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## CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES[1]

**October 7—November 3, 1934**

The prevalence of certain important communicable diseases, as indicated by weekly telegraphic reports from State health departments to the United States Public Health Service, is summarized in this report. The underlying statistical data are published weekly in the Public Health Reports, under the section entitled "Prevalence of Disease."

*Poliomyelitis.*—The number of cases of poliomyelitis dropped from 1,072 during the 4 weeks ended October 6 to 705 during the 4 weeks ended November 3. The current incidence was about 20 percent in excess of that for the corresponding period last year and about 50 percent above the normal years of 1932 and 1929. It was, however, only about 40 percent of the incidence in the epidemic years of 1930 and 1931.

From a comparison of recent reports of poliomyelitis cases with the incidence in preceding years it is evident that the recent outbreak was largely confined to the Pacific, Mountain, and South Central sections; and while the incidence has been on the decline for several weeks, the disease is still quite prevalent in some of the States in those areas. In California, where the disease has been most prevalent, 122 cases were reported for the current period, as against 21 for the corresponding period last year; in the State of Washington, 103 as compared with 16 last year; in Montana 30 as compared with none; in Texas 39 and 2; and in Kentucky, 15 and 3, respectively.

The West North Central States appear to have been little affected by the epidemic and, while several of the East North Central States have reported more than the expectancy of cases, the total number for the entire area has been less than one-third of that reported in 1931, when the epidemic of that year started in New York (Middle Atlantic

[1] From the Office of Statistical Investigations, U S. Public Health Service. The numbers of States included for the various diseases are as follows: Typhoid fever, 48; poliomyelitis, 48; meningococcus meningitis, 48; smallpox, 48; measles, 47; diphtheria, 48; scarlet fever, 48; influenza, 43 States and New York City. The District of Columbia is counted as a State in these reports. These summaries include only the 8 important communicable diseases for which the Public Health Service receives regular weekly reports from the State health officers.

area), and spread into both the East and West North Central sections. These areas were both affected by the 1930 epidemic which, like the current one, started in the West and spread eastward.

Virginia and West Virginia, in the South Atlantic area, have continued to report a significant number of poliomyelitis cases, but the incidence in the other States in that region has been below that of recent years. The New England and Middle Atlantic States have shown no trace of the epidemic. Only 63 cases were reported from those areas for the current period as compared with 262, 230, 1,014, and 422 for this period in 1933, 1932, 1931, and 1930, respectively.

*Smallpox.*—The number of cases of smallpox reported for the current period was 350. Of the total, Minnesota reported 110, Washington 91, Wisconsin 60, and Indiana and Nebraska 10 each. Due to the high incidence in those States, the totals for the geographic areas in which they are located (East North Central, West North Central, and Pacific) were considerably in excess of those for the corresponding period in the 2 preceding years. Other States in those areas reported only a normal incidence. In other regions the situation was very favorable; in the New England and Middle Atlantic States no cases were reported for either year, and in all other regions fewer cases were reported for this period than occurred last year.

*Scarlet fever.*—The number of cases of scarlet fever rose from 8,355 for the preceding 4 weeks to 15,150 for the 4 weeks ended November 3. Each geographic area contributed to the increase. Compared with recent years the current incidence was slightly below that for the corresponding period last year but was considerably in excess of the incidence in the 4 preceding years. The East North Central States reported a 25-percent increase over last year's figure for this period, and the Mountain and Pacific regions a 30-percent increase. In each of those areas the current incidence was the highest in the 6 years for which data are available. In the regions along the Atlantic Coast the incidence compared very favorably with last year, and in the South Central areas the number of cases was only about one-half of last year's figure.

*Meningococcus meningitis.*—The reported incidence of meningococcus meningitis was the same as that for the preceding 4-week period. The number of cases (135) represented about a 10-percent increase over last year's figure for the same period and a 10-percent decrease from the figure for 1932. For this period in 1931 and 1930 the numbers of cases totaled 225 and 319, respectively. In the West North Central section the number of cases (15) was 2.5 times that for the corresponding period last year; the cases were not concentrated in any one State but were distributed over the entire area. In the South Atlantic States the number of cases (10) was the lowest

reported for this period in recent years. Other areas closely approximated last year's incidence.

*Diphtheria.*—The usual seasonal increase of diphtheria continued through the 4 weeks ended November 3. The number of reported cases (5,699) was, however, only about 70 percent of the number for the corresponding period in 1933 and 75 percent of that in 1932. For this period in 1931 there were 9,816 cases. While each geographic area reported an increase over the preceding 4-week period, only the East North Central reported an increase over the corresponding period of last year. In the South Central areas the incidence dropped about 50 percent from that of last year, while in each of the other areas a decrease of approximately 25 percent occurred.

*Measles.*—The incidence of measles reached its lowest level for the current year during the 4 weeks ended October 6, and the expected seasonal increase was reported from all sections of the country during the current 4-week period. Measles has maintained a very high level throughout the current year. At its lowest incidence during the period ended October 6, it was 1.5 times that for the corresponding period last year; the number of cases (7,192) for the current period was almost twice that of last year and was the highest reported for this period in the 6 years for which data are available. The disease was most prevalent in the East and West North Central regions, each area reporting almost five times the number reported for the same period last year. The South Atlantic and South Central areas reported fewer cases than last year.

*Influenza.*—During the current 4-week period the incidence of influenza increased about 35 percent, but the total number of cases was only about 75 percent of that for the corresponding period last year and 50 percent of the number in 1932. Only one area, the West North Central, reported an excess over last year. While the number of cases (164) in that region was not large, it was about five times the number reported for the corresponding period in each of the five preceding years. Decreases from last year's incidence in other sections varied from 15 percent in the New England and Middle Atlantic regions to 45 percent in the South Atlantic section.

*Typhoid fever.*—A gradual decline in the number of cases of typhoid fever continued. During the current 4-week period there were 1,959 cases reported—approximately 1,000 less than occurred during the preceding 4 weeks. The decline was very general. In relation to preceding years, for the country as a whole the current incidence was the lowest for this period in the 6 years for which data are available. A comparison of geographic sections shows that a similar situation existed in each geographic area except the West North Central, Mountain, and Pacific. In the West North Central region the number of cases (185) was almost twice that reported for the corresponding

period last year, and in the Mountain and Pacific areas the incidence was about the same as last year.

*Mortality, all causes.*—The average mortality rate from all causes in large cities for the 4 weeks ended November 3, as reported by the Bureau of the Census, was the same as for the corresponding period last year, viz, 10.6 per 1,000 inhabitants (annual basis). For this period in the three preceding years the rate was 10.3, 10.6, and 11.3, respectively.

## STREPTOCOCCUS BACTERIOPHAGE: A STUDY OF FOUR SEROLOGICAL TYPES

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### INTRODUCTION

In general treatises on bacteriophage scant attention is given to the races [2] which attack streptococci, because they have been little studied. They are believed to be difficult to isolate. Burnet states that it is extremely rare to obtain a phage active against hemolytic streptococci. He mentions the one which was isolated by Clark and Clark as the only indubitable streptococcus phage on record.

A number of laboratories in this country have on hand another race of streptococcus phage, however, which seems to have been mentioned in the literature only once. The writer recently isolated two races of phage active against hemolytic streptococci, both of which have been reported briefly with a description of the method of isolation. The readiness with which they were found in sewage led to the conclusion that streptococcus phage is not rare nor difficult to isolate.

In order to facilitate discussion it appears necessary to give a logical designation to the various types of streptococcus phage. Since roman numerals are commonly applied to the various serological groups of streptococci, the various serological types of streptococcus phage may be designated by letters. Two races of phage are regarded as belonging to the same type when the antiserum prepared by treating rabbits with either one of them neutralizes both.

The sequence of the letters given to the four races here described is in the order of their range of activity for the lysis of hemolytic streptococci, phage A having the broadest range of activity. The lytic filtrates are designated by a combination of the phage type and the number designating the streptococcus strain at the expense of which the lytic filtrate was produced as, for example, A/751.

[1] Through the courtesy of Sir Henry Dale and Capt. S. R. Douglas a part of this study was pursued for 6 weeks during the summer of 1932 at the National Institute for Medical Research, London.

[2] For the sake of clarity the term "race" is applied to bacteriophages, and the use of the term "strain" is limited to bacteria.

The culture used as a substratum in the preparation of a lytic filtrate is called the "homologous" culture.

The first race of streptococcus phage to be described was isolated from sludge by Clark and Clark. It was previously referred to by the writer as the "Wisconsin" phage. This race is well known to workers interested in phage, having been used in studies reported by Shwartzman, by the writer, and by others. The serological type of the Wisconsin phage now receives the designation B. The type B phage used in this study was always the Wisconsin race.

Colvin isolated a streptococcus bacteriophage from sewage and used it for studies reported in several papers. It has also been used by other workers. I am indebted to Dr. Colvin for a sample of his phage, which proved to be identical with the Wisconsin race in respect to the strains of streptococci which it could attack, and it agreed serologically with the Wisconsin race. Hence it is regarded as a type B phage.

The second serologically distinct race of streptococcus phage was received through the courtesy of Dr. Pearl Kendrick, of the Michigan Department of Health. She isolated it in May 1928 from the feces in a case showing intestinal hemorrhages. Brief mention of it was made in a paper by Kendrick and Hollon. It was previously referred to by the writer as the "Michigan" phage. The serological type to which it belongs now receives the designation D, because among the four types for which representative races are at hand, it is capable of attacking the fewest number of strains of hemolytic streptococci. The Michigan race is the only one of type D which was encountered in this study.

The third serologically distinct race of streptococcus phage to be described was isolated by the writer in April 1933 from a sample of sludge which had been taken the preceding month from the activated sludge plant maintained in connection with the United States Public Health Service Stream Pollution Investigations in Cincinnati, Ohio. The serological type to which the "Cincinnati" race of phage belongs now receives the designation C. Type C phage was subsequently isolated from samples of sewage from Boston, Mass., and from Hartford, Conn. These three were the only samples examined for phage C. Apparently, therefore, it is widely distributed. In this study the Cincinnati race was always used for type C.

The fourth serologically distinct race of streptococcus phage was isolated by the writer from the same sample of Boston sewage which yielded one of the races of type C. Despite the facts that it was the last one to be isolated, and that it was obtained with considerable difficulty, the Boston race was found to have the widest range of activity. Hence the type to which it belongs is designated A. The Boston race is the only one of type A which has been encountered,

but probably it would be found to be widespread if a special search were made for it.

### STRAINS OF STREPTOCOCCI USED AS SUBSTRATA

As the data to be presented will show, some of the characteristics of a lytic filtrate depend largely upon the strain of streptococcus at the expense of which it was produced. Hence the histories of the streptococcus strains used as substrata in this study are of interest. They are given below. These strains were selected from a large collection of the beta type of streptococci. Each strain was chosen on account of its high degree of sensitivity to one of the races of phage, or because it was found to serve some special purpose in the course of the study.

Streptococcus 563 is the strain known to many workers as "Birkhaug E–1." Although this strain is reputed to be from erysipelas, Birkhaug states that his E–1 was isolated from pus in a case of empyema.

Streptococcus 594 was received from Dr. Kraus, of the Franz-Josefspital, Vienna, Austria. It was isolated from a case of scarlet fever.

Streptococcus 639 was received from the late Dr. F. B. Jennings. It was one of his virulent cultures derived from a nonvirulent culture by selection of dissociating colonies.

Streptococcus 646 was received from the New York City Department of Health. It is the scarlet fever strain known as "Type III (57)."

Streptococcus 693 was isolated by Dr. Pearl Kendrick, of the Michigan State Department of Health, from feces in a case showing intestinal hemorrhages.

Streptococcus 751 was received from the Massachusetts State Department of Health, labeled "1–a." It was isolated from a case of sore throat during the Lee epidemic.

Streptococcus 756 was received from Dr. Mickle, of the Connecticut State Department of Health, labeled "2670 ep". It was isolated from the ear of a patient during the Thomaston epidemic, in which about half of the cases developed the usual scarlatinal rash, and the other half developed sore throat without the rash.

Streptococcus 775 was received from Dr. D. J. Davis, labeled "C." It was isolated from a case of septic sore throat during the epidemic at Baraboo, Wis.

Streptococcus 806 was received from the New York City Department of Health, labeled "$C_3$." It was isolated from a case of erysipelas by Birkhaug. It represents the erysipelas type I of Williams and her collaborators.

TECHNIQUE

The media used to test a fluid for the presence of lytic principle was meat infusion broth of pH about 7.2, sterilized in tubes with 9 cc of broth per tube. One cubic centimeter or less of filtered lysate undiluted, or suitably diluted, and a drop of sensitive culture were added to a tube of broth. A drop of the culture alone was added to another tube of broth to serve as a control, and a tube of broth containing the phage alone also served as a control The tubes were incubated overnight, and readings were made the following day after shaking to obtain an even suspension of bacteria. Complete lysis, or partial lysis with a turbidity definitely less than in the control tube of broth culture, was recorded as positive.

The homologous strain was always used as the sensitive strain to demonstrate active lytic principle, with an exception in the case of phage B/639. Zoning (to be discussed later) was found to be so persistent when phage B/639 was tested with its homologous culture that an equally sensitive strain, no. 563, was substituted for it when tests were made to demonstrate active B/639 phage.

The test tube method described above was found to be a more delicate test for the demonstration of streptococcus lytic principle than was the agar plate method, which is regarded by some investigators as the better method for the demonstration of phage active against intestinal bacteria.

It has already been mentioned that the strain of streptococcus used as the substratum for the production of a lytic filtrate influences its character. Hence it was necessary to find one strain of streptococcus which was sensitive to the lytic filtrates of those races which were to be compared. The selection of a suitable strain could not be made until the study of the sensitivity of many strains of streptococci to the four races of phage (reported further on under the heading "Range of Activity") was well advanced. Finally there was found a strain, no. 646, which was sensitive to the lytic filtrates of the A and C types of phage. No strain has yet been found to be sensitive to the lytic filtrate of phage B and another race, nor to phage D and another race.

The lytic filtrates were always purified before use in the comparative studies. A description of the purification of filtrate A/646 will serve to illustrate the method. Streptococcus 646 was lysed by filtrate A/775 in the 1 to 10 dilution. This lysate was filtered, and the filtrate was titrated with strain 646. Lysis occurred in dilutions as high as $10^{-4}$. The lysate in the last clarified tube of the series was filtered, and the process was repeated until the lysed products which were in the original A/775 lysate had been eliminated by dilution.

## ZONING

The zone phenomenon exhibited by the Wisconsin races of phage was discussed in an earlier paper (1933). Phages of types A, B, and C were all found to be sometimes subject to the zone phenomenon, with failure of lysis in low dilutions of the lysate when there was complete lysis in the higher dilutions. A given lot of filtered lysate might show zoning when serial dilutions were tested with one strain, and fail to show it when tested with another strain; further, a given strain sometimes would and sometimes would not exhibit zoning when used for testing for the presence of active principle in several lots of filtered lysate prepared in the same manner. On the other hand, when the zone phenomenon was once observed in the titration of any given lot of phage, it was found to occur regularly whenever that lot of phage was titrated under the same conditions with the same test strain. No explanation can be offered for the zoning. It was never observed in phage D, but there were so few streptococcus strains sensitive to this phage that experience with it is limited.

It was always necessary to consider the possibility of zoning when an unknown strain was tested for sensitivity to a lytic filtrate with negative results. When negative results were obtained in a $10^{-1}$ dilution, it happened occasionally that positive results were obtained when the test was repeated using a higher dilution of the lytic filtrate.

## VIRULENCE

In table 1 there is presented a summary of the tests for virulence of the four races of streptococcus phage. The results are recorded in terms of the highest dilution of filtrate which was found capable of lysing the homologous streptococcus. The virulences varied from a titer of $10^{-6}$ for phage A/751 to $10^{-11}$ for phage B/563.

The comparative titers of phages A and C for strain 646 are also given in table 1. When propagated on this strain the titers of phages A and C vary from $10^{-4}$ for phage A to $10^{-6}$ for phage C. These data indicate that the virulence of a phage depends upon the degree of sensitivity of the streptococcus for that race of phage, rather than upon any inherent property of the phage. Hence the fact that the highest recorded potent dilution of filtrate of phage A was only $10^{-6}$, whereas the highest potent dilution of filtrate of phage B was $10^{-11}$ is not to be interpreted as proof that phage B is of greater virulence than phage A. It merely signifies that a strain highly sensitive to phage B was found, whereas no strain of comparable sensitivity to phage A has yet been found.

TABLE 1.—*Summary of the tests for virulence of the 4 races of phage. The results are recorded in terms of the highest dilution of filtrate capable of lysing the streptococcus*

| Phage | Virulence for the most sensitive strain found | | Virulence for strain 646 |
|---|---|---|---|
| | Strain | Highest dilution found active | |
| A | 751 | $10^{-6}$ | $10^{-4}$ |
| B | 563 | $10^{-11}$ | |
| C | 594 | $10^{-9}$ | $10^{-6}$ |
| D | 693 | $10^{-10}$ | |

## VIABILITY

When protected from the air with a vaseline cap and kept in a refrigerator, streptococcus phage retains its virulence for years. Exposure to air or to higher temperatures hastens its deterioration. Data on the deterioration of the four types of phage, in rubber-stoppered vials, at refrigerator and room temperatures, are given in table 2, in the "control" columns.

When first isolated it was noted that phage C deteriorated with unusual rapidity. This observation agrees with that of Asheshov and his collaborators, who noted that freshly isolated cholera phage is extremely unstable. After phage C had been in the laboratory a few months it was as stable as the other types of streptococcus phage.

TABLE 2.—*Merthiolate and phenol hasten the deterioration of streptococcus phage*

| Lytic filtrate | Original titer | Period of standing | Titers after standing in— | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Refrigerator | | | Room | | |
| | | | Control | Merthiolate | Phenol | Control | Merthiolate | Phenol |
| | | *Days* | | | | | | |
| A/751 | $10^{-6}$ | 145 | $10^{-6}$ | $10^{-6}$ | $10^{-6}$ | $10^{-2}$ | [1] 0 | 0 |
| B/563 | $10^{-7}$ | 261 | $10^{-7}$ | $10^{-4}$ | $10^{-4}$ | $10^{-4}$ | 0 | 0 |
| C/594 | $10^{-6}$ | 261 | $10^{-5}$ | $10^{-5}$ | $10^{-4}$ | | | |
| D/693 | $10^{-6}$ | 261 | $10^{-6}$ | 0 | $10^{-3}$ | $10^{-7}$ | $10^{-3}$ | $10^{-3}$ |

[1] No lysis in the 1 to 1,000 dilution of the preserved samples is recorded as zero. The preservative inhibited growth in the 1 to 10 and 1 to 100 dilutions.

## THE DETRIMENTAL EFFECT OF PRESERVATIVES

To determine the effect of preservatives on streptococcus phage, merthiolate (sodium ethyl mercurithiosalicylate) was added in a dilution of 1 to 10,000, and phenol in a dilution of 1 to 200. Samples containing preservatives and control samples without preservative were placed in vials covered with rubber stoppers and kept at room

temperature and in the refrigerator at about 5° C. The samples were tested occasionally to follow the deterioration. The results are given in table 2. Both merthiolate and phenol hastened the deterioration of phages A, B, and D, but samples of phage C, stored in the refrigerator, were only slightly affected by the preservative. There was no notable difference in the effect of the two preservatives. The complete inactivation of the sample of phage D preserved with merthiolate and kept in the refrigerator, compared with the lesser deterioration of the corresponding sample kept at room temperature, is an unexplainable irregularity.

### THERMOLABILITY

According to Burnet the races of phage specific for the typhoid-colon group of bacteria weaken at 60° C., and are completely inactivated at 70° to 75° C., whereas staphylococcus phages are much more sensitive, being inactivated at 60° C. The following data show that the streptococcus phages are comparable with the staphylococcus phages in their sensitivity to heat.

Preliminary tests to demonstrate thermolability were made in cotton-plugged test tubes deeply immersed in a water bath of the given temperature. The results showed that there is a slight weakening of the streptococcus phages when heated for 1 hour at 50° C., and that complete inactivation occurs at about 60° C. The preliminary tests also showed that the various races differ slightly in their thermolability.

More careful triplicate tests were then made to determine the inactivation temperatures accurately. The samples of phage were sealed in 5-mm tubes and submerged for 1 hour in water of the given temperature. The heated phage from each tube was added to a test tube of broth, which was then planted with the homologous culture and incubated. If the culture developed a turbidity it was filtered, and dilutions of 1 to 5, 1 to 10, and 1 to 100 of the filtrate were inoculated to demonstrate an active phage. If the result was again negative, the 3 cultures were filtered together and the process was repeated until 4 passages had been made before a final conclusion was drawn that complete inactivation had occurred.

The tests revealed slight differences in the thermolability of the four races of phage. (See table 3.) Phages A and B were found to be the most sensitive to heat, being completely inactivated by a temperature of 60° C. for 1 hour. Phage C was definitely more resistant, with an inactivation temperature between 63° and 65° C. Phage D also survived 60° for an hour but was inactivated at 63°.

According to the data in table 3 the thermolability of a given race of phage is a property inherent in the lytic principle, for the inactivation temperature was always the same regardless of the strain of streptococcus which served as the substratum.

The results of exposure to preservatives and to injurious temperatures were consistent in showing that phage C is endowed with an unusual resistance to adverse conditions.

TABLE 3.—*Inactivation temperatures of the 4 races of phage. Time of heating, 1 hour*

| | 60° C. | | 63° C. | | 65° C. | |
|---|---|---|---|---|---|---|
| | Dates when the tests were made [1] | Results | Dates when the tests were made | Results | Dates when the tests were made | Results |
| A/646 | June 13, 1934 | Inactivated | | | | |
| | June 15, 1934 | do | | | | |
| A/751 | June 13, 1934 | do | | | | |
| | June 15, 1934 | do | | | | |
| B/563 | June 13, 1934 | do | | | | |
| | June 15, 1934 | do | | | | |
| B/639 | July 30, 1934 | do | | | | |
| C/594 | Oct. 17, 1933 | Not activated | Oct. 16, 1933 | Not inactivated | Oct. 19, 1933 | Inactivated. |
| | June 13, 1934 | do | June 19, 1934 | do | June 27, 1934 | Do. |
| C/646 | June 13, 1934 | do | do | do | do | Do. |
| C/756 | July 30, 1934 | do | Aug. 3, 1934 | do | | |
| C/806 | do | do | do | do | | |
| D/693 | Oct. 17, 1933 | do | Oct. 16, 1933 | Inactivated | | |

[1] All tests of a given date were made simultaneously in the same water bath.

## PLAQUE FORMATION

The best medium for the demonstration of plaques was found to be infusion broth to which 1.25 percent agar and 0.5 percent glucose were added. Without the glucose the growth of the streptococcus is so scant that it is difficult to see the plaques. The usual procedure was to prepare the agar plates a day or more before they were to be used. After cooling, they were stored in the refrigerator.

The plates were planted with two drops (from a pipette) of a mixture of equal parts of overnight homologous culture and phage diluted to contain about $10^3$ active corpuscles per cubic centimeter, as determined by a previous titration. The inoculum was spread over as much of the surface of the agar as possible by manipulating the plate. The cultures were incubated overnight.

Since there are two variables involved in the production of plaques—the phage and the streptococcus—a comparison of plaques could be made only of phages A and C.

Plaques produced by phage A on streptococcus 646 were scarcely visible to the naked eye. Under a hand lens plaques of varying sizes were seen, some exceedingly minute. Plaques produced by phage C on streptococcus 646 were larger, the largest being about 0.5 mm in diameter.

Plaques produced by phage C on the more sensitive streptococcus 594 were still larger, some attaining a diameter of 1.0 mm. From these observations it appears that the size of the plaques depends upon the strain of streptococcus which forms the substrate as well as upon the race of phage.

The largest plaques which were observed in this study were produced by phage B on the highly sensitive strain 563, on which the largest plaques were as much as 3 mm in diameter. The edges were ragged with partially lysed colonies, but the centers were clean.

The plaques of about 0.75 mm in diameter formed by phage D on streptococcus 693 gave an excellent demonstration of plaque formation. The edges were clear-cut, and the entire surface of the plaques was free from any remnants of colonies.

The plaques of phage A formed on streptococcus 751 were of another type. To the naked eye they appeared to be about 1.0 mm in diameter, but under a hand lens there was no definite edge. The entire surface was covered with incompletely lysed colonies, and there was a gradual transition from the plaque to the surrounding area.

## SECONDARY CULTURES

The subject of secondary streptococcus cultures which develop in the presence of virulent phage is treated only superficially here because it is a large subject, which belongs rather in a study of bacterial variability. A few observations, however, are recorded.

Agar plates for the observation of growth of secondary colonies were prepared as for the study of plaque formation. The plate was first planted with 2 drops of homologous culture, which was spread around as much as possible by manipulating the plate, then 1 drop of undiluted lytic filtrate was added and spread over most (but not all) of the same area.

Secondary growth was never observed on cleared areas of agar cultures of streptococcus 563 lysed by phage B, nor on cleared areas of streptococcus 693 lysed by phage D, although incubation was continued for 2 weeks and the agar remained moist during the entire period of incubation. On the other hand, colonies developed within a few days on the cleared areas of cultures 751 and 775 after lysis by phage A and on the cleared areas of cultures 594, 646, and 756 after lysis by phage C.

Broth cultures of streptococcus 563 lysed by phage B and of streptococcus 693 lysed by phage D sometimes remained clear indefinitely, but sometimes a secondary growth occurred after several days' incubation. Broth cultures of streptococcus 639 lysed by phage B were incubated for 7 weeks without the development of a secondary growth. On the other hand, as in the case of the agar cultures of the few strains examined, slight secondary growth occurred within a few days in broth cultures lysed by phages A and C.

Secondary cultures, whether derived from secondary colonies on lysed areas on agar plates, or from secondary growth in broth, were usually resistant to the action of the homologous nascent phage.

(Nascent phage is defined further on.) Other properties of the secondary cultures were not studied.

## SEROLOGICAL DIFFERENTIATION

The antigenic quality of the several races of streptococcus phage was the only character found by which they could be clearly differentiated.

Bordet and Ciuca were the first to show that the sera of rabbits which have been given a series of injections of active filtrates contain not only antibodies specific for the lysed bacteria, but also an antibody which neutralizes the lytic principle.

Antilysin specific for each of the phage types was prepared in rabbits by repeated intravenous injections with the phage for which the antilysin was desired. Beginning with 1 or 2 cc, the doses were gradually increased to 8 or 10 cc with 3- or 4-day intervals between the doses. The total quantity of antigen injected varied considerably, as indicated in table 4. About a week after the last dose, the rabbits were bled, and the serum was stored in the refrigerator with 0.25 percent tricresol as a preservative.

The titer of antilysin in the serums was determined as follows: Serial dilutions of the serum were made in broth, and 0.1 cc of lytic filtrate, diluted so as to contain about 100 particles of active principle, was added to the series of tubes containing the diluted serum and to a control tube containing broth. The tubes were shaken and incubated overnight at 37° C. The next day each tube was planted with a drop of broth culture of the homologous streptococcus. The cultures were incubated and readings were made the following day. A summarized statement of the antilytic titer of the serums used for differential tests is given in table 4.

TABLE 4.—*Titers of antilysin in serums used for cross reactions*

| Rabbit no. | Antigen | Total quantity injected | Antilytic titer of serum |
|---|---|---|---|
| | | cc | |
| 201 | A/751 | 55 | $10^{-4}$ |
| 51 | B/639 | 59 | $10^{-4}$ |
| 90 | C/594 | 60 | $10^{-3}$ |
| 125 | D/693 | 34 | $10^{-4}$ |

Each new race of phage was identified with one of the recognized types or differentiated to establish a new type by means of cross serological tests. These tests were done in duplicate in serum dilutions of 1 to 200 and 1 to 500. (The inhibitory action of normal serum described in a previous publication would interfere with the results in lower dilutions.) The technique was the same as described

above for the determination of the antilytic potency of the serum. A summary of the results obtained in the tests carried out with the 1 to 200 dilution of the serums is given in table 5. Similar results were obtained with the 1 to 500 dilution of all serums.

Table 5 shows that there is no serological relationship between phages A, B, C, and D when the tests were made with the use of the same lytic filtrates as were used for the production of the antilysins. It remained to be shown whether the specificity of the antilysin depends solely upon the race of phage, or whether it is influenced by the strain of streptococcus which serves as the substratum. The tests summarized in table 6 were planned to elucidate that question. The results show that the serum prepared by treatments with a given filtrate will neutralize any lytic filtrate of the same serological type, regardless of the streptococcus which served as the substratum.

TABLE 5.—*Summary of the tests showing serological dictinctions between the 4 types of streptococcus phage*

| Serum | Phage A/751 | Phage B/639 | Phage C/594 | Phage D/693 |
|---|---|---|---|---|
| Anti-A/751 | Heavy growth | Very slight growth [1] | Very slight growth [1] | Very slight growth.[1] |
| Anti-B/639 | Clear | Heavy growth | Clear | Clear. |
| Anti-C/594 | do | Clear | Heavy growth | Almost clear. |
| Anti-D/693 | Almost clear | do | Clear | Heavy growth. |

[1] The control tube containing normal serum in a dilution of 1:200 also showed very slight growth.

TABLE 6.—*Summary of tests showing that the sensitivity of a lytic filtrate to antiserum depends wholly on the type of phage, and is not influenced by the streptococcus which served as the substratum*

| Antiserum prepared by treatments with filtrate | Filtrate | Results |
|---|---|---|
| A/751 | A/646 | As turbid as the control. |
| | A/751 | Do. |
| | A/775 | Do. |
| | C/594 | Very slight turbidity. |
| B/639 | B/563 | As turbid as the control. |
| | B/639 | Do. |
| | C/646 | Almost clear. |
| C/594 | C/594 | As turbid as the control. |
| | C/646 | Do. |
| | C/756 | Do. |
| | C/806 | Do. |
| | B/563 | Clear. |

## RANGE OF ACTIVITY

The study of streptococcus bacteriophage was undertaken primarily as a new approach to a study now in progress of the relationships between hemolytic streptococci from various sources. Hence in the investigation of the range of activity of the races of phage, tests were made on a large number of strains of hemolytic streptococci, but on a limited number of strains of other species of cocci. The collection included 421 strains of the beta type of streptococci from wide

geographical sources and from a great variety of human and animal diseases.[3] The collection also included 5 strains of the alpha type of streptococcus, 8 strains of pneumococci (types I, II, and III and unclassified), 6 strains of *Streptococcus lacticus*, and 4 strains of staphylococci.

The range of activity of lytic filtrates has been used commonly in the description of races of phage active against various bacterial species. There is another range of lytic activity which has not been utilized heretofore in the description of races of phage, but which has been found to be an important distinguishing character of streptococcus phages, namely, the activity of the phage in the presence of a sensitive strain.

The increased potency of "lysin" in the presence of sensitive bacteria was noted by Twort. He observed that dead staphylococci were dissolved by lysin if living staphylococci were also present, although it was unable to attack the dead cells alone. He noted further that in the presence of living cocci the lysin is as specific in its action on dead bacteria as it is when they are living. Twort's observations were confirmed by Reynals, and more recently by Wolman and Wolman and also by Rakieten.

It was observed that in the presence of a sensitive strain each of the four races of streptococcus phage could attack many strains which were resistant to the filtered lysate. "Nascent" appears to be a proper term to describe the potent stage of phage in the presence of sensitive bacteria.

The range of activity of streptococcus phage, either in the nascent or filtered state, depends to a considerable extent on the strain of streptococcus used as the substratum. Phage C illustrates the difference in range of activity of the nascent phage when developed on two different strains of streptococci. Soon after phage C was isolated, a search was made for a highly sensitive strain, and no. 594 from scarlet fever met the requirement. It was therefore chosen as the propagating strain. On further study, however, streptococcus 594 proved to fall into the phagological group of *Streptococcus equi*, which included very few scarlet-fever strains. In the nascent state phage C/594 lysed less than half of the scarlet-fever strains. A better representative strain of scarlet-fever streptococcus, no. 646, was then chosen as a propagating strain. In the nascent state phage C/646 lysed about 95 percent of scarlet-fever strains.

In considering the range of activity of the several races of phage in the nascent state the tests were carried out so as to provide the

[3] It is a pleasure to acknowledge my indebtedness to the many investigators in this and other countries who have graciously responded to requests for cultures. Especial thanks are due to Dr. L. L. Colebrook, of Queen Charlotte's Maternity Hospital, London, who supplied most of the puerperal fever strains of the collection, and to Dr. C. H. Andrewes and to Mrs. Ethel M. Christie, through whom many strains which had been studied by the late Sir Frederick W. Andrewes were transferred to this collection.

best known opportunity for the demonstration of lysis. The technique was the same as that which has already been described for the testing for the presence of active principle, except that a drop of sensitive culture was added to the broth, together with the filtered lysate and the culture to be tested. The sensitive culture used for this purpose was always the one which had served as the substratum in the preparation of the lysate. Additional control tubes were set up, one with the sensitive culture alone, and one with sensitive culture and lysate. Negative reactions were never recorded unless the phage control tube planted with sensitive strain and lysate showed complete, or almost complete, lysis. With that provision, it was found that the dilution of the lysate could vary greatly without influencing the results.

Tests for sensitiveness to nascent phage A were made in A/751 and A/775; tests for sensitiveness to phage B were made in B/563; tests for sensitiveness to phage C were made in C/594 and C/646; and tests for sensitiveness to phage D were made in D/693. For some strains the duplicate tests were done simultaneously; for others the second test was made only in case of a negative reaction in the first test.

The range of activity of the four races of streptococcus phage in the nascent state is summarized in table 7. On the basis of their ability to attack hemolytic streptococci, phages A and B differ only slightly, both attacking the majority of strains; phage C has a somewhat more limited range of activity; phage D is capable of attacking only a few strains of hemolytic streptococci.

TABLE 7.—*Range of activity of the 4 races of streptococcus phage in the nascent state*

| | Percentage of strains sensitive to the nascent phage | | | | |
|---|---|---|---|---|---|
| | Beta type of streptococcus (421 strains) | Pneumococcus (8 strains) | Alpha type of streptococcus (5 strains) | Str. lacticus (6 strains) | Staphylococcus (4 strains) |
| Phage A | 89.3 | 100 | 0 | 0 | 25 |
| Phage B | 88.4 | 80 | 0 | 0 | 0 |
| Phage C | 79.3 | 50 | 0 | 0 | 0 |
| Phage D | 9.7 | 100 | 0 | 16.6 | 0 |

On the whole the pneumococci were found to be even more sensitive than the hemolytic streptococci. On the other hand, no evidence of sensitivity to any of the 4 races of phage was found in the 5 strains of the alpha type of streptococci. One of the 6 strains of *Str. lacticus* was found to be sensitive to phage D and 1 of 4 strains of staphylococci was found to be sensitive to phage A.

The high degree of sensitivity of pneumococci for nascent streptococcus phage suggests a relationship between these two species which will not be considered further at this time.

It was readily apparent that in their behavior toward the four races of phage the hemolytic streptococci were differentiated into groups which correspond approximately with groups that have been recognized on the basis of other characters. The majority of the 421 strains were classified by other investigators before they were added to our collection. The strains of the species *mastitidis*, *pyogenes*, *equi* and the so-called "enterococcus" as determined by the previous investigators fell into well defined phagological groups. Another phagological group (IV) includes strains from septic sore throat, and also certain animal strains. Three small phagological groups were found which have not yet been identified with any previous classification.

The grouping of the hemolytic streptococci according to their sensitivity to the four races of phage is given in table 8, together with the species names which appear to belong to the various groups. The numbers given to the groups in this table were merely to facilitate the present discussion.

The figures of the column "Percentage of total strains" are of little significance in estimating the distribution of the various groups in nature. They indicate rather the direction of the investigator's interests. As long as human pathogenic strains were of primary interest, most of the strains collected fell into the *pyogenes* group. When animal strains were added to the collection for comparative purposes, the groups *mastitidis* and *equi* were enlarged.

The distribution of the strains of the several groups will be considered in the studies now in progress. Also in these studies the phagological characteristics of the strains will be correlated with fermentation reactions and other characters which have been found useful for the differentiation of hemolytic streptococci.

It has already been stated that fewer strains are lysed by the lytic filtrates than by the nascent phage. If sensitivity to the lytic filtrates were also considered, the groups as given in table 8 would be further subdivided. It appears that a subdivision of the large group which is designated *pyogenes* might be useful. The possibility of a valid subgrouping according to sensitivity to lytic filtrates remains for a future investigation.

TABLE 8.—*The grouping of 421 strains of hemolytic streptococci from human and animal sources according to sensitivity to 4 races of phage in the nascent state*

| Group | Number of strains in the group | Percentage of total strains | Sensitivity to nascent phage | | | | Correlation of the groups with recognized species |
|---|---|---|---|---|---|---|---|
| | | | A | B | C | D | |
| I | 34 | 8.08 | − | − | − | − | *Str. mastitidis.* |
| II | 8 | 1.9 | + | − | − | − | |
| III | 4 | .95 | − | + | − | − | |
| IV | 34 | 8.08 | + | + | − | − | |
| V | 299 | 71.02 | + | + | + | − | *Str. pyogenes.* |
| VI | 33 | 7.82 | + | + | + | + | *Str. equi.* |
| VII | 1 | .24 | + | + | − | + | |
| VIII | 8 | 1.9 | − | − | − | + | "Enterococcus." |

SUMMARY

Four serological types of streptococcus bacteriophage, designated A, B, C, and D, are described. Their distinct behavior in cross serological reactions is the only character which clearly differentiates them.

The virulence of a lytic filtrate for a given strain of streptococcus depends upon the sensitivity of the strain and varies with different strains.

When kept in a refrigerator protected from the air, streptococcus bacteriophage retains its virulence for years. Exposure to air or to higher temperatures hastens its deterioration. The addition of phenol or merthiolate in quantities ordinarily used for preservation also hastens the deterioration of streptococcus phage. There was no notable difference in the deleterious effect of the two preservatives.

The inactivation temperature for streptococcus phage lies between 60° and 65° C. There is a slight but definite difference in the inactivation temperature of the several types of phage. Phages A and B were inactivated at 60°; phage D at 63°; and phage C at 65° C.

The size and the nature of the plaques formed on agar cultures depend upon the streptococcus which forms the substratum as well as upon the type of the phage.

Secondary cultures were generally resistant to lysis by filtrates homologous to that in which growth occurred.

In the nascent state (in the presence of a sensitive strain) streptococcus bacteriophage will attack strains which are resistant to the filtered lysate.

The 4 races of phage in the nascent state were examined for ability to attack 421 strains of hemolytic streptococci. Phage A lysed 89.3 percent of strains; phage B lysed 88.4 percent of strains; phage C lysed 79.3 percent of strains; and phage D lysed 9.7 percent of strains.

In general, pneumococci were more sensitive than hemolytic streptococci to the four types of phage in the nascent state. None of the few strains of the alpha type of streptococcus examined was sensitive to the phage. Among the few strains of *Streptococcus lacticus* examined, one was found sensitive to phage D, and one of a few strains of staphylococcus was found sensitive to phage A.

According to their sensitivity to the 4 races of phage, the strains of hemolytic streptococci fell into 8 groups, the largest of which agree in a general way with groups already recognized as species on the basis of other characteristics.

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## STUDIES IN ASPHYXIA

A report on experiments covering the reaction of dogs to asphyxia by carbon monoxide and by atmospheres deficient in oxygen has recently been published by the Public Health Service.[1] The report deals with both neuropathology and blood chemistry. The studies were conducted for the purpose of obtaining fundamental information on the response of the organism to asphyxial environment, with the particular viewpoint of devising a procedure for treating moribund cases of carbon monoxide poisoning in the human being. Comparatively rapid and comparatively slow asphyxia were both investigated.

[1] W. P. Yant, John Chornyak, H. H. Schrenk, F. A. Patty, and R. R. Sayers: Studies in Asphyxia. Public Health Bulletin 211. Government Printing Office, Washington: 1934.

The following is a summary of the general findings:

With comparatively rapid carbon monoxide asphyxia of dogs (20 to 30 minutes' exposure), circulatory changes (characterized by dilatation, stasis, perivascular hemorrhage, and edema) were noted. The edema was diffuse and severe, both perineuronal and perivascular. There was a marked difference in the susceptibility of the nerve cells, those of the cortex, corpus striatum, dorsal motor nucleus of the vagus, and the dorsal sensory areas of the medulla being the most susceptible.

In comparatively slow carbon monoxide asphyxia (8- and 15-hour exposures), the neuropathology of dogs differed from the preceding only in degree. In dogs killed from 16 to 165 days after comparatively slow carbon monoxide asphyxia, there was an extensive proliferation of both neuroglia and endothelium. In many of the hemorrhagic areas, as well as in some of the extremely dilated vessels, the red blood cells had undergone disintegration. Large cystic areas were found in the medullary substance of the brain.

The neuropathology of dogs after comparatively rapid asphyxia by atmospheres deficient in oxygen was quite similar to that observed in the case of dogs given equivalent exposures to carbon monoxide. (Certain experiments made on rats showed a marked difference in reaction, the changes in the latter case being limited mostly to the larger perforating cerebral vessels.)

None of the chemical changes found in the dogs was thought to be of a nature that would not readily be corrected when the anoxemia was relieved by treatment with oxygen or a mixture of 5 to 7 percent carbon dioxide in oxygen. It therefore seems that the changes found are not primarily responsible for the failure of moribund cases of carbon monoxide poisoning to respond to such treatment.

From the pathology noted in these experiments, treatment for edema of the brain is obviously indicated. Studies to determine the value of such treatment should be carried out.

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## COURT DECISION ON PUBLIC HEALTH

*Operation of rendering plant enjoined as nuisance.*—(Iowa Supreme Court; *State ex rel. Harris, Co. Atty.*, v. *Drayer*, 255 N. W. 532; decided June 23, 1934.) A suit was brought seeking an unqualified injunction against the operation of a rendering plant situated within the corporate limits of the town of Jefferson. The function of the plant was to process the carcasses of animals. The lower court issued an injunction decree and, on appeal to the supreme court by the defendant, it was principally contended that he should have the opportunity and privilege of experimenting with his plant with a view

to discovering some means whereby he could operate it without its being offensive to the neighborhood. The appellate court, however, affirmed the decree of the trial court, closing its opinion with the following language:

The foregoing is sufficiently illustrative of the offensive condition created by the operation of this plant. It is manifest from the defendant's own testimony that he has no course of conduct in contemplation that will make the conditions less offensive. As it is, they are literally intolerable. Take the one picture of a hundred carcasses a day of hogs, cholera diseased, and a substantial number of horses and cattle in addition. In the defendant's evidence, we find no sign of purpose or probability that a different method of operation is available to the defendant, which will eliminate from such operation the nuisance character otherwise attaching to it. The trial court has assumed a sympathetic attitude toward the enterprise, and has sincerely sought to avoid the necessity of absolute abatement.

We think it has done all that justice requires, or permits, and the decree is affirmed.

## DEATHS DURING WEEK ENDED NOV. 3, 1934

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

| | Week ended Nov. 3, 1934 | Corresponding week, 1933 |
|---|---|---|
| Data from 86 large cities of the United States: | | |
| Total deaths | 7,595 | 7,947 |
| Deaths per 1,000 population, annual basis | 10.6 | 11.1 |
| Deaths under 1 year of age | 599 | 579 |
| Deaths under 1 year of age per 1,000 estimated live births | 56 | [1] 50 |
| Deaths per 1,000 population, annual basis, first 44 weeks of year | 11.3 | 10.8 |
| Data from industrial insurance companies: | | |
| Policies in force | 67,051,927 | 67,497,374 |
| Number of death claims | 11,460 | 12,320 |
| Death claims per 1,000 policies in force, annual rate | 8.9 | 9.5 |
| Death claims per 1,000 policies, first 44 weeks of year, annual rate | 9.9 | 9.8 |

[1] Data for 81 cities.

# PREVALENCE OF DISEASE

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

## UNITED STATES

### CURRENT WEEKLY STATE REPORTS

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

### Reports for Weeks Ended Nov. 10, 1934, and Nov. 11, 1933

*Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 10, 1934, and Nov. 11, 1933*

| Division and State | Diphtheria | | Influenza | | Measles | | Meningococcus meningitis | |
|---|---|---|---|---|---|---|---|---|
| | Week ended Nov. 10, 1934 | Week ended Nov. 11, 1933 | Week ended Nov. 10, 1934 | Week ended Nov. 11, 1933 | Week ended Nov. 10, 1934 | Week ended Nov. 11, 1933 | Week ended Nov. 10, 1934 | Week ended Nov. 11, 1933 |
| New England States: | | | | | | | | |
| Maine | 2 | 3 | ---- | ---- | 20 | 1 | 0 | 0 |
| New Hampshire | ---- | 1 | ---- | ---- | ---- | 1 | 0 | 0 |
| Vermont | ---- | 3 | ---- | ---- | ---- | 28 | 0 | 0 |
| Massachusetts | 19 | 19 | ---- | ---- | 65 | 97 | 1 | 1 |
| Rhode Island | 1 | 5 | ---- | ---- | ---- | 3 | 0 | 0 |
| Connecticut | 8 | 5 | ---- | 2 | 145 | 3 | 0 | 2 |
| Middle Atlantic States: | | | | | | | | |
| New York | 41 | 43 | [1] 18 | [1] 27 | 544 | 251 | 2 | 3 |
| New Jersey | 17 | 36 | 5 | 11 | 26 | 18 | 1 | 0 |
| Pennsylvania | 69 | 61 | ---- | ---- | 347 | 128 | 3 | 2 |
| East North Central States: | | | | | | | | |
| Ohio | 54 | 120 | 5 | 93 | 130 | 50 | 1 | 1 |
| Indiana | 69 | 101 | 19 | 57 | 85 | 9 | 0 | 1 |
| Illinois | 98 | 49 | 8 | 20 | 180 | 18 | 2 | 5 |
| Michigan | 25 | 16 | 4 | 1 | 60 | 25 | 0 | 2 |
| Wisconsin | 6 | 13 | 4 | 18 | 144 | 38 | 0 | 0 |
| West North Central States: | | | | | | | | |
| Minnesota | 8 | 8 | 1 | 1 | 59 | 16 | 0 | 0 |
| Iowa [2] | 13 | 23 | 2 | ---- | 46 | 1 | 1 | 2 |
| Missouri | 57 | 85 | 30 | 8 | 74 | 23 | 0 | 2 |
| North Dakota | 8 | 10 | ---- | ---- | 68 | 31 | 0 | 0 |
| South Dakota | 1 | 8 | ---- | ---- | 10 | 64 | 0 | 0 |
| Nebraska | 1 | 7 | 4 | ---- | 2 | 2 | 1 | 0 |
| Kansas | 16 | 45 | 2 | ---- | 45 | 12 | 0 | 0 |
| South Atlantic States: | | | | | | | | |
| Delaware | 2 | 1 | ---- | ---- | ---- | 2 | 0 | 0 |
| Maryland [3] | 29 | 31 | 7 | 5 | 37 | 1 | 0 | 0 |
| District of Columbia | 11 | 14 | 1 | 1 | 1 | 7 | 1 | 0 |
| Virginia | 99 | 92 | ---- | ---- | 124 | 43 | 4 | 0 |
| West Virginia | 58 | 98 | 51 | 63 | 48 | 28 | 0 | 2 |
| North Carolina [3] | 96 | 114 | 4 | 12 | 38 | 38 | 1 | 0 |
| South Carolina [3] | 16 | 24 | 221 | 337 | 5 | 74 | 0 | 0 |
| Georgia [3] | 49 | 47 | ---- | ---- | ---- | 105 | 2 | 2 |
| Florida | 11 | 7 | ---- | ---- | 2 | ---- | 0 | 0 |

See footnotes at end of table.

*Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 10, 1934, and Nov. 11, 1933*—Continued

| Division and State | Diphtheria | | Influenza | | Measles | | Meningococcus meningitis | |
|---|---|---|---|---|---|---|---|---|
| | Week ended Nov. 10, 1934 | Week ended Nov. 11, 1933 | Week ended Nov. 10, 1934 | Week ended Nov. 11, 1933 | Week ended Nov. 10, 1934 | Week ended Nov. 11, 1933 | Week ended Nov. 10, 1934 | Week ended Nov. 11, 1933 |
| East South Central States: | | | | | | | | |
| Kentucky | 86 | 143 | 12 | 19 | 120 | 5 | 4 | 2 |
| Tennessee | 36 | 78 | 24 | 38 | 9 | 131 | 0 | 0 |
| Alabama [3] | 43 | 53 | 41 | 29 | 12 | 3 | 0 | 0 |
| Mississippi [3] | 27 | 36 | | | | | 0 | 0 |
| West South Central States: | | | | | | | | |
| Arkansas | 33 | 31 | 31 | 29 | 1 | 55 | 1 | 0 |
| Louisiana [3] | 31 | 27 | 7 | 11 | 2 | 2 | 1 | 0 |
| Oklahoma [4] | 14 | 56 | 37 | 15 | 2 | 103 | 0 | 0 |
| Texas [3] | 73 | 244 | 179 | 133 | 44 | 13 | 1 | 0 |
| Mountain States: | | | | | | | | |
| Montana | 9 | 3 | 8 | 3 | 72 | 1 | 0 | 0 |
| Idaho | | 1 | | | | 1 | 0 | 0 |
| Wyoming | 2 | | | | 2 | 2 | 0 | 0 |
| Colorado | 3 | 4 | 1 | | 134 | 6 | 0 | 0 |
| New Mexico | 9 | 3 | | 5 | 31 | 15 | 0 | 1 |
| Arizona | 3 | 12 | 4 | 15 | | 7 | 0 | 0 |
| Utah [3] | | | | | 14 | 94 | 0 | 0 |
| Pacific States: | | | | | | | | |
| Washington | 1 | 2 | 1 | 1 | 99 | 34 | 0 | 0 |
| Oregon | | 2 | 17 | 8 | 4 | 29 | 0 | 0 |
| California | 49 | 44 | 18 | 37 | 152 | 139 | 0 | 0 |
| Total | 1,303 | 1,828 | 766 | 999 | 3,003 | 1,757 | 27 | 28 |

| Division and State | Poliomyelitis | | Scarlet fever | | Smallpox | | Typhoid fever | |
|---|---|---|---|---|---|---|---|---|
| | Week ended Nov. 10, 1934 | Week ended Nov. 11, 1933 | Week ended Nov. 10, 1934 | Week ended Nov. 11, 1933 | Week ended Nov. 10, 1934 | Week ended Nov. 11, 1933 | Week ended Nov. 10, 1934 | Week ended Nov. 11, 1933 |
| New England States: | | | | | | | | |
| Maine | 0 | 1 | 30 | 7 | 0 | 0 | 4 | 0 |
| New Hampshire | 0 | 0 | 8 | 25 | 0 | 0 | 0 | 0 |
| Vermont | 0 | 0 | 14 | 11 | 0 | 0 | 2 | 0 |
| Massachusetts | 3 | 2 | 132 | 107 | 0 | 0 | 3 | 0 |
| Rhode Island | 0 | 0 | 7 | 12 | 0 | 0 | 0 | 0 |
| Connecticut | 0 | 1 | 37 | 55 | 0 | 0 | 0 | 3 |
| Middle Atlantic States: | | | | | | | | |
| New York | 2 | 13 | 294 | 323 | 0 | 0 | 9 | 19 |
| New Jersey | 0 | 3 | 74 | 86 | 0 | 0 | 2 | 5 |
| Pennsylvania | 6 | 7 | 408 | 377 | 0 | 0 | 26 | 33 |
| East North Central States: | | | | | | | | |
| Ohio | 3 | 9 | 373 | 528 | 0 | 0 | 16 | 17 |
| Indiana | 2 | 1 | 148 | 142 | 5 | 7 | 8 | 5 |
| Illinois | 4 | 1 | 516 | 69 | 0 | 0 | 29 | 16 |
| Michigan | 3 | 1 | 206 | 267 | 0 | 0 | 10 | 7 |
| Wisconsin | 1 | 4 | 382 | 83 | 20 | 27 | 2 | 9 |
| West North Central States: | | | | | | | | |
| Minnesota | 6 | 4 | 77 | 39 | 11 | 7 | 0 | 4 |
| Iowa [3] | 2 | 3 | 76 | 80 | 2 | 0 | 3 | 1 |
| Missouri | 2 | 1 | 77 | 121 | 2 | 4 | 12 | 3 |
| North Dakota | 0 | 1 | 18 | 26 | 0 | 0 | 1 | 1 |
| South Dakota | 0 | 3 | 11 | 9 | 0 | 1 | 0 | 9 |
| Nebraska | 1 | 0 | 23 | 35 | 9 | 0 | 2 | 0 |
| Kansas | 4 | 1 | 65 | 149 | 1 | 0 | 8 | 6 |
| South Atlantic States: | | | | | | | | |
| Delaware | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 3 |
| Maryland [2] | 1 | 3 | 86 | 107 | 0 | 0 | 7 | 12 |
| District of Columbia | 0 | 0 | 31 | 10 | 0 | 0 | 1 | 0 |
| Virginia | 1 | 1 | 144 | 130 | 0 | 1 | 9 | 17 |
| West Virginia | 0 | 1 | 149 | 188 | 0 | 3 | 14 | 36 |
| North Carolina [3] | 2 | 2 | 97 | 178 | 0 | 0 | 2 | 6 |
| South Carolina [3] | 2 | 2 | 10 | 16 | 0 | 0 | 8 | 6 |
| Georgia [3] | 0 | 0 | 20 | 15 | 0 | 0 | 7 | 21 |
| Florida | 1 | 0 | 9 | 3 | 0 | 0 | 1 | 0 |

See footnotes at end of table.

*Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 10, 1934, and Nov. 11, 1933*—Continued

| Division and State | Poliomyelitis | | Scarlet fever | | Smallpox | | Typhoid fever | |
|---|---|---|---|---|---|---|---|---|
| | Week ended Nov. 10, 1934 | Week ended Nov. 11, 1933 | Week ended Nov. 10, 1934 | Week ended Nov. 11, 1933 | Week ended Nov. 10, 1934 | Week ended Nov. 11, 1933 | Week ended Nov. 10, 1934 | Week ended Nov. 11, 1933 |
| East South Central States: | | | | | | | | |
| Kentucky | 7 | 1 | 121 | 134 | 1 | 0 | 52 | 23 |
| Tennessee | 1 | 1 | 85 | 157 | 0 | 2 | 9 | 22 |
| Alabama [3] | 1 | 0 | 18 | 50 | 0 | 1 | 3 | 8 |
| Mississippi [2] | 0 | 0 | 27 | 33 | 0 | 6 | 10 | 7 |
| West South Central States: | | | | | | | | |
| Arkansas | 0 | 0 | 23 | 49 | 1 | 2 | 13 | 2 |
| Louisiana [3] | 1 | 0 | 25 | 17 | 0 | 1 | 12 | 14 |
| Oklahoma [4] | 0 | 1 | 20 | 37 | 4 | 1 | 10 | 22 |
| Texas [3] | 4 | 1 | 44 | 56 | 0 | 12 | 47 | 41 |
| Mountain States: | | | | | | | | |
| Montana | 5 | 0 | 12 | 9 | 0 | 0 | 4 | 4 |
| Idaho | 1 | 1 | 9 | 7 | 1 | 7 | 2 | 0 |
| Wyoming | 0 | 0 | 25 | 5 | 1 | 0 | 0 | 0 |
| Colorado | 0 | 0 | 123 | 28 | 3 | 11 | 2 | 7 |
| New Mexico | 0 | 0 | 29 | 15 | 0 | 0 | 29 | 9 |
| Arizona | 0 | 0 | 21 | 17 | 0 | 0 | 12 | 0 |
| Utah [2] | 0 | 0 | 29 | 10 | 0 | 0 | 1 | 0 |
| Pacific States: | | | | | | | | |
| Washington | 16 | 4 | 43 | 25 | 22 | 5 | 3 | 3 |
| Oregon | 4 | 0 | 57 | 51 | 0 | 2 | 1 | 10 |
| California | 26 | 5 | 163 | 187 | 1 | 5 | 13 | 7 |
| Total | 112 | 79 | 4,401 | 4,087 | 84 | 105 | 409 | 418 |

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typus fever, week ended November 10, 1934, 16 cases, as follows: North Carolina, 1; South Carolina, 3; Georgia, 5; Alabama, 4; Louisiana, 1; Texas, 2.
[4] Exclusive of Oklahoma City and Tulsa.

## SUMMARY OF MONTHLY REPORTS FROM STATES

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

| State | Meningococcus meningitis | Diphtheria | Influenza | Malaria | Measles | Pellagra | Poliomyelitis | Scarlet fever | Smallpox | Typhoid fever |
|---|---|---|---|---|---|---|---|---|---|---|
| *October 1934* | | | | | | | | | | |
| Connecticut | 1 | 8 | 5 | | 155 | | 0 | 90 | 0 | 4 |
| Georgia | | 272 | 171 | 946 | 13 | 22 | 6 | 99 | 0 | 68 |
| Indiana | 3 | 258 | 78 | | 188 | | 7 | 431 | 4 | 43 |
| Massachusetts | 5 | 70 | | 2 | 91 | 2 | 10 | 479 | 0 | 15 |
| North Carolina | 2 | 566 | 18 | | 104 | 20 | 4 | 537 | 2 | 32 |
| Vermont | | 1 | | | 3 | | 0 | 41 | 0 | 4 |

*October 1934*

| | Cases |
|---|---|
| Anthrax: | |
| Massachusetts | 2 |
| Chicken pox: | |
| Connecticut | 199 |
| Georgia | 9 |
| Indiana | 134 |
| Massachusetts | 377 |
| North Carolina | 61 |
| Vermont | 103 |
| Dengue: | |
| Georgia | 838 |
| Dysentery: | |
| Connecticut (amoebic) | 1 |
| Connecticut (bacillary) | 71 |

*October 1934*—Continued

| | Cases |
|---|---|
| Dysentery—Continued. | |
| Georgia | 12 |
| Indiana (amoebic) | 9 |
| Massachusetts (amoebic) | 1 |
| Massachusetts (bacillary) | 11 |
| German measles: | |
| Connecticut | 8 |
| Massachusetts | 45 |
| North Carolina | 9 |
| Hookworm disease: | |
| Georgia | 198 |

*October 1934*—Continued

| | Cases |
|---|---|
| Lead poisoning: | |
| Connecticut | 1 |
| Massachusetts | 2 |
| Lethargic encephalitis: | |
| Connecticut | 1 |
| Indiana | 9 |
| Massachusetts | 1 |
| Mumps: | |
| Connecticut | 55 |
| Georgia | 22 |
| Indiana | 1 |
| Massachusetts | 98 |
| Vermont | 3 |

*October 1934*—Continued

| | Cases |
|---|---|
| Ophthalmia neonatorum: | |
| Connecticut | 1 |
| Massachusetts | 117 |
| North Carolina | 3 |
| Paratyphoid fever: | |
| Massachusetts | 2 |
| North Carolina | 1 |
| Rabies in animals: | |
| Indiana | 29 |
| Massachusetts | 25 |
| Septic sore throat: | |
| Connecticut | 2 |
| Georgia | 40 |
| Massachusetts | 17 |
| North Carolina | 18 |

*October 1934*—Continued

| | Cases |
|---|---|
| Tetanus: | |
| Connecticut | 2 |
| Georgia | 5 |
| Indiana | 2 |
| Trachoma: | |
| Georgia | 1 |
| Massachusetts | 2 |
| Trichinosis: | |
| Connecticut | 1 |
| Massachusetts | 1 |
| Tularaemia: | |
| Georgia | 2 |
| Typhus fever: | |
| Georgia | 45 |
| North Carolina | 4 |

*October 1934*—Continued

| | Cases |
|---|---|
| Undulant fever: | |
| Connecticut | 8 |
| Georgia | 5 |
| Massachusetts | 2 |
| North Carolina | 5 |
| Vincent's infection: | |
| Indiana | 1 |
| Whooping cough: | |
| Connecticut | 219 |
| Georgia | 63 |
| Indiana | 181 |
| Massachusetts | 411 |
| North Carolina | 660 |
| Vermont | 208 |

## DENGUE IN SOUTHEASTERN STATES

During the week ended November 10, 1934, 65 cases of dengue were reported in the State of Georgia.

The following table shows the number of cases of dengue reported in Florida for the weeks ended November 3 and November 10, 1934:

| Locality | County | Number of cases week ended— | |
|---|---|---|---|
| | | Nov. 3, 1934 | Nov. 10, 1934 |
| Orlando | Orange | 6 | 2 |
| Sulphur Springs | Hillsborough | ---------- | 1 |
| Tampa | do | 12 | 4 |
| Miami | Dade | 7 | 2 |
| Miami Beach | do | 2 | ---------- |
| Eastport | Duval | 1 | ---------- |
| Fort Lauderdale | Broward | 1 | ---------- |
| Fort Myers | Lee | ---------- | 1 |
| Winter Beach | Indian River | 1 | ---------- |
| Total | | 30 | 10 |

## WEEKLY REPORTS FROM CITIES

*City reports for week ended Nov. 3, 1934*

[This table summarizes the reports received regularly from a selected list of 121 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference]

| State and city | Diphtheria cases | Influenza | | Measles cases | Pneumonia deaths | Scarlet fever cases | Smallpox cases | Tuberculosis deaths | Typhoid fever cases | Whooping cough cases | Deaths, all causes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Cases | Deaths | | | | | | | | |
| Maine: | | | | | | | | | | | |
| Portland | 0 | ------ | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 6 | 20 |
| New Hampshire: | | | | | | | | | | | |
| Concord | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- |
| Manchester | 1 | ------ | ---------- | 0 | ------ | 0 | 0 | ------ | 0 | 0 | ---------- |
| Vermont: | | | | | | | | | | | |
| Barre | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- |
| Burlington | 0 | ------ | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 8 |
| Massachusetts: | | | | | | | | | | | |
| Boston | 3 | ------ | 2 | 1 | 17 | 20 | 0 | 12 | 0 | 24 | 222 |
| Fall River | 0 | ------ | 0 | 17 | 1 | 0 | 0 | 1 | 0 | 1 | 29 |
| Springfield | 0 | ------ | 0 | 5 | 0 | 2 | 0 | 1 | 0 | 0 | 29 |
| Worcester | 0 | ------ | 0 | 0 | 2 | 21 | 0 | 3 | 0 | 12 | 45 |
| Rhode Island: | | | | | | | | | | | |
| Pawtucket | 0 | ------ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 |
| Providence | 0 | ------ | 0 | 0 | 2 | 6 | 0 | 2 | 2 | 10 | 50 |
| Connecticut: | | | | | | | | | | | |
| Bridgeport | 0 | ------ | 0 | 0 | 4 | 3 | 0 | 0 | 0 | 2 | 27 |
| Hartford | 3 | ------ | 0 | 65 | 2 | 4 | 0 | 0 | 0 | 5 | 31 |
| New Haven | 0 | ------ | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 39 |

*City reports for week ended Nov. 3, 1934*—Continued

| State and city | Diphtheria cases | Influenza | | Measles cases | Pneumonia deaths | Scarlet fever cases | Smallpox cases | Tuberculosis deaths | Typhoid fever cases | Whooping cough cases | Deaths, all causes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Cases | Deaths | | | | | | | | |
| New York: | | | | | | | | | | | |
| Buffalo | 0 | | 1 | 22 | 19 | 28 | 0 | 13 | 0 | 11 | 149 |
| New York | 19 | 13 | 5 | 12 | 103 | 68 | 0 | 84 | 3 | 192 | 1,343 |
| Rochester | 1 | | 1 | 9 | 2 | 5 | 0 | 0 | 0 | 7 | 45 |
| Syracuse | 0 | | 1 | 1 | 2 | 8 | 0 | 0 | 0 | 17 | 50 |
| New Jersey: | | | | | | | | | | | |
| Camden | 0 | | 0 | 0 | 2 | 3 | 0 | 1 | 0 | 4 | 36 |
| Newark | 0 | 2 | 0 | 1 | 5 | 11 | 0 | 2 | 0 | 26 | 90 |
| Trenton | 0 | | 1 | 0 | 1 | 17 | 0 | 3 | 0 | 1 | 33 |
| Pennsylvania: | | | | | | | | | | | |
| Philadelphia | 8 | 1 | 1 | 3 | 26 | 54 | 0 | 27 | 4 | 157 | 462 |
| Pittsburgh | 4 | | 2 | 10 | 15 | 28 | 0 | 4 | 0 | 8 | 139 |
| Reading | 2 | | 0 | 0 | 1 | 4 | 0 | 0 | 0 | 15 | 26 |
| Scranton | 0 | | | 5 | | 2 | 0 | | 0 | 4 | |
| Ohio: | | | | | | | | | | | |
| Cincinnati | 7 | | 1 | 0 | 11 | 20 | 0 | 8 | 1 | 1 | 126 |
| Cleveland | 3 | 24 | 2 | 1 | 13 | 30 | 0 | 10 | 1 | 29 | 175 |
| Columbus | 5 | 2 | 2 | 1 | 1 | 34 | 0 | 1 | 1 | 1 | 78 |
| Toledo | 0 | 1 | 0 | 1 | 6 | 8 | 0 | 4 | 0 | 15 | 73 |
| Indiana: | | | | | | | | | | | |
| Fort Wayne | 4 | | 0 | 0 | 1 | 0 | 3 | 0 | 2 | 0 | 25 |
| Indianapolis | 21 | | 0 | 3 | 5 | 41 | 0 | 4 | 0 | 15 | |
| South Bend | 0 | | 1 | 21 | 2 | 1 | 0 | 0 | 0 | 0 | 16 |
| Terre Haute | 1 | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 12 |
| Illinois: | | | | | | | | | | | |
| Chicago | 15 | | 1 | 14 | 39 | 171 | 0 | 29 | 3 | 49 | 621 |
| Springfield | 1 | 2 | 0 | 0 | 3 | 5 | 0 | 1 | 1 | 0 | 21 |
| Michigan: | | | | | | | | | | | |
| Detroit | 7 | 4 | 0 | 11 | 15 | 48 | 0 | 17 | 0 | 35 | 232 |
| Flint | 6 | | 0 | 3 | 4 | 5 | 0 | 3 | 2 | 4 | 23 |
| Grand Rapids | 0 | | 0 | 0 | 2 | 9 | 0 | 0 | 0 | 1 | 30 |
| Wisconsin: | | | | | | | | | | | |
| Kenosha | 1 | | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 8 | 9 |
| Madison | 0 | | 0 | 1 | 0 | 6 | 0 | 0 | 0 | 1 | 8 |
| Milwaukee | 0 | | 0 | 13 | 5 | 251 | 0 | 1 | 0 | 37 | 88 |
| Racine | 0 | | 0 | 0 | 1 | 4 | 0 | 0 | 0 | 4 | 16 |
| Superior | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Minnesota: | | | | | | | | | | | |
| Duluth | 0 | | 1 | 19 | 1 | 1 | 0 | 2 | 0 | 0 | 23 |
| Minneapolis | 3 | | 0 | 17 | 2 | 14 | 1 | 1 | 0 | 15 | 65 |
| St. Paul | 0 | | 0 | 0 | 5 | 8 | 0 | 1 | 0 | 13 | 57 |
| Iowa: | | | | | | | | | | | |
| Davenport | 0 | | | 0 | | 3 | 0 | | 0 | 0 | |
| Des Moines | 3 | | | 0 | | 9 | 0 | | 0 | 0 | 32 |
| Sioux City | 0 | | | 0 | | 3 | 0 | | 0 | 3 | |
| Waterloo | 4 | | | 11 | | 1 | 0 | | 0 | 1 | |
| Missouri: | | | | | | | | | | | |
| Kansas City | 4 | | 0 | 0 | 8 | 9 | 0 | 2 | 1 | 0 | 94 |
| St. Joseph | 5 | | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 18 |
| St. Louis | 30 | | 0 | 0 | 6 | 10 | 0 | 7 | 4 | 5 | 183 |
| North Dakota: | | | | | | | | | | | |
| Fargo | 0 | | 0 | 0 | 6 | 1 | 0 | 0 | 0 | 11 | 9 |
| Grand Forks | 0 | | | 0 | | 10 | 0 | | 0 | 2 | |
| South Dakota: | | | | | | | | | | | |
| Aberdeen | 0 | | | 0 | | 0 | 0 | | 0 | 5 | |
| Nebraska: | | | | | | | | | | | |
| Omaha | 9 | | 0 | 1 | 2 | 6 | 0 | 1 | 0 | 0 | 43 |
| Kansas: | | | | | | | | | | | |
| Topeka | 0 | | 0 | 0 | 2 | 3 | 0 | 2 | 0 | 0 | 25 |
| Wichita | 1 | | 0 | 0 | 2 | 1 | 0 | 3 | 0 | 2 | 28 |
| Delaware: | | | | | | | | | | | |
| Wilmington | 1 | | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 1 | 44 |
| Maryland: | | | | | | | | | | | |
| Baltimore | 0 | | 0 | 2 | 17 | 23 | 0 | 10 | 0 | 17 | 173 |
| Cumberland | 1 | | 0 | 0 | 1 | 5 | 0 | 0 | 0 | 0 | 6 |
| Frederick | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| District of Columbia: | | | | | | | | | | | |
| Washington | 10 | | 0 | 3 | 16 | 24 | 0 | 10 | 0 | 7 | 175 |
| Virginia: | | | | | | | | | | | |
| Lynchburg | 4 | | 0 | 0 | 2 | 6 | 0 | 1 | 0 | 0 | 17 |
| Richmond | 2 | | 1 | 0 | 2 | 6 | 0 | 0 | 0 | 0 | 57 |
| Roanoke | 9 | | 0 | 0 | 0 | 10 | 0 | 1 | 0 | 2 | 17 |

*City reports for week ended Nov. 3, 1934*—Continued

| State and city | Diphtheria cases | Influenza | | Measles cases | Pneumonia deaths | Scarlet fever cases | Smallpox cases | Tuberculosis deaths | Typhoid fever cases | Whooping cough cases | Deaths all causes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Cases | Deaths | | | | | | | | |
| West Virginia: | | | | | | | | | | | |
| Charleston | 1 | | 0 | 4 | 1 | 4 | 0 | 0 | 1 | 1 | 16 |
| Huntington | 6 | | | 0 | | 2 | 0 | | 0 | 0 | |
| Wheeling | 2 | | 0 | 0 | 2 | 31 | 0 | 1 | 0 | 4 | 21 |
| North Carolina: | | | | | | | | | | | |
| Raleigh | | | | | | | | | | | |
| Wilmington | 1 | | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 14 |
| Winston-Salem | 8 | | 0 | 0 | 2 | 3 | 0 | 1 | 2 | 13 | 18 |
| South Carolina: | | | | | | | | | | | |
| Charleston | 0 | 25 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 21 |
| Columbia | 0 | | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 19 |
| Greenville | 0 | | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 13 |
| Georgia: | | | | | | | | | | | |
| Atlanta | 14 | 21 | 0 | 0 | 6 | 9 | 0 | 6 | 0 | 4 | 96 |
| Brunswick | 0 | | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Savannah | 1 | 19 | 0 | 0 | 6 | 1 | 0 | 2 | 1 | 3 | 36 |
| Florida: | | | | | | | | | | | |
| Miami | 1 | | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 41 |
| Tampa | 0 | | 0 | 0 | 1 | 3 | 0 | 1 | 0 | 0 | 21 |
| Kentucky: | | | | | | | | | | | |
| Ashland | 2 | | | 0 | | 0 | 0 | | 2 | 0 | |
| Lexington | 2 | | 0 | 0 | 1 | 2 | 0 | 1 | 2 | 2 | 21 |
| Louisville | 21 | | 0 | 1 | 5 | 12 | 0 | 8 | 0 | 3 | 86 |
| Tennessee: | | | | | | | | | | | |
| Memphis | 2 | | 0 | 0 | 5 | 5 | 0 | 8 | 0 | 5 | 89 |
| Nashville | 5 | | 1 | 0 | 0 | 8 | 0 | 2 | 1 | 5 | 48 |
| Alabama: | | | | | | | | | | | |
| Birmingham | 4 | 5 | 0 | 0 | 3 | 6 | 0 | 3 | 2 | 3 | 64 |
| Mobile | 6 | | 0 | 0 | 0 | 5 | 0 | 3 | 0 | 0 | 19 |
| Montgomery | 1 | | | 0 | | 2 | 2 | | 0 | 0 | |
| Arkansas: | | | | | | | | | | | |
| Fort Smith | | | | | | | | | | | |
| Little Rock | 0 | | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 2 |
| Louisiana: | | | | | | | | | | | |
| New Orleans | 11 | 1 | 1 | 0 | 5 | 6 | 0 | 10 | 8 | 0 | 133 |
| Shreveport | 1 | | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 41 |
| Oklahoma: | | | | | | | | | | | |
| Oklahoma City | 1 | | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 37 |
| Texas: | | | | | | | | | | | |
| Dallas | 5 | | 0 | 1 | 5 | 2 | 0 | 1 | 0 | 1 | 62 |
| Fort Worth | 1 | | 0 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 23 |
| Galveston | 0 | | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 20 |
| Houston | 9 | | 0 | 0 | 7 | 1 | 0 | 2 | 1 | 0 | 65 |
| San Antonio | 0 | | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 23 |
| Montana: | | | | | | | | | | | |
| Billings | 1 | | 0 | 12 | 0 | 1 | 0 | 0 | 0 | 1 | 6 |
| Great Falls | 0 | | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| Helena | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Missoula | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| Idaho: | | | | | | | | | | | |
| Boise | | | | | | | | | | | |
| Colorado: | | | | | | | | | | | |
| Denver | 4 | 37 | 1 | 49 | 7 | 101 | 0 | 7 | 0 | 1 | 73 |
| Pueblo | 2 | | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 5 |
| New Mexico: | | | | | | | | | | | |
| Albuquerque | 1 | | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 1 | 12 |
| Utah: | | | | | | | | | | | |
| Salt Lake City | 0 | | 0 | 4 | 2 | 20 | 0 | 3 | 0 | 21 | 30 |
| Nevada: | | | | | | | | | | | |
| Reno | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Washington: | | | | | | | | | | | |
| Seattle | 0 | | | 0 | | 3 | 4 | | 0 | 2 | |
| Spokane | 0 | | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 23 |
| Tacoma | 1 | | 0 | 0 | 2 | 2 | 12 | 0 | 0 | 0 | 26 |
| Oregon: | | | | | | | | | | | |
| Portland | 0 | | 0 | 5 | 3 | 16 | 0 | 2 | 0 | 0 | 73 |
| California: | | | | | | | | | | | |
| Los Angeles | 27 | 22 | 0 | 9 | 8 | 33 | 0 | 12 | 0 | 4 | 265 |
| Sacramento | 1 | | 0 | 0 | 5 | 5 | 0 | 2 | 0 | 6 | 19 |
| San Francisco | 2 | 2 | 0 | 3 | 8 | 12 | 0 | 8 | 0 | 21 | 153 |

*City reports for week ended Nov. 3, 1934*—Continued

| State and city | Meningococcus meningitis | | Poliomyelitis cases |
|---|---|---|---|
| | Cases | Deaths | |
| Massachusetts: | | | |
| Fall River | 1 | 0 | 0 |
| New York: | | | |
| New York | 1 | 1 | 0 |
| New Jersey: | | | |
| Trenton | 0 | 0 | 1 |
| Pennsylvania: | | | |
| Philadelphia | 1 | 1 | 0 |
| Pittsburgh | 0 | 0 | 1 |
| Scranton | 1 | 0 | 0 |
| Ohio: | | | |
| Cincinnati | 0 | 0 | 3 |
| Cleveland | 0 | 0 | 1 |
| Indiana: | | | |
| Indianapolis | 1 | 0 | 0 |
| Illinois: | | | |
| Chicago | 0 | 0 | 1 |
| Michigan: | | | |
| Detroit | 0 | 0 | 2 |
| Grand Rapids | 0 | 0 | 1 |
| Wisconsin: | | | |
| Milwaukee | 0 | 0 | 3 |
| Iowa: | | | |
| Des Moines | 0 | 0 | 1 |
| Sioux City | 1 | 0 | 0 |
| Kansas: | | | |
| Topeka | 0 | 0 | 2 |
| District of Columbia: | | | |
| Washington | 1 | 0 | 0 |
| Virginia: | | | |
| Lynchburg | 0 | 1 | 0 |
| Roanoke | 0 | 0 | 1 |
| Georgia: | | | |
| Atlanta | 2 | 1 | 0 |
| Arkansas: | | | |
| Little Rock | 0 | 0 | 1 |
| Louisiana: | | | |
| New Orleans | 0 | 0 | 1 |
| New Mexico: | | | |
| Albuquerque | 1 | 0 | 0 |
| Utah: | | | |
| Salt Lake City | 0 | 0 | 1 |
| Washington: | | | |
| Seattle | 0 | 0 | 4 |
| Spokane | 0 | 0 | 2 |
| Oregon: | | | |
| Portland | 0 | 0 | 1 |
| California: | | | |
| Los Angeles | 2 | 7 | 4 |

*Lethargic encephalitis*.—Cases: Philadelphia, 1; Kansas City, Mo., 1; St. Louis, 1; Memphis, 1.
*Pellagra*.—Cases: Washington, D. C., 1; Charleston, S. C., 1; Atlanta, 1; Savannah, 2; Louisville, 1; New Orleans, 1.
*Typhus fever*.—Cases: Mobile, 1; Montgomery, 3; New Orleans, 1; Dallas, 1; Galveston, 1.
*Dengue*.—Cases: Atlanta, 23; Savannah, 80; Miami, 7; Birmingham, 2.

## FOREIGN AND INSULAR

### CUBA

*Habana—Communicable diseases—4 weeks ended October 27, 1934.*—During the 4 weeks ended October 27, 1934, certain communicable diseases were reported in Habana, Cuba, as follows:

| Disease | Cases | Deaths | Disease | Cases | Deaths |
|---|---|---|---|---|---|
| Cerebrospinal meningitis | 1 | | Rabies | [1] 1 | 1 |
| Diphtheria | 2 | | Scarlet fever | 2 | |
| Leprosy | 1 | | Tuberculosis | 19 | 6 |
| Malaria | [1] 22 | 2 | Typhoid fever | [1] 7 | 1 |
| Poliomyelitis | [1] 11 | 2 | | | |

[1] Includes imported cases.

*Habana—Poliomyelitis.*—According to a recent report, 160 verified cases of poliomyelitis have occurred in Habana, Cuba, from July 1 to October 31, 1934. Forty-three cases occurred in July, 45 in August, 38 in September, and 34 in October. The age distribution of the cases was as follows:

| | Cases | | Cases |
|---|---|---|---|
| Under 2 years | 62 | 7-13 | 10 |
| 2-7 | 83 | 13-31 | 5 |

### FRANCE

*Vital statistics—First 6 months of 1934—Comparative.*—The Office of General Statistics of France has published the following vital statistics for the first half of 1934, as compared with the corresponding period of 1933:

| | First 6 months— | | | First 6 months— | |
|---|---|---|---|---|---|
| | 1934 | 1933 | | 1934 | 1933 |
| Births | 349,177 | 349,974 | Stillbirths | 13,242 | 13,377 |
| Deaths | 346,344 | 358,046 | Marriages | 145,071 | 152,862 |
| Deaths under 1 year of age | 26,416 | 27,782 | Divorces | 9,577 | 10,009 |

### IRISH FREE STATE

*Vital statistics—Second quarter 1934.*—The following statistics for the Irish Free State for the second quarter, ended June 30, 1934, are

taken from the Quarterly Return of Marriages, Births, and Deaths, issued by the Registrar General, and are provisional:

| | Number | Rates per 1,000 population | | Number | Rates per 1,000 population |
|---|---|---|---|---|---|
| Population | 3,013,000 | | Deaths from—Continued. | | |
| Marriages | 3,548 | 4.70 | Influenza | 214 | 0.28 |
| Births | 14,999 | 19.90 | Measles | 13 | |
| Total deaths | 10,029 | 13.30 | Puerperal sepsis | 34 | [2] 2.27 |
| Deaths under 1 year | 874 | [1] | Scarlet fever | 25 | |
| Deaths from: | | | Tuberculosis (all forms) | 1,018 | 1.35 |
| Cancer | 814 | 1.08 | Typhoid fever | 25 | |
| Diarrhea and enteritis (under 2 years) | 74 | | Typhus fever | 1 | |
| Diphtheria | 83 | | Whooping cough | 88 | |

[1] Deaths under 1 year per 1,000 births, 58.
[2] Per 1,000 births.

## JAMAICA

*Communicable diseases—4 weeks ended November 3, 1934.*—During the 4 weeks ended November 3, 1934, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

| Disease | Kingston | Other localities | Disease | Kingston | Other localities |
|---|---|---|---|---|---|
| Cerebrospinal meningitis | 1 | | Poliomyelitis | | 2 |
| Chicken pox | 46 | 76 | Puerperal fever | | 5 |
| Diphtheria | 1 | | Scarlet fever | | 1 |
| Dysentery | 50 | 15 | Tuberculosis | 36 | 89 |
| Leprosy | 1 | | Typhoid fever | 31 | 105 |

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

(NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for Oct. 26, 1934, pp. 1286-1299. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued Nov. 30, 1934, and thereafter, at least for the time being, in the issue published on the last Friday of each month.)

### Cholera

*India—Punjab Province.*—Cholera has been reported in Punjab Province, India, as follows: Week ended September 1, 1934, 28 cases, 20 deaths; week ended September 22, 1934, 6 cases, 4 deaths.

### Plague

*China—Manchuria.*—According to a report dated September 29, 1934, the following numbers of deaths from plague have been reported in certain districts of Manchuria, China: Changling, 5; Chengchiatun, 32; Chienan, 26; Fuyu, 4; Nungan, 132; Shuangshan, 11; Tungliao, 106.

*Dutch East Indies—Java—Batavia.*—Information received relative to pulmonary plague in Batavia, Java, states that a native and his

niece escaped from the isolation camp in Bandoeng on September 29, 1934. Search for them revealed both had died on October 2, 1934, in a native settlement in the city of Batavia. On October 7, 1934, another death from pneumonic plague occurred and on October 11, 1934, 2 more residents of Batavia died of the same disease making a total of 5 fatal cases, 2 of which were imported. The two fatal cases which occurred on October 11 were both directly traceable to the original cases.

*Hawaii Territory—Island of Hawaii—Hamakua District—Kalopa.*—On October 29, 1934, one plague-infected rat was reported in Kalopa, Hamakua District, Hawaii Territory.

*India—Punjab Province.*—During the week ended October 20, 1934, 18 cases of plague with 10 deaths were reported in Punjab Province, India.

**Smallpox**

*Belgian Congo—Lusambo Province.*—According to information dated October 23, 1934, smallpox has been reported in Lusambo Province, Belgian Congo, where 142 cases and 10 deaths have occurred.

**Yellow Fever**

*Ivory Coast—Bobo-Diolasso.*—During the period October 11 to 20, 1934, 1 suspected case of yellow fever with 1 death was reported in Bobo-Diolasso, Ivory Coast.