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TIME DISTRIBUTION OF COMMON COLDS AND ITS RELATION TO CORRESPONDING WEATHER CONDITIONS [1]

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Almost everything shows some variation with season of the year. Aycock (1) cites data indicating that the activity of several of the glands of the body varies with season, that the dose of diphtheria toxin and of other poisons which is fatal to guinea pigs and mice varies with season, that the chemical content of the blood of infants varies with season, and that other physiological functions of the body are different in summer and winter. Palmer (5) has shown a definite seasonal variation in the growth of school children. Death rates, even from such chronic ailments as heart and kidney diseases, vary considerably with season, and the incidence of many diseases is quite different in summer and winter.

Typhoid fever, diarrhea and enteritis, and poliomyelitis are examples of diseases that tend to occur more frequently in the summer than in the winter. The outstanding disorders which occur more frequently in winter than in summer and which vary markedly with season are the common respiratory affections. In the Southern Hemisphere the summer and winter months are reversed, but the relation of the variation to summer and winter remains the same.

If atmospheric conditions could be expressed by a single variable such as temperature, it might be a simple matter to relate the mortality or incidence of a disease to such conditions. The fact is, however, that along with temperature variation there are variations in humidity, hours of sunshine, and other conditions that might conceivably have something to do with the variation in physiological functions

[1] From the Office of Statistical Investigations, United States Public Health Service, in cooperation with the Department of Bio-statistics (Paper No. 196), of the School of Hygiene and Public Health, the Johns Hopkins University.

While this article was in preparation, Dr. J. J. Van Loghem, professor of hygiene, University of Amsterdam, submitted a note on the relation of the incidence of colds to temperature which it was originally intended to publish with this paper but which has since been printed elsewhere (8). In Dr. Van Loghem's paper the relationship was pictured graphically. While there was shown a striking similarity in the seasonal swing of the two variables, the correspondence in weekly peaks and depressions was not close enough to enable the reader to evaluate the correlation from the graphs. The method of the present paper is to eliminate seasonal swing and evaluate the short-time relationship by the correlation coefficient.

and the incidence of disease. Because summer and winter, in terms of meteorological conditions, are a composite expression of many varying factors, the problem of relating the incidence of disease to atmospheric conditions is a complicated one. It is obvious that the mere increase in mortality in the fall and winter when there is a decrease in the hours of sunshine cannot be assumed to express any causative relationship. The same is true of temperature and other weather conditions that may, upon closer examination, be found to be associated with the incidence of respiratory diseases. Aside from the fallacy of assuming causative relationship, it cannot be assumed that there is any very close association between such variables as respiratory disease incidence and temperature or hours of sunshine until the usual or normal seasonal variation has been eliminated from the picture. So many weather conditions show the same seasonal swing that any one or all might appear to be closely correlated with respiratory affections unless examined apart from seasonal variation.

In addition to these elementary difficulties in the problem of correlating disease incidence and atmospheric conditions, a distinction must be made between *weather* and *climate*. Briefly, climate may be said to represent average weather conditions, including such items as *average* temperature, *average* humidity, *average* hours of sunshine, *average* difference in summer and winter temperature or other weather conditions, and *average* daily change in temperature, humidity, etc. Weather, on the other hand, refers to atmospheric conditions (such as temperature, humidity, etc.) at a given time apart from average or normal conditions. These two concepts, themselves, suggest a method of study of the relation of atmospheric conditions to the incidence of common colds, namely, to correlate deviations from average or normal temperature, humidity or other weather condition with deviations in respiratory case incidence from some normal or average figure for the season of the year.

SOURCE AND CHARACTER OF THE DATA

Data are available on the weekly incidence of respiratory affections among students in various universities in the United States for a period of 18 months from November 1923 to April 1925, inclusive. The method of collecting the records has been described in previous papers (2, 3, 6, 7) but are briefly summarized as follows: Students who signified their willingness to report their respiratory attacks made out an enrollment record including such essential information as sex, date of birth, and status as to illness from any of a group of chronic respiratory diseases that were listed on the form. After enrollment, a schedule for reporting respiratory attacks was sent to the student at semimonthly intervals. Respiratory affections as used in this paper include coryza and colds, bronchitis, tonsillitis and sore throat, influenza, and pneumonia, or any combination of those diagnoses. Hay fever and asthma were reported but were excluded in making the tabulations.

The six student groups large enough for computing fairly reliable weekly rates and the *average* numbers under observation were as follows: Harvard, at Boston (668); Georgetown, at Washington, D.C. (485); Ohio State, at Columbus (1208); Chicago, at Chicago (575); Tulane, at New Orleans (393); and California, at Berkeley, near San Francisco (1746). The variation from week to week in the numbers of persons observed was not great except that fewer students reported during the summer vacation. Males predominated in all the groups except that at the University of California. Respiratory attack rates were about the same in female as in male students (2), so the two sexes are combined in this paper.

Detailed daily records of weather conditions for the whole period of the study are available for each locality where the universities are located. Weather conditions and respiratory attacks are considered in weekly time intervals, but a summary for a full 12-month period is presented to give a climatic background for each city. The weather conditions used and a definition of each follow:

Mean temperature is the weekly average of daily means of maximum and minimum temperatures.

Daily temperature range is the difference between weekly averages of daily maximum and of daily minimum temperatures.

Relative humidity (percent) is the weekly average of three daily humidity records.

Absolute humidity is expressed in grains of moisture per cubic foot and is obtained directly from relative humidity and temperature by the use of a table showing the weight of a cubic foot of aqueous vapor at different temperatures and percentages of saturation.

Hours of sunshine is the weekly mean of the number of hours of sunshine per day.

Wind velocity is the weekly average of hourly wind velocities in miles per hour.

Precipitation is the weekly average of the number of inches of rain or snow (converted to rain) per day.

Weekly data for these various meteorological measures are taken from Monthly Meteorological Summaries, issued by the United States Weather Bureau, for the different cities.

The weekly values for weather conditions as defined above and the weekly respiratory attack rates are plotted for each city for the 52 weeks ending May 2, 1925, in figures 1, 2, and 3 as continuous irregular lines. The broken smooth lines in the same charts represent norms or averages based on approximately 60 years of records for temperature, wind velocity, and precipitation, and 40 years for humidity and hours of sunshine. For mean temperature and temperature range, the norms are weekly averages of daily norms computed by the United States Weather Bureau; for the other measures they are weekly interpolations from monthly averages that are given in the Annual Meteorological Summaries of the United States Weather Bureau for the various cities. Because of long-time cycles in weather conditions, the levels of the norms were raised or lowered by an amount equal to the difference between the means of the weekly actual values for the various measures over the 18-month period of recorded respiratory case incidence and the means of the 40- to 60-year monthly averages for a like period of 18 months.

The seasonal norm for colds is a free-hand curve based on such data as the average curve for the students in all six universities, the curve of respiratory affections for a group of families who were reporting in the same way and at the same time as the students, a 9-week moving average of the rate in each university, and other items that influenced but did not determine the hand curve. The characteristics of the weekly incidence of respiratory diseases have already been described as showing a season of high and a season of low incidence, with a series of epidemic-like peaks occurring in the course of the high incidence winter period (3). The magnitude of the peaks is such that small variations in the smooth curves do not materially affect the results in correlating the deviations from these curves.

CLIMATIC DIFFERENCES AND RESPIRATORY ATTACK RATES IN THE VARIOUS CITIES

Table 1 gives a quantitative description of the climate of each of the six cities in terms of one average or normal for each weather condition for the whole year. In addition to annual means, averages are given for the maximum and the minimum month of the year. All the averages are based on 40 to 60 years of records. The difference between the maximum and minimum is included as a measure of the "seasonal swing." This seasonal change is also illustrated in the broken lines of figures 1, 2, and 3.

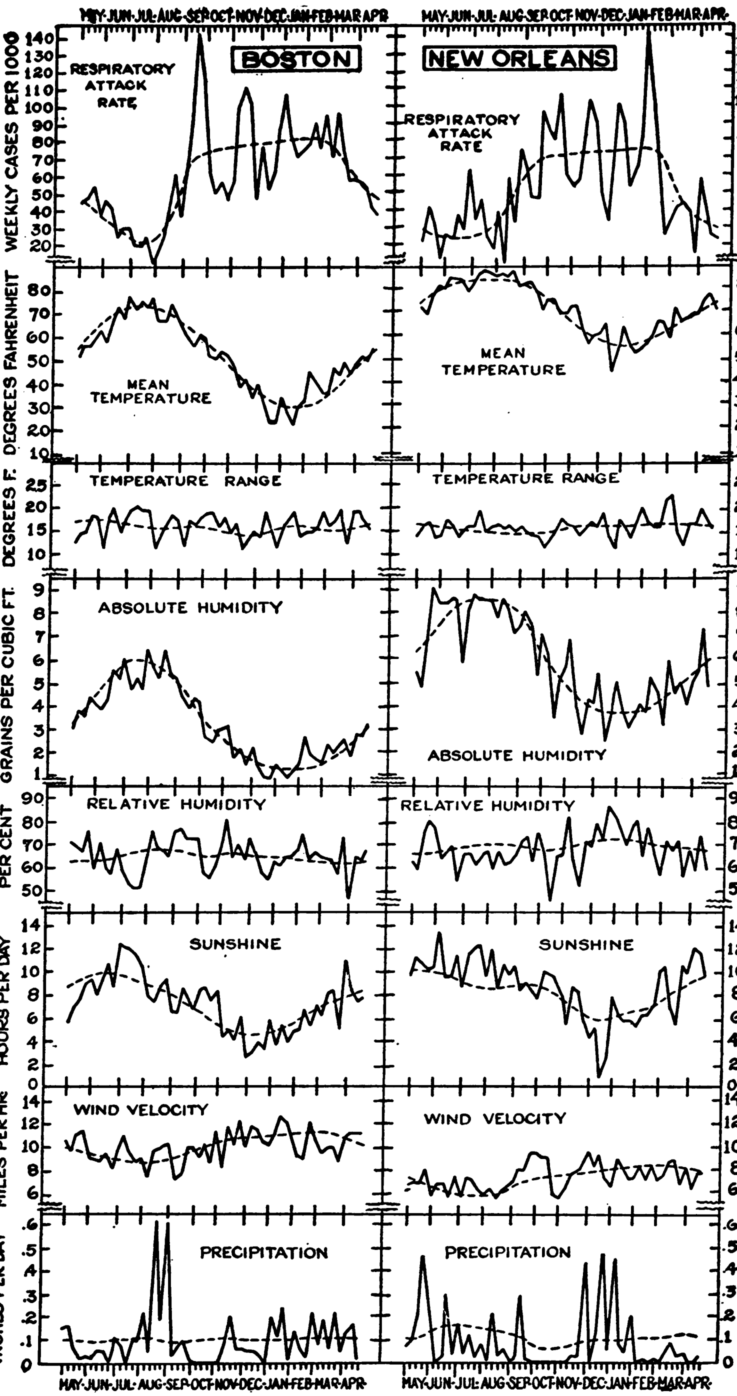

Figure 1.—Weekly respiratory attack rates among observed students, and weekly values for certain weather conditions. (Broken line=normal or average. See text and footnotes to table 1 for details.)

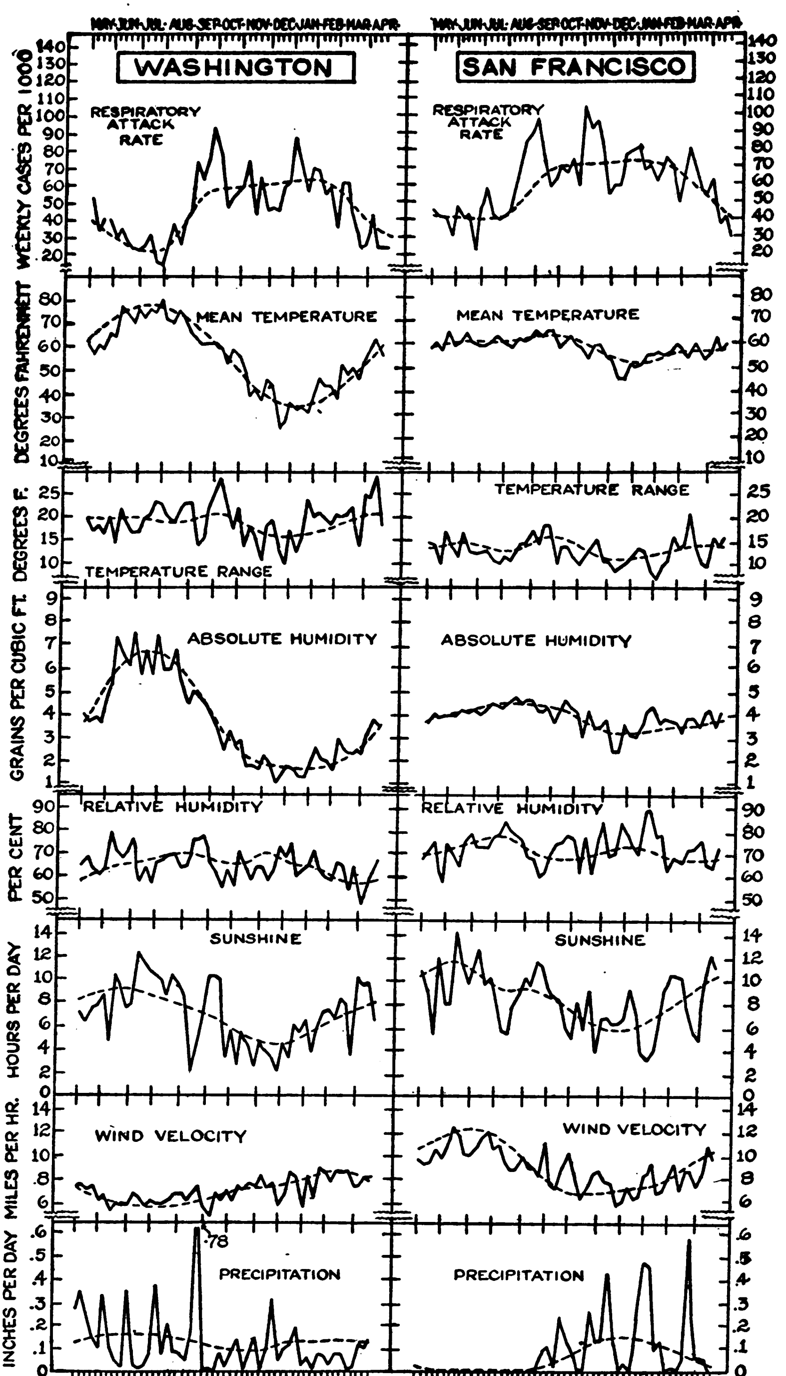

FIGURE 2.—Weekly respiratory attack rates among observed students, and weekly values for certain weather conditions. (Broken line=normal or average. See text and footnotes to table 1 for details.)

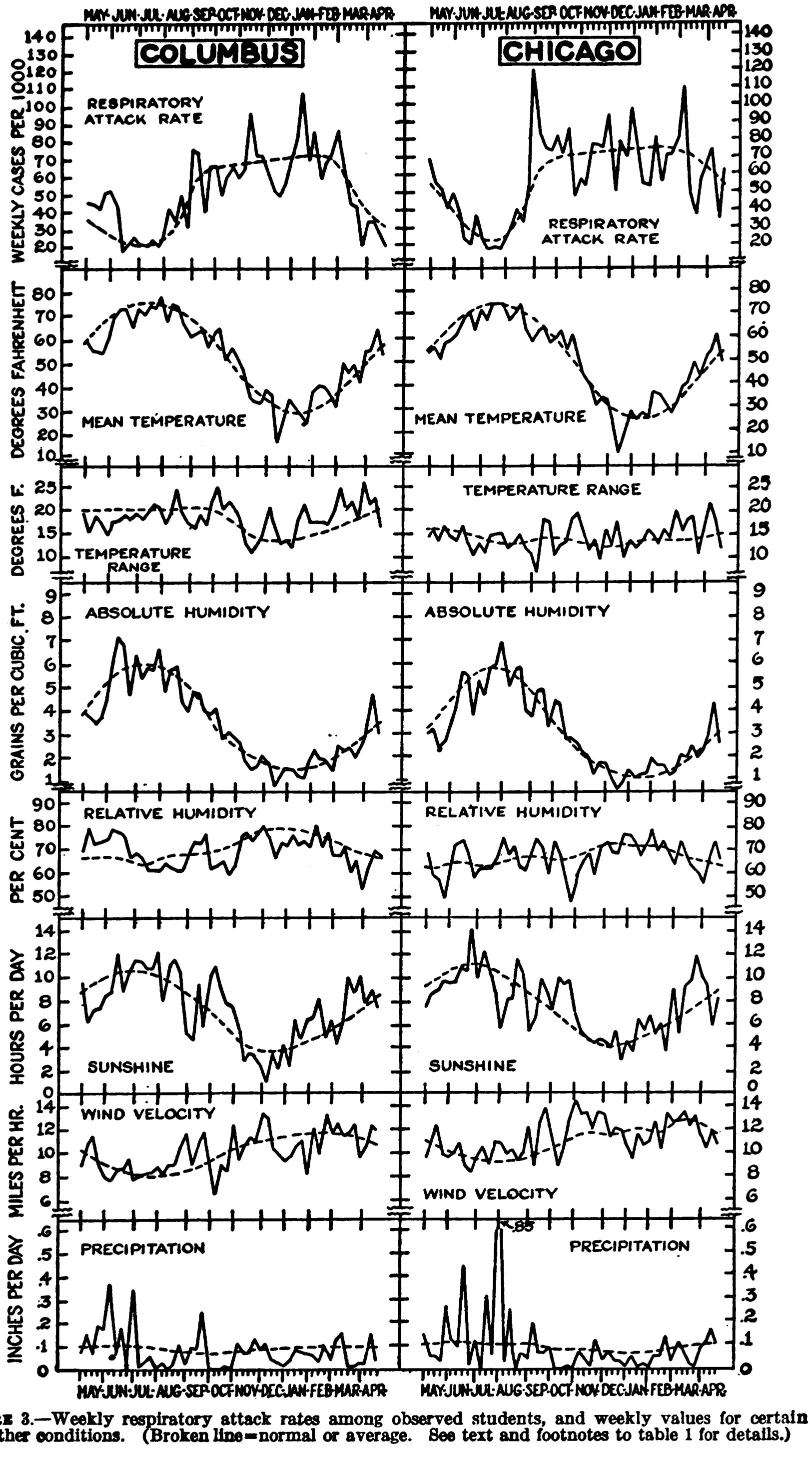

Figure 3.—Weekly respiratory attack rates among observed students, and weekly values for certain weather conditions. (Broken line=normal or average. See text and footnotes to table 1 for details.)

Table 1.—*Climatic data: Annual averages for approximately 40 to 60 years*[1]

	Washington	Columbus	New Orleans	Chicago	Boston	San Francisco
Mean temperature[2] (F°):						
Yearly mean	55.1	52.3	69.4	49.1	49.8	56.2
Monthly maximum	76.8	75.0	82.4	72.6	72.0	61.4
Monthly minimum	33.9	29.0	54.7	23.9	28.2	49.8
Difference between maximum and minimum	42.9	46.0	27.7	48.7	43.8	11.6
Daily temperature range[3] (F°):						
Yearly mean	18.2	17.9	14.8	14.8	15.9	12.1
Monthly maximum	20.5	20.1	15.7	16.4	17.5	14.0
Monthly minimum	15.1	13.6	13.3	12.6	14.3	10.2
Difference between maximum and minimum	5.4	6.5	2.4	3.8	3.2	3.8
Absolute humidity[4] (gr. per cu. ft.):						
Yearly mean	3.56	3.41	5.93	3.13	3.14	3.74
Monthly maximum	6.57	5.89	8.60	5.80	5.96	4.44
Monthly minimum	1.48	1.43	3.69	1.10	1.17	3.10
Difference between maximum and minimum	5.09	4.46	4.91	4.70	4.79	1.34
Relative humidity[5] (percent):						
Yearly mean	65	70	73	70	68	73
Monthly maximum	71	78	76	76	71	80
Monthly minimum	56	63	70	65	65	70
Difference between maximum and minimum	15	15	6	11	6	10
Sunshine[6] (daily hours):						
Yearly mean	7.1	6.8	7.0	7.2	7.1	8.0
Monthly maximum	9.3	10.4	9.1	10.8	9.7	11.1
Monthly minimum	4.6	3.1	4.6	3.6	4.4	5.2
Difference between maximum and minimum	4.7	7.3	4.5	7.2	5.3	5.9
Wind velocity[7] (miles per hour):						
Yearly mean	7.8	10.8	8.1	11.5	10.3	10.0
Monthly maximum	9.8	12.4	9.2	13.5	11.7	13.2
Monthly minimum	6.3	8.9	6.6	9.7	8.8	7.5
Difference between maximum and minimum	3.5	3.5	2.6	3.8	2.9	5.7
Precipitation[8] (daily inches):						
Yearly mean	.111	.099	.163	.090	.112	.061
Monthly maximum	.145	.115	.207	.117	.122	.152
Monthly minimum	.068	.079	.110	.063	.100	.000
Difference between maximum and minimum	.077	.036	.097	.054	.022	.152
Weekly respiratory attack rate per 1,000[9]	46.6±1.8	51.0±2.0	53.3±2.7	58.1±2.2	60.9±2.7	61.1±1.8

[1] The comparative climatic data are taken from the Annual Meteorological Summary for 1931 published by the U.S. Department of Agriculture, Weather Bureau.

The averages are based on periods varying from about 40 years for records of humidity and sunshine to about 60 years for temperature, wind velocity, and precipitation in the various cities.

[2] "Yearly mean" of mean temperature is the average of maximum and minimum hourly records for each day of the year.

"Monthly maximum" and "monthly minimum" of mean temperatures are the highest and lowest monthly averages, respectively, of daily maximum and minimum records.

The "difference between maximum and minimum" gives the yearly average range of temperature, based on monthly means.

These definitions of "yearly mean", "monthly maximum", "monthly minimum", and "difference between maximum and minimum" apply in general to each of the climatological measures represented in this table.

[3] "Daily temperature range" is the difference between averages of maximum and minimum daily temperature records.

[4] "Absolute humidity" is expressed as grains of moisture per cubic foot of air and is based on 3 daily humidity records taken at 8 a.m., noon, and 8 p.m.

[5] "Relative humidity" is absolute humidity expressed in percent of moisture that the atmosphere will hold at a given temperature and is based on 3 daily records taken at 8 a.m., noon, and 8 p.m.

[6] "Sunshine" is the actual daily hours of sunshine averaged for the entire period.

[7] "Wind velocity" is the average of hourly records of 3 or 4 cup anemometers reduced to true velocity.

[8] "Precipitation" is the total daily amount of rain or snow (reduced to rain) averaged for the entire period.

[9] "Weekly respiratory attack rate per 1,000" is the mean *weekly* attack rate of all respiratory diseases for the year ending May 2, 1925, for both male and female students. Males predominated in all universities except California.

The probable errors of the mean rates are based on the actual variation in the 52 weeks of the year. They are computed as follows:

$P.E._M = .6745 \frac{\sigma_{sample}}{\sqrt{n}}$, in which n=number of items or weeks=52, $\sigma_{sample} = \sqrt{\frac{\Sigma d^2}{n}}$, in which Σ=sum of, d=deviation of weekly rate from the mean weekly rate for the year, n=number of items or weeks=52.

Table 2 represents a further description of the weather and to some extent the climate in the six cities in that it gives for the 52 weeks ending May 2, 1925, a measure of the variability of the weekly weather conditions around the normal or average weather as plotted in figures 1, 2, and 3. The root mean squared deviation gives a quantitative statement of the extent to which the actual weekly data (irregular continuous line) deviate from the normal or average data (broken smooth line) for the corresponding week of the year.

TABLE 2.—*Variability during the year ending May 2, 1925, around an assumed normal attack rate and around mean or normal weather conditions* [1]

Deviations of—	Washington	Columbus	New Orleans	Chicago	Boston	San Francisco
	Root mean squared deviation from the weekly normal [1]					
Weekly respiratory rate per 1,000	11.71 ±0.77	13.13 ±0.87	20.49 ±1.36	16.11 ±1.07	18.12 ±1.20	13.58 ±0.90
Mean temperature	4.94 ± .33	6.11 ± .40	4.18 ± .28	5.84 ± .39	4.96 ± .33	2.82 ± .19
Daily temperature range	3.70 ± .24	3.32 ± .22	2.15 ± .14	3.04 ± .20	2.73 ± .18	2.61 ± .17
Absolute humidity	.573± .038	.622± .041	.997± .066	.674± .045	.543± .036	.364± .024
Relative humidity	6.57 ± .43	6.39 ± .42	8.04 ± .53	6.19 ± .41	7.38 ± .49	6.68 ± .44
Hours of sunshine	2.08 ± .14	1.96 ± .13	1.84 ± .12	1.87 ± .12	1.54 ± .10	2.20 ± .15
Wind velocity	.83 ± .05	1.46 ± .10	1.03 ± .07	1.39 ± .09	1.18 ± .08	1.34 ± .09
Precipitation	.135± .009	.080± .005	.134± .009	.134± .009	.125± .008	.119± .008

[1] See text and figs. 1, 2, and 3 for description of norms and the methods of deriving them. The root mean squared deviation is computed by the formula $\sqrt{\frac{\Sigma d^2}{n}}$, in which Σ=sum of, d=deviation from normal for corresponding week, and n=number of items or weeks, =52. The probable errors of the root mean squared deviations are computed by the formula: $\text{P.E.}=.6745\frac{\text{root mean squared deviation}}{\sqrt{2n}}$, in which n=number of items or weeks =52.

Considering first the annual mean weather conditions and the annual attack rates in each city, there does not appear to be any close association between attack rates and climatic conditions. The cities are arrayed in ascending order of the respiratory attack rate; an examination of the table does not show a single line (either of means or of seasonal differences) that approaches an ascending or a descending order. With only six cities, one would not expect to find regularity or be able to say definitely whether the respiratory rate is related to average annual weather conditions. Nevertheless, these six places represent the extremes of latitude, longitude, and climatic conditions within the continental United States; if a marked relationship existed, some suggestion of it would probably appear in the data in spite of the inaccuracies inherent in respiratory material.[2]

Mean annual temperatures range from 49° in Chicago to 69° in New Orleans. Washington and San Francisco have approximately the same mean temperature, 55° and 56°, but they are at the two extremes in mean weekly respiratory attack rates of 47 and 61 per 1,000, respectively. The normal for the daily temperature range in these

[2] Reports by the student were made at biweekly intervals upon his or her own colds. Such frequent personal records should include all attacks. It is possible, however, that the students of some universities were more zealous reporters than others and some of the differences in attack rates could be due to this spurious factor.

six cities decreases from 18° to 12° with some regularity as the respiratory rate increases, but it is the only climatic variable with a suggestion of relationship to the respiratory attack rate.

In the matter of the magnitude of the seasonal swing in weather conditions, San Francisco stands out as having less difference in temperature and in other weather conditions between summer and winter than any other city. In variability of weekly weather conditions around the normal or average weather, as shown in table 2, San Francisco also stands apart from the other cities as being less variable in temperature and absolute humidity but not so different in other weather measurements.

TABLE 3.—*Mean weekly respiratory attack rates and mean weather conditions in each of the six 3-month periods of the study (see table 1 for definitions of variables)*

Cities (arranged in ascending order of attack rate)	Weekly respiratory attack rate per 1,000	Mean temperature	Daily temperature range	Absolute humidity	Relative humidity	Hours of sunshine	Wind velocity	Precipitation
13 weeks, Nov. 4, 1923–Feb. 2, 1924:								
San Francisco	72.5	53.6	12.6	3.14	67.2	6.9	7.5	0.058
Washington	75.7	41.6	16.4	2.08	67.5	5.0	7.2	.089
New Orleans	91.6	56.8	15.5	3.87	73.0	5.0	7.7	.154
Boston	96.2	38.7	14.3	1.89	66.2	4.5	10.6	.122
Chicago	96.7	33.8	12.7	1.84	71.2	4.8	11.9	.051
Columbus	99.3	36.7	14.9	2.06	80.0	3.9	9.7	.136
13 weeks, Feb. 3, 1924–May 3, 1924:								
San Francisco	55.2	56.3	14.0	3.39	66.8	8.8	9.5	.060
New Orleans	55.8	61.5	16.3	4.40	70.1	7.4	7.9	.122
Columbus	62.8	40.0	15.3	2.15	71.8	5.0	11.6	.104
Washington	65.7	43.6	16.2	1.95	57.6	7.3	9.1	.161
Boston	71.2	37.9	13.7	1.69	60.5	7.3	11.3	.096
Chicago	80 1	38.2	11.5	1.87	68.9	5.5	11.4	.072
13 weeks, May 4, 1924–Aug. 2, 1924:								
Washington	30.6	69.1	18.5	5.46	66.8	8.8	6.5	.148
New Orleans	31.5	80.9	15.7	7.64	66.3	10.9	6.6	.141
Columbus	32.8	65.5	18.1	5.20	70.7	9.5	8.8	.128
Boston	33.7	65.9	16.5	4.53	63.5	9.5	9.7	.064
Chicago	35.2	63.4	14.0	4.28	63.2	10.2	9.9	.137
San Francisco	40.6	59.4	12.7	3.98	71.7	10.3	10.7	0
13 weeks, Aug. 3, 1924–Nov. 1, 1924:								
Columbus	51.9	64.5	19.9	4.55	65.2	8.9	9.3	.047
Washington	54.4	65.4	20.8	4.83	67.2	8.2	6.3	.148
New Orleans	61.3	78.8	15.1	6.85	64.4	9.5	7.3	.054
Boston	62.2	62.8	16.2	4.52	68.5	8.1	9.1	.153
Chicago	62.6	63.5	13.3	4.46	66.0	8.6	10.7	.134
San Francisco	70.2	60.5	13.5	4.23	73.5	8.7	9.2	.033
13 weeks, Nov. 2, 1924–Jan. 31, 1925:								
Washington	59.8	38.2	15.9	1.74	64.2	4.3	7.4	.098
Columbus	69.0	32.8	15.7	1.66	73.2	3.8	10.9	.064
Chicago	69.6	29.8	13.8	1.45	69.1	4.9	11.9	.039
New Orleans	70.5	58.7	15.8	4.13	72.5	5.8	7.7	.132
San Francisco	75.3	52.0	10.9	3.26	74.8	6.7	7.3	.115
Boston	79.9	33.9	15.2	1.62	65.8	4.7	11.1	.082
13 weeks, Feb. 1, 1925–May 2, 1925:								
Washington	41.7	49.2	20.7	2.44	60.8	7.3	7.9	.057
New Orleans	50.1	66.2	17.7	4.76	66.4	8.6	7.6	.038
Columbus	50.2	45.4	19.9	2.43	67.7	7.4	11.3	.063
San Francisco	58.4	56.2	12.7	3.64	72.5	8.3	8.3	.146
Chicago	65.2	41.8	16.0	2.13	67.5	7.7	11.9	.070
Boston	68.0	44.0	16.3	2.15	64.5	7.1	10.3	.102

Mean respiratory attack rates and mean weather conditions for the six 3-month periods of the study are shown in table 3. In each quarter the cities are arranged in the order of the mean attack rate for that period. It must be remembered that the data contain all the seasonal variation in these items except insofar as the consideration of the various items in a specific quarter eliminates season.

An examination of the weather variables does not indicate any close association between the magnitude of the respiratory attack rate and weather conditions, but there is a tendency toward a slight association with some of the items.

A consideration of the variation in the respiratory attack rate from quarter to quarter and in the different cities is of interest. San Francisco reported the highest attack rate for the year ending May 2, 1925; when that year is considered in 3-month periods, San Francisco is highest in the 2 summer quarters only, but is among the 3 highest in the other 2 quarters. In the 2 winter quarters of the preceding year San Francisco has the lowest respiratory rate. Similar but less marked variability exists for other places in the order of the city as to the size of the attack rate. The short record available suggests that respiratory rates vary about as much from year to year in the same city as from city to city in the same year.

WEATHER DEVIATIONS FROM NORMAL AND ASSOCIATION WITH RESPIRATORY ATTACK RATE DEVIATIONS FROM NORMAL

Correlation coefficients have been computed between the respiratory rate and the various measures of weather conditions, using short-time deviations from the seasonal normal for each variable. Figures 1, 2, and 3 show the actual observations with the norms for each set of observations. Table 4 gives correlation coefficients between respiratory incidence and various weather measures for each of the six cities for the year ending May 2, 1925.

TABLE 4.—*Correlation coefficients*[1] *for the deviations of the weekly incidence of respiratory attacks*[2] *from an assumed normal with the deviations of weather conditions*[2] *from the mean or normal—6 cities for the year ending May 2, 1925*

Deviations of respiratory rate correlated with deviations of—	1 week's lag in respiratory rate[3]						All cities	
	Washington	Columbus	New Orleans	Chicago	Boston	San Francisco	1 week's lag in respiratory rate[3]	No lag in respiratory rate
Mean temperature	−.416	−.332	−.397	−.316	−.214	−.300	−.304	−.217
Daily temperature range	−.242	−.434	−.089	−.244	−.151	−.170	−.214	−.155
Absolute humidity	−.247	−.275	−.241	−.255	−.072	−.079	−.198	−.169
Relative humidity	+.157	+.315	−.016	−.096	+.218	+.143	+.107	+.162
Hours of sunshine	−.310	−.218	−.019	−.119	−.130	−.252	−.161	−.164
Wind velocity	+.441	−.006	+.018	+.091	−.184	−.038	+.012	−.065
Precipitation	+.302	+.052	+.011	+.055	−.001	+.075	+.075	+.079

[1] The probable errors of the coefficients for individual cities (first 6 columns) are approximately ±.090, and for the coefficients for all cities (last 2 columns) are approximately ±.037. The correlation tables were examined carefully for exceptional values that might unduly influence the coefficients. Recomputation of the coefficients with the doubtful items eliminated made 2 significant changes: For Washington the correlation with hours of sunshine was reduced from −.310 to −.201 and the correlation with precipitation from +.302 to +.142. In all other instances the coefficients that were more than 3 times their probable errors remained in that class after the corrections were made. The coefficients included in the table are based on *all* the items.

[2] See text and figs. 1, 2, and 3 for description and source of weather and respiratory data and the method of deriving the various norms.

[3] By "1 week's lag" is meant that the respiratory rate is correlated with weather conditions for the preceding week.

Correlations were computed between the respiratory attack rate and weather conditions for the same week as well as for the preceding week. The latter coefficients (week's lag) were nearly always higher. In the last two columns of table 4 both sets of coefficients are shown for all cities combined; in all other places the coefficients are correlations between the respiratory attack rate and weather conditions for the preceding week.

For the year ending May 2, 1925, in each city except Boston the attack rate shows a small negative correlation with mean temperature that is statistically significant as judged by its probable error. The coefficient for Boston is slightly less than three times its probable error. Daily temperature range shows a significant correlation for only one of the cities, Columbus. The relative humidity correlation is statistically significant in only one city, Columbus, and is positive in sign. Hours of sunshine, wind velocity, and precipitation each show a statistically signifieant correlation in one of the cities, Washington, negative for sunshine and positive for wind velocity and precipitation.

Mean temperature is the only weather condition that consistently shows correlation with respiratory rates in the various cities; the correlation is negative and relatively small. The other weather measures show occasional coefficients that are significant for the year under consideration, but the fact that only a few are significant suggests that in another year less association might be present.

All the cities were combined and correlations computed for the six 13-week periods between November 4, 1923, and May 2, 1925 (table 5). Several of the coefficients are higher during the months of August, September, and October of 1924 than during the other periods, mean temperature, daily temperature range, and sunshine being negatively correlated with the respiratory attack rate and relative humidity positively correlated. Temperature shows a statistically significant negative correlation for 3 periods out of the 4 for the year ending May 2, 1925, the summer period (May, June, and July) showing no significant correlation. Wind velocity and precipitation are consistent in showing no correlation with the respiratory attack rate, but a few scattered coefficients are significant for some of the other factors.

TABLE 5.—*Correlation coefficients*[1] *for the deviations of the weekly incidence of respiratory attacks*[2] *from an assumed normal with the deviations of weather conditions from the mean or normal—six 13-week periods from Nov. 4, 1923, to May 2, 1925, for all 6 cities (1 week's lag in respiratory rate, i.e., the respiratory rate is correlated with weather conditions for the preceding week)*

Deviations of respiratory rate correlated with deviations of—	Nov.-Jan. 11/4/23 to 2/2/24	Feb.-Apr. 2/3/24 to 5/3/24	May-July 5/4/24 to 8/2/24	Aug.-Oct. 8/3/24 to 11/1/24	Nov.-Jan. 11/2/24 to 1/31/25	Feb.-Apr. 2/1/25 to 5/2/25
Mean temperature	-.179	-.172	-.194	-.331	-.249	-.309
Daily temperature range	+.063	-.138	-.212	-.326	-.153	-.067
Absolute humidity	-.263	-.166	-.101	-.102	-.263	-.256
Relative humidity	-.112	-.076	+.117	+.320	+.042	-.060
Hours of sunshine	-.021	+.070	-.222	-.305	-.056	-.031
Wind velocity	-.005	+.128	-.098	+.024	-.104	+.058
Precipitation	-.060	+.020	+.122	+.097	-.072	+.118

[1] The probable errors of the coefficients in this table are approximately ±.075. The correlation tables were examined carefully for exceptional values that might unduly influence the coefficients. A few such items were found and coefficients recomputed with the doubtful items eliminated. In 1 or 2 instances there was considerable change, but none that would revise the general correlation picture as it appears in this table. All the coefficients that were more than 3 times their probable errors remained in that class after the corrections were made. The coefficients included in the table are based on *all* the items.

[2] See text and figs. 1, 2, and 3 for description and source of weather and respiratory data and the method of deriving the various norms.

Gafafer (4), in computing the same sort of coefficients for respiratory attack rates in Baltimore, divided his material into 6-month periods; he found higher correlations during the warm season and that they occurred with temperature, for which he used several measures, with daily temperature range, with percent of possible sunshine, and with absolute humidity,[3] results not inconsistent with ours.

SUMMARY

In conclusion (1) we find no definite association of respiratory attack rates with marked variations in climate as represented by six American cities with wide geographic and climatic differences, and (2) weekly deviations from the "norm" of the respiratory attack rate show a small association with deviations from the "norm" in mean temperature for the corresponding week and also for the preceding week. This correlation is consistently negative, so that a respiratory rate above normal is associated with a mean temperature below normal, and the association is higher during the early fall months than at any other time of the year. During these months there appears to be also a slight tendency for a higher than normal respiratory rate to be associated with a relative humidity above normal, and with a subnormal daily temperature range and number of hours of sunshine.

[3] Gafafer used vapor pressure but since it is proportional to absolute humidity the correlation would be the same.

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ELECTROCUTION A NEW AID IN THE PREPARATION OF MOSQUITO MOUNTS

By C. P. Coogle, M.D., *Malariologist, United States Public Health Service*

In mounting mosquito specimens, the wings often fold up, obscuring the abdomen. The following procedure has been employed successfully in maintaining rigidly extended wings:

The insect is partially etherized; and just before it revives, a fine wire is thrust into the ventral thorax diagonally through the neck to the dorsal side. By means of the eye of a sewing needle, the projecting end of the wire is slightly looped to prevent its release from the body, and the wire is then pushed back until the loop touches the mosquito.

The mosquito should have revived from the anaesthetic by this time, and the electrocution proceeds as follows: Hold a terminal in each hand, touch one to the wire used to transfix the insect, the other preferably to an abdominal segment. Automatically, the wings assume a flight position and the legs are extended.

A needle dipped into embalming fluid is applied to the loop on the mosquito's back. The fluid will remain there as a bead and slowly trickle into the puncture made by the wire. Invert the specimen and allow a droplet of xylol balsam to harden where the legs join the body. This prevents the breaking off of the appendages during inspection. The wings need no extra support; they hold their shape satisfactorily.

The usual procedure for insect mounts may be employed from this point on.

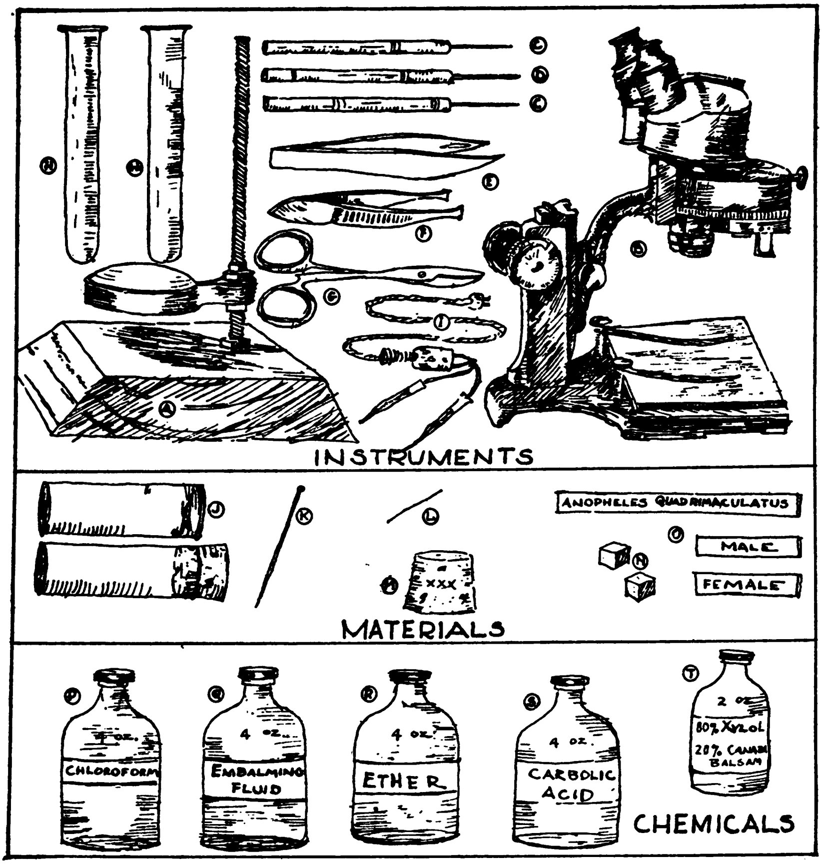

FIGURE 1.—Articles and materials used in mounting.

A. Magnifying lens mounted on wooden block.
B. Binocular dissecting microscope.
C. Teasing needles.
D. No. 8 sewing needle fixed in wood handle.
E. Long straight forceps (4 inches long).
F. Sharp-pointed tweezers (4 inches long).
G. Hemostatic forceps (4 inches long).
H. Glass test tubes, ¾ inch diameter, 6 inches long.
I. Electric cord and socket.
J. Glass shell vial, 25 by 60 mm.
K. Silver pins, No. 0, 1½ inches long.
L. Stainless steel wire, No. 28 gauge, ½ inch long.
M. No. 12 corks of XXX quality.
N. Small pieces of cork, size 4 by 4 by 4 mm.
O. Labels.
P. 4-ounce bottle chloroform.
Q. 4-ounce bottle embalming fluid.
R. 4-ounce bottle ether.
S. 4-ounce bottle carbolic acid.
T. 2-ounce bottle 80 percent xylol, 20 percent Canada balsam.

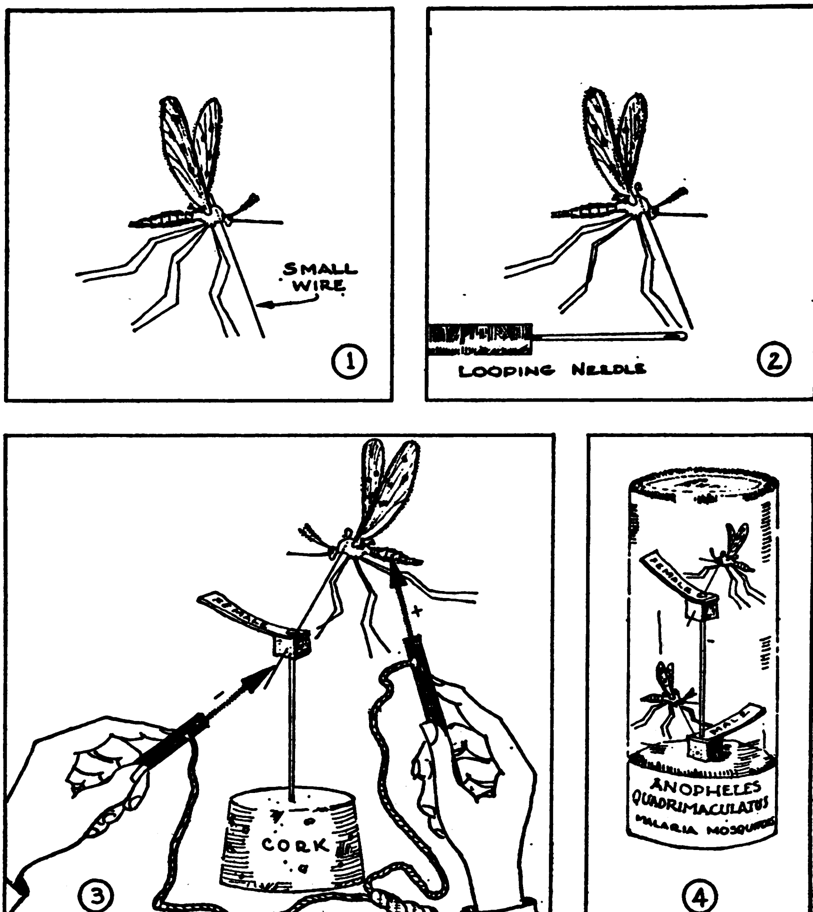

FIGURE 2.—Illustration of technique.

1. Small wire piercing mosquito's thorax (diagonal position).
2. Loop on small wire made with eye of needle.
3. Applying electricity; negative pole to wire, positive pole to body segment of mosquito.
4. Finished specimen inside glass vial.

DEVICES FOR CONTROL OF DUST IN ROCK-DRILLING OPERATIONS

In a paper that appeared in the Public Health Reports for June 8, 1934, entitled "Silicosis among Granite Quarriers", reference was made to some recent studies in the control of the silicosis hazard in the hard-rock industries which resulted in the development of a dust-removal device known as the "Kelley dust trap." At the time when this paper went to press the authors were not aware of any other device on the market that had been developed for the purpose of dust control in drilling operations. Had they been cognizant of the existence of any other device or apparatus of this type, mention of such device would have been made in the paper. On the date that the above-mentioned article appeared in print, the authors received a report from the Spencer Turbine Co., of Hartford, Conn., presenting the results of tests on a device developed by them for the control of dust arising in various kinds of drilling operations. The authors desire to present these facts to the readers of the PUBLIC HEALTH REPORTS. It might also be stated here that the Public Health Service has not made any studies of the efficiency of either the Kelley or the Spencer trap, nor of any similar device, and that reference made to such apparatus does not imply official approval by the Public Health Service, but merely presents findings reported elsewhere for the benefit of those interested in this problem.

COURT DECISION ON PUBLIC HEALTH

Performance of health duties by city upon order of the State department of health.—(Ohio Court of Appeals; *Hess* v. *City of Canton*, 189 N.E. 18; decided October 18, 1933.) An action was brought against the city of Canton in which the plaintiff sought to recover compensation for a period during which he was temporarily employed as chief chemist in connection with the operation of the city's sewage plant. He averred that, immediately prior to a certain date, the city was without a chief chemist, that no competent person was acting as such, and that the public health of the community was not being protected. He further claimed that the State department of health, acting under statutory authority, ordered the employment of some qualified person during the emergency and that such order was complied with by his being temporarily employed. The trial court sustained the city's demurrer to the plaintiff's amended petition and the court of appeals said that the question was whether a cause of action had been stated.

The appellate court made reference to section 1237 of the General Code in which, with respect to the State health department, it was provided as follows:

It may make and enforce orders in local matters when emergency exists, or when the local board of health has neglected or refused to act with sufficient promptness or efficiency. * * * In such cases the necessary expense incurred shall be paid by the city, village, or township for which the services are rendered.

Another section referred to was section 1240–2 which provided:

The State department of health shall exercise general supervision of the disposal of sewage and industrial wastes and the operation and maintenance of works or means installed for the collection, treatment, or disposal of sewage and industrial wastes. Such general supervision shall apply to all features of construction, operation, and maintenance of such works or means which do or may affect the proper treatment or disposal of such sewage and industrial wastes * * * whenever deemed necessary by the department and whenever requested to do so by local health officials; and may adopt and enforce orders and regulations governing the operation and maintenance of such works or means. * * *

Speaking with reference to these statutory provisions, the court of appeals said:

In these provisions we find warrant and authority for interference by the State board of health in a city's manner of disposing of its sewage. A local board of health, or other city officials, may feel that, if the city's sewage is drawn outside the city limits, they need be no longer concerned with its disposition. The State board of health, however, may take a broader view, in that the public health of adjoining communities may be affected by such indifference. To meet such a situation the legislature, no doubt, sought by these and kindred sections to correct such practices. It therefore provided that, if such an emergency should exist, the State board might act by proper order, and the expense incident thereto be borne by the city for which the services were rendered.

It may, therefore, be concluded that a city may be compelled to perform its health duties that are for the benefit of the public health generally, and to pay for such service, even though it is unwilling to do so, and it cannot avoid paying the cost thereof by standing behind such statutes as are here called upon to escape liability. The general law on municipal expenditure in such case must give way to the special act for the public good.

DEATHS DURING WEEK ENDED JUNE 23, 1934

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

	Week ended June 23, 1934	Corresponding week, 1933
Data from 86 large cities of the United States:		
Total deaths	7,370	7,446
Deaths per 1,000 population, annual basis	10.3	10.4
Deaths under 1 year of age	532	532
Deaths under 1 year of age per 1,000 estimated live births	50	[1] 44
Deaths per 1,000 population, annual basis, first 25 weeks of year	12.1	11.6
Data from industrial insurance companies:		
Policies in force	67,776,458	67,755,624
Number of death claims	12,348	13,121
Death claims per 1,000 policies, in force, annual rate	9.5	10.1
Death claims per 1,000 policies, first 25 weeks of year, annual rate	10.7	10.5

[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 June 30, 1934, and July 1, 1933

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 30, 1934, and July 1, 1933

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 30, 1934	Week ended July 1, 1933	Week ended June 30, 1934	Week ended July 1, 1933	Week ended June 30, 1934	Week ended July 1,1933	Week ended June 30, 1934	Week ended July 1, 1933
New England States:								
Maine	1	3	-	5	15	10	0	1
New Hampshire	0	-	-	-	113	9	0	0
Vermont	3	-	-	-	24	40	0	0
Massachusetts	10	11	-	-	596	440	2	0
Rhode Island	0	1	-	1	20	-	0	0
Connecticut	3	4	-	1	105	99	1	0
Middle Atlantic States:								
New York [1]	16	43	[2] 3	[2] 3	505	792	4	3
New Jersey	12	25	6	3	366	404	1	0
Pennsylvania	35	36	-	-	1,015	575	1	2
East North Central States:								
Ohio	15	27	14	32	971	104	0	1
Indiana	7	13	12	12	140	69	0	2
Illinois [3]	37	12	14	18	1,131	236	7	8
Michigan	7	21	-	-	214	199	2	2
Wisconsin	9	5	11	8	1,320	140	3	0
West North Central States:								
Minnesota	13	7	-	1	52	117	0	0
Iowa [4]	8	6	-	-	94	25	1	0
Missouri	31	29	7	4	87	142	4	0
North Dakota	1	1	-	-	53	10	0	0
South Dakota	1	2	-	-	47	4	0	0
Nebraska	2	6	-	-	21	68	0	3
Kansas	25	1	1	-	135	88	0	1
South Atlantic States:								
Delaware	-	2	-	-	26	8	0	0
Maryland [3] [4]	8	1	1	2	228	15	0	1
District of Columbia	4	3	1	-	18	43	0	0
Virginia [1]	10	6	-	-	500	97	1	2
West Virginia	11	4	-	-	100	11	0	0
North Carolina [1]	4	4	5	1	332	248	0	2
South Carolina	5	8	70	35	66	104	0	0
Georgia [3]	5	14	-	-	26	119	0	0
Florida [3]	2	2	2	1	82	6	0	0
East South Central States:								
Kentucky	3	1	1	-	211	10	0	1
Tennessee	2	7	-	14	94	89	1	1
Alabama [3]	17	6	10	4	127	27	0	0
Mississippi	8	3	-	-	-	-	0	0
West South Central States:								
Arkansas	-	-	2	-	8	75	1	0
Louisiana [3]	15	10	3	8	46	11	1	1
Oklahoma [5]	1	9	21	9	21	14	0	0
Texas [3]	49	59	33	59	147	253	0	4

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 30, 1934, and July 1, 1933—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 30, 1934	Week ended July 1, 1933	Week ended June 30, 1934	Week ended July 1, 1933	Week ended June 30, 1934	Week ended July 1, 1933	Week ended June 30, 1934	Week ended July 1, 1933
Mountain States:								
Montana [1]	2		2		4	38	1	0
Idaho					3		0	0
Wyoming [1]	1	1			157	4	2	0
Colorado	11	6			334	11	0	0
New Mexico		3	2	1	24	4	0	0
Arizona			2		11	36	0	0
Utah [4]			4		3	43	0	0
Pacific States:								
Washington		4			124	67	3	1
Oregon	0		18	10	16	15	0	1
California [1]	31	42	17	12	515	534	0	2
	420	448	262	244	10,247	5,453	36	39

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 30, 1934	Week ended July 1, 1933	Week ended June 30, 1934	Week ended July 1, 1933	Week ended June 30, 1934	Week ended July 1, 1933	Week ended June 30, 1934	Week ended July 1, 1933
New England States:								
Maine	0	0	17	3	0	0	1	7
New Hampshire	0	0	5	11	0	0	0	1
Vermont	0	0	6	1	0	0	0	0
Massachusetts	1	5	119	168	0	0	0	2
Rhode Island	0	1	6	13	0	0	0	0
Connecticut	1	2	12	33	0	0	0	1
Middle Atlantic States:								
New York [1]	3	7	294	232	0	0	11	17
New Jersey	3	0	61	81	0	0	3	4
Pennsylvania	0	3	253	288	0	0	26	21
East North Central States:								
Ohio	1	3	282	262	0	4	19	12
Indiana	0	1	41	21	1	2	5	22
Illinois [3]	5	4	209	134	1	0	30	21
Michigan	0	1	196	171	0	5	4	1
Wisconsin	1	1	258	65	6	0	3	1
West North Central States:								
Minnesota	1	0	44	23	0	1	4	0
Iowa [4]	0	1	24	4	1	12	2	0
Missouri	0	0	25	23	4	0	23	21
North Dakota	0	0	4	2	0	2	0	0
South Dakota	0	0	1	8	0	0	1	0
Nebraska	0	0	10	14	1	4	5	0
Kansas	2	0	15	17	0	1	6	4
South Atlantic States:								
Delaware	0	0	2	2	0	0	1	0
Maryland [3] [4]	1	1	22	27	0	0	10	19
District of Columbia	0	0	5	7	0	0	0	0
Virginia [1]	1	0	10	22	0	0	23	29
West Virginia	1	3	28	11	0	0	12	18
North Carolina [1]	0	0	16	22	1	0	14	43
South Carolina	0	0	1	1	0	1	12	37
Georgia [3]	0	0	4		0	0	38	44
Florida [3]	1	0	1	2	0	0	6	4
East South Central States:								
Kentucky	0	0	11	10	0	0	21	32
Tennessee	1	2	4	7	0	0	31	58
Alabama [3]	0	0	4	9	0	0	17	30
Mississippi	2	0	4	4	0	1	14	26
West South Central States:								
Arkansas	0	0		1	0	0	14	17
Louisiana [3]	0	0	9	9	1	0	30	32
Oklahoma [5]	0	1	7	8	1	0	11	28
Texas [3]	6	1	28	41	12	32	58	54

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 30, 1934, and July 1, 1933—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 30, 1934	Week ended July 1, 1933	Week ended June 30, 1934	Week ended July 1, 1933	Week ended June 30, 1934	Week ended July 1, 1933	Week ended June 30, 1934	Week ended July 1, 1933
Mountain States:								
Montana [1]	1	0	7	18	0	0	1	7
Idaho	2	0	1	1	0	3	0	1
Wyoming [1]	0	0	1	3	1	0	0	1
Colorado	0	0	13	20	0	21	1	0
New Mexico	0	0	6	5	0	0	7	1
Arizona	2	0	9	3	0	0	3	3
Utah [4]	0	0	6	5	0	0	1	0
Pacific States:								
Washington	1	0	19	3	6	6	1	2
Oregon	4	0	15	14	1	20	8	1
California [1]	297	4	113	76	0	15	18	3
	338	41	2,228	1,905	37	130	495	624

[1] Rocky Mountain spotted fever, week ended June 30, 1934, 15 cases, as follows: New York, 1; Virginia, 3; North Carolina, 5; Montana, 2; Wyoming, 3; California, 1.
[2] New York City only.
[3] Typhus fever, week ended June 30, 1934, 22 cases, as follows: Illinois, 1; Maryland, 1; Georgia, 8; Florida, 1; Alabama, 7; Louisiana, 1; Texas, 3.
[4] Week ended earlier than Saturday.
[5] 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
May 1934										
New Hampshire							0	74	0	1
June 1934										
Delaware		4			241		0	13	0	2
District of Columbia	3	43	4		98		0	27	0	1

June 1934

Delaware:	Cases
Anthrax	1
Chicken pox	23
Mumps	18
Rabies in animals	1

June 1934

Delaware—Continued.	Cases
Typhus fever	2
Undulant fever	4
Whooping cough	36

June 1934

District of Columbia:	Cases
Chicken pox	44
Tularaemia	1
Whooping cough	99

PLAGUE AND PLAGUE-INFECTED RODENTS IN CALIFORNIA

The director of public health of California has reported a case of human plague with onset June 16, 1934, in Tulare County, in the interior of California. The patient was a boy, 10 years of age. A blood culture was proved positive at the State bacteriological laboratory.

From June 9 to 28, 1934 (in addition to the report published in the PUBLIC HEALTH REPORTS of June 29, 1934, page 762), 26 ground squirrels from Modoc County, Calif., were found to be plague-infected.

WEEKLY REPORTS FROM CITIES

City reports for week ended June 23, 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	1	1	4	0	0	0	5	23
New Hampshire:											
Concord	0	------	0	12	1	2	0	0	1	0	8
Nashua	0	------	------	5	------	0	0	------	0	0	------
Vermont:											
Barre	0	------	0	0	0	0	0	1	0	0	6
Burlington	0	------	0	9	0	4	0	0	0	0	7
Massachusetts:											
Boston	1	------	0	145	12	29	0	9	0	37	186
Fall River	2	------	0	1	0	1	0	1	0	4	16
Springfield	0	------	0	0	1	1	0	0	0	7	27
Worcester	0	------	0	0	8	19	0	1	0	0	42
Rhode Island:											
Pawtucket	0	------	0	0	0	0	0	0	0	0	18
Providence	1	------	0	44	2	8	0	3	0	14	54
Connecticut:											
Bridgeport	0	------	0	0	1	3	0	1	0	0	36
Hartford	1	------	0	12	1	1	0	0	0	0	27
New Haven	0	------	0	0	2	1	0	1	0	6	56
New York:											
Buffalo	0	------	1	25	6	15	0	6	0	19	108
New York	45	1	2	230	86	114	0	83	8	169	1,286
Rochester	0	------	1	3	0	31	0	1	0	10	52
Syracuse	0	------	0	40	2	7	0	2	0	50	39
New Jersey:											
Camden	1	------	0	2	2	1	0	0	0	1	25
Newark	0	1	1	11	4	9	0	3	0	37	74
Trenton	0	------	0	16	2	9	0	4	0	0	31
Pennsylvania:											
Philadelphia	3	2	0	90	12	51	0	20	3	78	398
Pittsburgh	8	------	1	187	9	38	0	8	1	24	130
Reading	2	------	0	1	0	2	0	0	0	13	17
Scranton	2	------	------	7	------	1	0	------	0	3	------
Ohio:											
Cincinnati	1	------	1	4	1	19	0	8	0	9	97
Cleveland	1	7	0	230	7	53	0	6	0	52	158
Columbus	0	------	0	1	3	16	0	5	0	25	82
Toledo	0	------	0	42	3	38	0	4	1	64	64
Indiana:											
Fort Wayne	6	------	0	2	0	2	0	0	0	3	------
Indianapolis	5	------	0	40	4	2	0	1	0	11	------
South Bend	0	------	0	18	1	1	0	0	0	0	21
Terre Haute	0	------	1	0	1	1	0	0	0	1	9
Illinois:											
Chicago	3	------	1	455	80	173	0	39	21	110	612
Cicero	------	------	0	------	0	------	------	0	------	------	2
Springfield	4	------	0	4	2	0	0	0	0	7	20
Michigan:											
Detroit	6	------	1	93	11	41	0	18	0	79	249
Flint	0	------	0	2	0	20	0	0	0	10	21
Grand Rapids	0	------	0	3	2	16	0	0	1	0	31
Wisconsin:											
Kenosha	0	1	0	12	0	0	0	0	0	0	7
Milwaukee	0	------	0	234	5	172	0	4	1	27	74
Racine	0	------	0	5	1	5	0	0	0	10	8
Superior	1	------	0	3	0	0	0	0	0	0	10
Minnesota:											
Duluth	0	------	0	1	0	1	0	1	0	0	17
Minneapolis	1	------	0	2	2	12	0	0	1	3	81
St. Paul	1	------	0	3	2	9	0	4	0	25	56
Iowa:											
Davenport	0	------	------	2	------	1	0	------	0	0	------
Des Moines	0	------	------	9	------	4	1	------	0	1	31
Sioux City	3	------	------	36	------	0	0	------	0	6	------
Waterloo	0	------	------	0	------	1	0	------	0	1	------
Missouri:											
Kansas City	1	------	0	3	4	6	0	5	0	4	101
St. Joseph	0	------	0	0	1	0	0	0	0	0	19
St. Louis	19	------	0	5	4	6	0	5	4	55	175

City reports for week ended June 23, 1934—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
North Dakota:											
Fargo	0		0	6	0	1	0	0	0	11	8
South Dakota:											
Aberdeen	0			21		0	0		0	16	
Sioux Falls	0			0		0	0		0	0	7
Nebraska:											
Omaha	6		0	4	5	5	0	1	0	4	51
Kansas:											
Topeka	0		0	19	2	1	0	0	0	22	21
Wichita	0		0	14	0	1	0	0	0	8	12
Delaware:											
Wilmington	0		0	11	0	2	0	0	0	0	
Maryland:											
Baltimore	1	1	0	275	12	14	0	13	0	60	193
Cumberland	0		0	1	3	0	0	0	0	0	20
Frederick	0		0	0	0	0	0	0	0	1	2
District of Columbia:											
Washington	3		0	21	7	7	0	10	0	20	128
Virginia:											
Lynchburg	2		0	73	1	1	0	0	0	13	12
Norfolk	0		0	2	2	0	0	0	0	23	34
Richmond	1		0	76	5	1	0	1	3	0	55
Roanoke	0		0	2	2	0	0	0	0	2	16
West Virginia:											
Charleston	1		0	23	3	0	0	0	[1] 2	0	13
Huntington	0			4		2	0		0	0	
Wheeling	0		0	4	0	7	0	0	0	11	11
North Carolina:											
Raleigh	0		0	3	1	0	0	0	0	28	16
Wilmington	0		0	6	0	0	0	0	1	28	8
Winston-Salem	0		0	0	0	1	0	1	0	15	12
South Carolina:											
Charleston	0	4	0	14	3	0	0	1	2	0	25
Columbia	0		0	0	1	0	0	0	0	0	9
Georgia:											
Atlanta	0	1	0	1	3	0	0	4	1	15	86
Brunswick	0		0	0	0	0	0	0	0	0	2
Savannah	0	7	0	0	2	0	0	1	0	28	30
Florida:											
Miami	1		0	23	0	0	0	1	0	4	35
Tampa	0		0	13	0	1	0	0	0	0	29
Kentucky:											
Ashland	0			3		1	0		0	0	
Lexington	0		0	30	1	0	0		0	5	15
Louisville	1		0	139	4	5	0	3	0	45	81
Tennessee:											
Memphis	1		0	5	2	2	0	2	4	3	71
Nashville	1		0	0	0	1	0	5	0	9	61
Alabama:											
Birmingham	3	1	0	22	3	1	0	0	4	1	45
Mobile	1		0	1	0	1	0	3	0	3	25
Montgomery	1			9		0	0		1	1	
Arkansas:											
Fort Smith	0			1		0	0		0	1	
Little Rock	0		0	0	0	2	0	2	0	1	
Louisiana:											
New Orleans	4		0	22	4	2	0	8	1	2	134
Shreveport	0		0	1	3	0	0	1	0	2	38
Oklahoma:											
Oklahoma City	1	3	0	0	3	1	0	1	0	0	32
Tulsa	0			2		2	0		1	25	
Texas:											
Dallas	3	1	1		1	1	0	7	2	15	70
Fort Worth	1		0	0	4	2	0	1	0	1	41
Galveston	0		0	0	3	0	0	1	0	0	14
Houston	3		0	0	9	1	0	6	5	1	105
San Antonio	0		0	0	5	0	0	9	0	0	94
Montana:											
Billings	0		0	0	0	1	0	0	0	1	3
Great Falls	0		0	2	1	0	0	0	0	2	2
Helena	0		0	3	0	1	0	0	0	0	3
Missoula	0		0	0	0	0	0	0	0	0	1
Idaho:											
Boise	0		0	0	1	0	0	0	0	5	7

[1] Nonresident.

City reports for week ended June 23, 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								
Colorado:											
Denver	2	27	0	283	2	9	0	4	1	48	68
Pueblo	0	------	0	12	0	0	0	1	0	3	7
New Mexico:											
Albuquerque	0	------	0	13	2	1	0	2	0	0	16
Utah:											
Salt Lake City	0	------	0	2	3	2	0	0	0	88	19
Nevada:											
Reno	0	------	0	0	0	0	0	0	0	0	5
Washington:											
Seattle	0	------	0	22	3	9	1	2	0	21	80
Spokane	0	1	1	17	0	1	0	1	0	12	32
Tacoma	------	------	------	------	------	------	------	------	------	------	------
Oregon:											
Portland	1	------	0	12	2	3	0	2	0	15	69
Salem	0	------	------	0	------	0	0	------	0	0	------
California:											
Los Angeles	20	26	0	28	6	42	0	14	1	60	232
Sacramento	0	------	0	2	3	3	0	4	3	6	33
San Francisco	0	2	0	165	5	6	0	5	0	21	153

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
New Hampshire:			
Concord	0	0	1
Massachusetts:			
Boston	1	0	1
New York:			
New York	0	1	5
Pennsylvania:			
Philadelphia	1	0	0
Ohio:			
Cincinnati	0	1	0
Illinois:			
Chicago	5	0	1
Michigan:			
Detroit	2	1	0
Wisconsin:			
Milwaukee	1	0	0
Missouri:			
Kansas City	2	0	0
St. Joseph	0	1	0
Maryland:			
Baltimore	1	0	0
District of Columbia:			
Washington	2	0	0

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
West Virginia:			
Charleston	1	1	0
Florida:			
Miami	0	0	1
Kentucky:			
Louisville	0	0	1
Alabama:			
Birmingham	0	0	1
Texas:			
Houston	0	0	1
Idaho:			
Boise	0	0	1
Nevada:			
Reno	0	0	2
Washington:			
Seattle	0	1	0
Spokane	1	0	1
California:			
Los Angeles	1	0	122
San Francisco	0	0	27

Lethargic encephalitis.—Cases: New York, 1; St. Paul, 1; Wheeling (nonresident), 1; Atlanta, 1.

Pellagra.—Cases: Philadelphia, 1; Raleigh, 1; Charleston, S.C., 3; Atlanta, 2; Savannah, 1; Birmingham, 1; Mobile, 1; Montgomery, 3; Oklahoma City, 2; San Francisco, 1.

Typhus fever.—Cases: Baltimore, 1; Savannah, 1; Mobile, 1.

Rabies in man.—Boston, 1 death (nonresident).

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended June 16, 1934.—During the 2 weeks ended June 16, 1934, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada, as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis	1		1	2	3					7
Chicken pox		2		193	569	90	42	74	70	1,040
Diphtheria		4	2	28	10	9	9		5	67
Dysentery				2	1					3
Erysipelas		1		3	8	4	2		1	19
Influenza		5		4	1	1				11
Lethargic encephalitis							1			1
Measles		69		880	101	576	48	1	6	1,676
Mumps					414	18	2	4	81	519
Paratyphoid fever					1				1	2
Pneumonia		2			39		4		7	52
Poliomyelitis					2				2	4
Scarlet fever		9	4	162	204	31	16	5	136	567
Trachoma							4		3	7
Tuberculosis	3	2	23	99	119	20	37	7	47	357
Typhoid fever			1	36	6	1	1		2	47
Undulant fever					5		1			6
Whooping cough		8		161	508	78	30	1	61	847

CUBA

Provinces—Notifiable diseases—4 weeks ended May 26, 1934.—During the 4 weeks ended May 26, 1934, cases of certain notifiable diseases were reported in the Provinces of Cuba, as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	3	1		8			12
Chicken pox	1	10	4	5	4	12	36
Diphtheria		4	2	2		3	11
Hookworm disease		1	1	4			6
Leprosy		2		5		2	9
Malaria	62	5	21	62	1	299	450
Measles		6		6		1	13
Scarlet fever		2				1	3
Tuberculosis	8	45	12	42	4	11	122
Typhoid fever	5	9	9	51	40	12	126

GERMANY

Vital statistics—1933, comparative.—Following are vital statistics for Germany for the year 1933 compared with 1932:

	1933	1932		1933	1932
Number of marriages	630, 826	509, 597	Deaths per 1,000 inhabitants	11.2	10.8
Number of live births	956, 915	978, 210	Deaths under 1 year	73, 022	77, 451
Live births per 1,000 inhabitants	14.7	15.1	Deaths under 1 year per 100 live births	7.6	7.9
Number of stillbirths	27, 965	29, 588			
Total deaths	730, 802	699, 620			

PUERTO RICO

Notifiable diseases—4 weeks ended June 16, 1934.—During the 4 weeks ended June 16, 1934, cases of certain notifiable diseases were reported in the municipalities of Puerto Rico, as follows:

Disease	Cases	Disease	Cases
Chicken pox	128	Pellagra	7
Colibacillosis	1	Pink eye	7
Diphtheria	39	Ringworm	1
Dysentery	56	Syphilis	22
Erysipelas	6	Tetanus	6
Filariasis	1	Tetanus, infantile	1
Influenza	36	Trachoma	15
Malaria	1, 302	Tuberculosis	477
Measles	75	Typhoid fever	20
Mumps	43	Whooping cough	177
Ophthalmia neonatorum	7		

YUGOSLAVIA

Communicable diseases—May 1934.—During the month of May 1934 certain communicable diseases were reported in Yugoslavia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	38	4	Poliomyelitis	1	
Cerebrospinal meningitis	15	1	Scarlet fever	300	12
Diphtheria and croup	506	53	Sepsis	8	6
Dysentery	29	2	Tetanus	59	24
Erysipelas	135	4	Typhoid fever	144	21
Measles	1, 081	19	Typhus fever	398	15

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 June 29, 1934, pp. 768–781. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued July 27, 1934, and thereafter, at least for the time being, in the issue published on the last Friday of each month.)

Cholera

China—Tientsin.—During the week ended June 2, 1934, 1 case of cholera was reported in Tientsin, China.

India, French—Mahe.—During the week ended May 26, 1934, 11 cases of cholera were reported in Mahe, French India.

Plague

United States—California.—A report of plague in California appears on page 831 of this issue of PUBLIC HEALTH REPORTS.

Smallpox

Liberia—Chiefdom of Sanoyea.—A report dated June 27, 1934, states that an epidemic of smallpox had been reported in the Chiefdom of Sanoyea, Liberia, about 75 miles from Monrovia.

Yellow Fever

Ivory Coast—Abidjan.—For the period May 21 to 31, 1934, 2 cases of yellow fever with 1 death were reported in Abidjan, Ivory Coast.