callao	Mar. 1-31	1	1	
Ica—				
Chincha	Nov. 1-30	1		
Lambayeque	Feb. 1-28	6	2	
Chiclayo	Nov. 1-30	3		
Do	Jan. 1-31	2		
Libertad	Dec. 1-31	2		
Do	Jan. 1-Feb. 28	6		
Lima	Nov. 1-Dec. 31	42	14	
Do	Jan. 1-Mar. 31	75	20	
Piura	Feb. 1-28	1		
Portugal:				
Lisbon	Nov. 22-26	3	2	
Russia	May 1-June 30	44		
Do	July 1-Dec. 31	98		
Senegal	July 1-31	175	162	
Dakar	Apr. 1-10	10	7	
Diourbel	Nov. 20-30	12	1	
Thies	Mar. 28-May 11	19	16	
Tivaouane	Dec. 19-25	6	2	In interior.
Do	Mar. 21-May 11	49	23	Do.
Siam	Apr. 1-Jan. 1			Cases, 30; deaths, 22.
Do	Jan. 16-Apr. 9			Cases, 13; deaths, 11.
Bangkok	Feb. 27-Apr. 9	3	3	
Syria:				
Beirut	Nov. 11-Dec. 20	4		
Do	Feb. 1-10	1		
Tunisia	Dec. 1-31			Cases, 43.
Do	Jan. 12-26			Cases, 34.
Acheche district	Feb. 11-14	14	14	Pneumonia.
Bousse	Jan. 12-26	8		
Djeneniana	Feb. 11-14	8		
Kairouan	do	3		
Mahares	do	15		
Sfax	Oct. 1-Dec. 31	304	128	
Turkey:				
Constantinople	Dec. 15-25	1		
Union of South Africa:				
Cape Province—				
Cradock district	Jan. 2-Mar. 26	4	2	
De Aar district	Nov. 21-27	1		Native.
Glen Gray district	Jan. 31-Feb. 12	8	8	
Hanover district	Nov. 14-Jan. 1	3	2	
Do	Jan. 2-Apr. 2	3	2	
Middleburg district	Dec. 5-11	1	1	Do.
Richmond district	Mar. 6-12	3	2	
Tarkastad district	Mar. 27-Apr. 2	3	1	
Orange Free State	Dec. 5-11			Cases, 12; deaths, 2.
Bloomfontein district	Feb. 27-Mar. 19	3	3	
Bothaville district	Dec. 5-18	2	1	
Hoopstad district	Nov. 7-13	1	1	Native.
Do	Dec. 5-25	2	1	Do.
Do	Jan. 2-Feb. 12	4		
Rouville district	Apr. 3-16	2	2	
Vredefort district	Dec. 19-25	10	5	
Do	Feb. 6-12	2	1	
On vessel:				
S. S. Armadale Castle	Apr. 4	1	1	At Cape Town.
S. S. Leconte de Lisle	Feb. 21-23	2		At Tamatave, Madagascar.

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

Reports Received from January 1 to June 10, 1927—Continued

SMALLPOX

Place	Date	Cases	Deaths	Remarks
Algeria	Sept. 21-Dec. 31			Cases, 797.
Do	Jan. 1-Mar. 20			Cases, 518.
Algiers	Dec. 11-31	4		
Do	Jan. 1-Apr. 10	14		
Oran	Mar. 21-Apr. 30	51		
Angola	Oct. 1-15			Present in Congo district.
Congo	Feb. 2-15	1		
Cuanza Norte	Nov. 1-15			Present.
Do	Mar. 1-15	2		
Malange	Feb. 2-15	2		
Arabia:				
Aden	Dec. 12-18	1		Imported.
Do	Apr. 3-9	1		
Belgium	Oct. 1-10	1		
Brazil:				
Bahia	Oct. 30-Dec. 18	12	8	
Para	Oct. 31-Nov. 6		1	
Do	Feb. 5-12		1	
Pernambuco	Oct. 17-Dec. 25	58	4	
Rio de Janeiro	Year 1926			Cases, 4,033; deaths, 2,180.
Do	Jan. 2-Apr. 16	77	34	
Sao Paulo	Aug. 23-Dec. 5	34	18	
British East Africa:				
Kenya—				
Nairobi	Dec. 1-31	15	5	
Tanganyika Territory	Oct. 31-Nov. 20	2		
Do	Jan. 2-Apr. 9	34	35	
Zanzibar	Oct. 1-31	23	12	
Do	Jan. 1-Feb. 28	31	14	
British South Africa:				
Northern Rhodesia	Nov. 27-Dec. 3			Cases, 200. In natives.
Do	Feb. 26-Mar. 25	131	4	
Bulgaria	Nov. 1-30	1		
Canada	Dec. 5-Jan. 1			Cases, 155.
Do	Jan. 2-May 21			Cases, 678.
Alberta	Dec. 5-Jan. 1	132		
Do	Jan. 2-May 14	252		
Calgary	Nov. 28-Dec. 25	12		
Do	Jan. 2-May 7	38	1	
Edmonton	Dec. 1-31	4		
Do	Jan. 1-Mar. 31	18		
British Columbia—				
Vancouver	Jan. 31-May 2	11		
Manitoba	Dec. 5-Jan. 1	9		
Do	Jan. 2-May 21	29		
Winnipeg	Dec. 19-25	1		
Do	Jan. 2-May 21	14		
New Brunswick	Feb. 13-26	2		
Ontario	Dec. 5-Jan. 1	96		
Do	Jan. 2-May 21	330		
Kingston	Jan. 1-Feb. 19	3		
Ottawa	Dec. 12-31	5		
Do	Jan. 9-May 21	12		
Toronto	Dec. 14-25	14		
Do	Jan. 1-May 21	86	1	
Quebec	May 22-28	2		
Saskatchewan	Dec. 5-Jan. 1	18		
Do	Jan. 2-May 21	68		
Regina	Jan. 16-22	1		
Chile:				
Concepcion	Dec. 26-Jan. 1		5	
Iquique	Mar. 1-15	2		
China:				
Amoy	Jan. 1-Apr. 23	11		
Antung	Mar. 21-27	1		
Canton	Nov. 1-Dec. 31	6		
Chefoo	Jan. 23-Apr. 9			Present
Chungking	Nov. 7-Dec. 25			Do
Do	Jan. 2-Mar. 26			Do
Foochow	Nov. 7-Dec. 25			Do.
Do	Feb. 27-Apr. 2			Do.
Hankow	Nov. 6-30			Do.
Hong Kong	Jan. 23-Apr. 23	139	101	

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

Reports Received from January 1 to June 10, 1927—Continued

SMALLPOX—Continued

Place	Date	Cases	Deaths	Remarks
China—Continued				
Manchuria—				
An-shan	Mar. 21-Apr. 16	4		
Dairen	Feb. 20-Apr. 3	23	6	
Fushun	Apr. 11-24	3		
Harbin	Dec. 16-31	3		
Do	Feb. 7-13	1		
Kai-Yuan	Mar. 20-27	2		
Mukden	Dec. 5-11	1		
Do	Apr. 3-24	1		
Tiehling	Apr. 3-9	1		
Nanking	Dec. 12-25			Present.
Do	Jan. 2-Mar. 5			Do.
Shanghai	Dec. 12-18		1	
Do	Jan. 20-May 1	2	3	
Swatow	Nov. 21-27			Do.
Do	Mar. 27-Apr. 16			Do.
Tientsin	Jan. 16-Apr. 2	27		
Do	Apr. 3-23	8	1	
Chosen	Aug. 1-Nov. 30	53	19	
Do	Jan. 1-31	98	21	
Seoul	Nov. 1-30	2		
Egypt:				
Alexandria	Jan. 8-Apr. 15	3		
Cairo	June 11-Aug. 26	27	4	
Estonia	Oct. 1-30	2		
France	Sept. 1-Dec. 31	293		
Paris	Dec. 1-31	10	3	
Do	Jan. 1-Apr. 30	34	5	
French Guinea	Apr. 21-30	1		
Kissidougou	Feb. 19			Do.
French Settlements in India	Aug. 29-Jan. 1	127	127	
Do	Jan. 2-Feb. 20	58	58	
French Sudan:				
Kayes	Feb. 19			Do.
Kita	Mar. 28-Apr. 3			Do.
Germany:				
Stuttgart	Nov. 28-Dec. 4	7		
Gold Coast	Aug. 1-Nov. 30	59	14	
Do	Jan. 1-31	5	1	
Great Britain:				
England and Wales	Nov. 14-Jan. 1			Cases, 2,262.
Do	Jan. 2-Apr. 30			Cases, 7,540.
Birmingham	Mar. 13-19	5		
Bradford	Jan. 9-Apr. 30	7		
Cardiff	Feb. 13-19	1		
Hull	May 1-7	1		
Leeds	Mar. 27-Apr. 16	2		
London	Apr. 28-May 9	9	4	
Monmouthshire	Feb. 25	22		
Newcastle-on-Tyne	Dec. 5-13	2		
Do	Jan. 2-May 14	29		
Normanton	Dec. 30	1		9 miles from Leeds.
Sheffield	Nov. 28-Jan. 1	60		
Do	Jan. 2-May 23	568	1	
Stoke on Trent	May 1-7	1		
Wakefield	Jan. 30-Feb. 2	2		
Scotland—				
Dundee	Mar. 31-May 14	126		
Greece	Nov. 1-Dec. 31	25		
Athens	Dec. 1-31	14	2	
Do	Mar. 1-31	9	2	Including Piraeus.
Saloniki	Mar. 8-14		1	
Guatemala:				
Guatemala City	Nov. 1-Dec. 31		15	
Do	Jan. 1-Mar. 31		74	
India	Oct. 10-Jan. 1			Cases, 22,946; deaths, 6,006.
Do	Jan. 2-Apr. 2			Cases, 76,862; deaths, 19,816.
Bombay	Nov. 7-Jan. 1	37	20	
Do	Jan. 2-Apr. 23	800	439	
Calcutta	Oct. 31-Jan. 1	449	311	
Do	Jan. 2-Apr. 23	2,790	2,075	
Karachi	Dec. 19-25	1	1	
Do	Jan. 2-Apr. 16	43	26	
Madras	Nov. 21-Jan. 1	32	2	
Do	Jan. 2-Apr. 30	306	73	
Rangoon	Nov. 28-Jan. 1	2	2	
Do	Jan. 2-Apr. 16	401	100	

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

Reports Received from January 1 to June 10, 1927—Continued

SMALLPOX—Continued

Place	Date	Cases	Deaths	Remarks
Indo-China:				
Saigon	Dec. 26-Jan. 1	3		
Do	Feb. 6-Mar. 12	2		
Iraq:				
Baghdad	Oct. 31-Dec. 4	7	4	
Do	Jan. 23-Apr. 2	7	1	
Basra	Nov. 7-13	2	1	
Do	Mar. 20-26			
Italy	Aug. 29-Jan. 1	28		
Do	Jan. 2-Feb. 26	4		
Genoa	Dec. 30-31	1		
Do	Jan. 1-10	2		
Jamaica	Nov. 26-Jan. 1	37		Reported as alastrim.
Do	Jan. 2-Apr. 30	128		Do.
Japan	Oct. 24-Jan. 1	27		
Do	Jan. 2-Feb. 26	61		
Kobe	Nov. 14-20	1		
Do	Jan. 23-Apr. 2	3		
Sasebo	May 8-14	3		
Yokohama	Nov. 27-Dec. 3	2		
Do	Mar. 26-May 6	4	1	
Java:				
Batavia	Nov. 29-Dec. 3	2		Province.
Do	Mar. 13-19	1		
East Java and Madura	Oct. 24-Dec. 25	11	1	
Do	Jan. 2-27	4	3	
Lithuania	Nov. 1-30	2		
Luxemburg	Nov. 1-Dec. 31	2		
Mexico	July 1-Dec. 31		799	
Chihuahua	Dec. 31			Several cases; mild.
Do	Jan. 31-Feb. 6			Present.
Ciudad Camargo	May 21	4		
Ciudad Juarez	Dec. 14-27		2	
Manzanillo	Mar. 5-Apr. 25	7	5	
Mazatlan	Feb. 14-Apr. 17		3	
Mexico City	Nov. 23-Dec. 25	6		Including municipalities in Federal District.
Do	Dec. 23-Apr. 30	9		Do.
Nuevo Leon State—				
Cerralvo	Mar. 11			Epidemic.
Montemorelos	Feb. 24			Reported present.
Monterey	Feb. 24-Mar. 20	64	2	Other cases stated to exist.
Parral	Jan. 31-Feb. 6			Cases, 25. Unofficially reported.
Piedras Negras district	Feb. 25	68		At Nueva Rosita.
Saltillo	Feb. 6-Apr. 9		2	
San Luis Potosi	Nov. 12-Dec. 18		3	
Do	Jan. 9-May 7		28	
San Miguel	May 21	36		
Tampico	Jan. 21-31	1		
Do	May 11-20		2	
Torreon	Nov. 28-Jan. 1		12	
Do	Jan. 2-Mar. 19		13	
Victoria	Feb. 24			Present.
Netherlands East Indies	Dec. 14			Island of Borneo; epidemic in 2 villages.
Do	Feb. 7-28			Epidemic in 6 localities.
Nigeria	Aug.-Dec. 31	165	40	
Do	Jan. 1-31	96	12	
Persia:				
Teheran	Nov. 22-Dec. 23		5	
Do	Dec. 24-Feb. 23		5	
Peru:				
Arequipa	Dec. 1-31		1	
Do	Jan. 1-31		1	
Laredo	Dec. 1			Severe outbreak; vicinity of Trujillo.
Poland	Oct. 11-Dec. 31			Cases, 32; deaths, 3.
Do	Jan. 1-8			Death, 1.
Portugal:				
Lisbon	Nov. 22-Jan. 1	43	4	
Do	Jan. 2-May 14	44		
Rumania	Jan. 1-Sept. 30	7	1	
Russia	May 1-June 30	705		
Do	July 1-Sept. 30	884		
Do	Nov. 1-Dec. 31	1,815		

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

Reports Received from January 1 to June 10, 1927—Continued

SMALLPOX—Continued

Place	Date	Cases	Deaths	Remarks
Senegal:				
Dakar	Jan. 9-Apr. 3	4		
Gueudel	Apr. 11-17	1		
Kebener	do	1		
Niger Colony	Apr. 1-May 11		95	
Ouakam	Mar. 20-27	4		Vicinity of Dakar.
Tivaouane	Apr. 11-17	2		
Siam	Apr. 1-Jan. 1			Cases, 711; deaths, 265
Do	Jan. 2- Apr. 16			Cases, 115; deaths, 47.
Bangkok	Oct. 31-Jan. 1	28	10	
Do	Jan. 2-Apr. 16	52	32	
Sierra Leone:				
Makeni	Feb. 22-28	3		
Nanowa	Dec. 1-15	1		Pendembu district.
Spain	July 1-Oct. 31		15	
Valencia	Feb. 8-May 14	16		
Sumatra:				
Medan	Feb. 20-26	1		
Straits Settlements:				
Singapore	Oct. 31-Jan. 1	12	2	
Do	Jan. 2-Feb. 26	4	3	
Tunisia	Oct. 1-Dec. 31	9		
Do	Jan. 1-Mar. 20	23		
Tunis	Jan. 1-Mar. 10	3		
Turkey:				
Constantinople	Feb. 1-7		1	
Union of South Africa:				
Cape Province—				
Albany district	Jan. 23-29			Outbreaks.
Caledon district	Dec. 5-11			Do.
Steynsburg district	do			Do.
Stutterheim district	Nov. 21-27			Do.
Wodehouse district	Jan. 30-Feb. 12			Do.
Natal—				
Durban district	Nov. 7-27	9		Including Durban municipality. Total from date of outbreak: Cases, 62; deaths, 16.
Orange Free State	Nov. 14-27			Outbreaks.
Bothaville district	Nov. 21-27			Do.
Transvaal	Nov. 7-20	2		Europeans.
Bethel district	Jan. 23-29			Outbreaks.
Johannesburg	Nov. 14-20	1		
Yugoslavia	Nov. 1-Dec. 31	4	1	
Do	Jan. 1-31	3		

TYPHUS FEVER

Place	Date	Cases	Deaths	Remarks
Algeria	Sept. 21-Dec. 20	59	2	
Do	Jan. 1-Mar. 20			Cases, 210; deaths, 11.
Algiers	Feb. 1-Apr. 30	62	6	
Oran	Mar. 21-May 10	19		
Angola:				
Benguela district	Feb. 16-28	1		
Argentina:				
Rosario	Dec. 1-31		1	
Do	Jan. 25-31		3	
Bulgaria	July 1-Dec. 31	39	5	
Do	Jan. 1-Feb. 28	12	5	
Sofia	Apr. 16-29	2	1	
Chile	Sept. 15-Nov. 15	39	4	
Chillan	Jan. 1-31	4	3	
Concepcion	Sept. 15-Nov. 15	1		
Do	Jan. 23-29		1	
Iquique	Apr. 3-9		1	
Lebu	Sept. 15-Nov. 15	6	2	
Linares	do	2		
Los Andes	do	8		
Santiago	Sept. 15-Dec. 31	25	2	
Do	Feb. 1-28	3		
Valparaiso	Sept. 15-Dec. 25	10		
Do	Jan. 2-Apr. 16	6	2	

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

Reports Received from January 1 to June 10, 1927—Continued

TYPHUS FEVER—Continued

Place	Date	Cases	Deaths	Remarks
China:				
Antung	Nov. 22 Dec. 5	4		
Chefoo	Oct. 24-Nov. 6			Present.
Chungking	Dec. 25-31			Do.
Do	Feb. 27-Mar. 12			Do.
Manchuria—				
Harbin	Mar. 28-Apr. 17	2		
Chosen	Aug. 4-Dec. 31	54	5	
Do	Jan. 1-31	65	10	
Chemulpo	Mar. 1-31	5		
Seoul	Nov. 1-30	1		
Do	Jan. 1-Mar. 31	10	2	
Czechoslovakia	Oct. 1-Dec. 31	10		
Do	Jan. 1-Mar. 31	83	3	
Egypt	Apr. 2-8	45	7	
Alexandria	Dec. 3-9		1	
Do	Jan. 22-Apr. 29	9	4	
Cairo	Oct. 29-Nov. 4	1	1	
Estonia	Dec. 1-31	1		
Do	Jan. 1-Mar. 31	14		
France	Nov. 1-30	1		
Gold Coast	Sept. 1-30	1	1	
Greece	Nov. 1-30			Cases, 12.
Athens	Nov. 1-Dec. 31	19	2	
Do	Feb. 1-Mar. 31	17	3	
Drama	Dec. 1-31	2		
Kavalla	do	2		
Patras	Jan. 23-29		1	
Ravokan	Dec. 1-31	1		
Saloniki	Jan. 25-31	1		
Indo-China:				
Tonkin	Aug. 1-31	2		
Iraq:				
Baghdad	Mar. 6-19	2	2	
Ireland:				
Clare County—				
Tulla district	Jan. 9-15	1		Suspect.
Donegal County—				
Letterkenny	Mar. 27-May 1	7		Rural district.
Milford	Mar. 27-Apr. 3	3		
Dublin district	May 1-7	1		
Italy	Aug. 29-Sept. 23	3		
Do	Jan. 16-Feb. 26	15		
Japan	Jan. 2-29			Cases, 2.
Tokyo perfecture	Dec. 5-25	9		
Tokyo City	do	5	1	
Latvia	Jan. 1-31	2		
Lithuania	Sept. 1-Dec. 31	41	4	
Do	Jan. 1-31	24		
Mexico	July 1-Dec. 31			Deaths, 604.
Aguascalientes	Jan. 9-Feb 5	2		
Durango	Jan. 1-Apr. 30		2	
Guadalajara	Jan. 25-31		1	
Mexico City	Dec. 5-11	3		Including municipalities in Federal District.
Do	Jan. 2-May 14	103		Do.
Parral	Jan. 30-Feb. 5	1		
Morocco	Apr. 9			Present.
Marrakech	do			Do.
Mogador	do			Do.
Nigeria	Sept. 1-30	1		
Palestine	Apr. 12-May 2	6		
Acre	Dec. 29-Jan. 3	1		
Beisan	Dec. 21-27	1		
Haifa	Nov. 23-Dec. 13	5		
Do	Dec. 28-Feb. 7	7		
Jaffa	Nov. 23-Dec. 27	7		
Do	Jan. 11-Feb. 21	8		
Majdal	Dec. 28-Jan. 3	1		
Do	Apr. 5-11	1		
Nazareth	Nov. 16-Jan. 3	12		
Do	Mar. 1-7	1		
Ramleh	Jan. 31-Feb. 7	1		
Safad	Dec. 21-Jan. 3	2		

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

Reports Received from January 1 to June 10, 1927—Continued

TYPHUS FEVER—Continued

Place	Date	Cases	Deaths	Remarks
Peru:				
Arequipa	Year, 1926		9	District.
Lima	Jan. 1-31		1	
Poland	Oct. 11-Dec. 25			Cases, 341; deaths, 27.
Do	Jan. 1-Mar. 12			Cases, 825; deaths, 68.
Portugal:				
Lisbon	May 1-7	1		
Rumania	Aug. 1-Nov. 30	255	11	
Do	Jan. 1-31	391	31	
Russia	May 1-June 30	6,043		
Do	July 1-Aug. 31	3,060		
Do	Nov. 1-Dec. 31	4,609		
Spain	July 1-Sept. 30		4	
Seville	Mar. 16-22		1	
Syria:				
Aleppo	Mar. 13-19	1		
Tunisia	Oct. 1-Dec. 27	30		
Do	Jan. 1-Mar. 20	141		
Tunis	Jan. 21-Apr. 30	11		
Turkey:				
Constantinople	Dec. 12-25	3		
Do	Jan. 16-22			1 death reported by press.
Union of South Africa	Oct. 1-Dec. 31			Cases, 233; deaths, 30.
Cape Province	do	47	7	
Do	Jan. 1-Feb. 28	51	4	
Do	Mar. 13-19			Outbreaks.
Clydesdale	Mar. 6-12			Do.
East London	Nov. 21-27	1		Native. Imported.
Port St. Johns district	Dec. 5-11			Outbreaks. On farm.
Zumbu district	Apr. 10-16			Outbreaks.
Xalanga district	Mar. 20-Apr. 2			Do.
Natal	Oct. 1-31	1		
Do	Jan. 1-31	6		
Do	Mar. 27-Apr. 2			Do.
Orange Free State	Oct. 1-Dec. 31	31	2	
Do	Jan. 1-Feb. 28	17	3	
Do	Mar. 13-19			Do.
Transvaal	Oct. 1-31	1		
Do	Jan. 1-31	1		Native.
Yugoslavia	Nov. 1-Dec. 31	30	2	
Do	Jan. 1-Apr. 30	103	9	

YELLOW FEVER

Place	Date	Cases	Deaths	Remarks
French Sudan	Dec. 19-25	1	1	
Gold Coast	Aug. 1-Nov. 30	10	5	
Do	Jan. 1-31	17	7	
Nigeria	Sept. 1-Nov. 30	4	3	
Do	Jan. 1-31	1	1	
Senegal	Dec. 19-25	3	3	
Diourbel	Dec. 6	1	1	
Do	Jan. 1-20	1	1	At N'Bake.
Guinguineo	Dec. 7	1	1	
Rufisque	Nov. 27-Dec. 29	2	1	In European.
Do	Jan. 2-8	3	3	
Togoland:				
Lome	May 7-8	2	2	Europeans.
Upper Volta:				
Gaoua district	Oct. 25	2		

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