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An Experimental Study of the Relation of Hydrogen Ion Concentrations to the Formation of Floc in Alum Solutions.

By EMERY J. THERIAULT, Assistant Chemist, and W. MANSFIELD CLARK, Chief of Division of Chemistry, Hygienic Laboratory, United States Public Health Service.

In approaching a scientific analysis of the art of water clarification it seems to us essential to distinguish the several aspects of the subject. These are so integrated in actual plant operation that it is difficult to perceive the true importance of each of the several factors which have to be mastered by the operator under every exigency. The isolation of phenomena, and their exact quantitative evaluation, will alone permit a true appraisal of any factor in relation to the process as a whole.

We have limited our attention to certain laboratory experiments which clarify one distinct aspect of the alum process. Our data doubtless lack the scope desirable for general practical application, but they indicate that, unless factors still to be investigated have an unexpected influence, maximum precipitation of added aluminium will occur within definite and narrow limits of hydrogen ion concentration.

It is well recognized that a precipitate is not formed from alum when the final solution is either too "acid" or too "alkaline." Hitherto the essential degree of "acidity" or "alkalinity" has been sought in the *quantity* of acid or alkali determined by one or another analytical method. More recently there has been a growing appreciation of the fact that the waterworks operator is dealing with reversible reactions, that his task is to control equilibria, and that all too often the methods of the analyst, devised originally for other purposes, upset an established equilibrium to yield information of dubious value to the case at hand.

There is little need to review here the relations which have been brought to light in studies of equilibria among acids and bases. They have been emphasized frequently and summarized in various treatises. However, we shall preface our contribution by a brief discussion of a set of equilibria pertinent to the subject.

It has frequently been emphasized that the construction of a titration curve may show the salient characteristics of an acid, a base, or an ampholyte. It is therefore interesting to approach the

problem first by a consideration of the titration curve of an aluminium salt.

In Figure 1 are shown two such curves. These were constructed from the data obtained when known concentrations of potassium alum were titrated with sodium hydroxide solutions and the hydrogen ion concentration was measured after each addition of alkali.

For the determination of hydrogen ion concentration, the electrometric method was used. The potentiometric system consisted of a Leeds and Northrup type K potentiometer and type R galvanometer with properly shielded switchboard and wiring. The Weston cell values were certified by the Bureau of Standards. The calomel half-cells used as working standards were compared with a battery of tenth normal KCl calomel half-cells and the system was brought to the standard recommended in "The Determination of Hydrogen Ions" (Clark, 1920).

The hydrogen used was electrolytic hydrogen supplied in tanks. It was passed over heated platinized asbestos and then over soda-lime, and wherever possible was led through copper tubing rather than rubber tubing.

Since very dilute solutions were to be dealt with in some of the experiments, it was considered of more importance to guard the solution from atmospheric contamination during handling than to take advantage of several features in Clark's electrode vessel. Therefore, instead of titrating aliquots and measuring each when separately transferred to the electrode vessel, continuous electrode measurements were carried out in Erlenmeyer vessels, into which were led the electrodes, the gas inlet and outlet, a gooseneck siphon from the saturated calomel half-cell, and a burette tip. The chief objection to this arrangement was in the narrow liquid junction—made narrow to prevent too great contamination of the solution by the saturated KCl of the liquid junction and too great a loss of titrated material by the exchange. However, this inherent error was probably small and constant and displaces our curves in no essential respect. All titrations were made at constant temperature.

The alum solutions used in the titrations illustrated in Figure 1 were prepared from conductivity water, and a sample of

$$K_2SO_4 \cdot Al_2(SO_4)_3 24H_2O$$

which had been recrystallized several times. Analysis by the procedure of Blum (1916) indicated 99.6 per cent, 100.1 per cent, and 100.1 per cent, or an average of 99.93 per cent of the theoretical amount of aluminium. Once prepared, this sample was carefully protected against change in moisture content.

The sodium hydroxide solution and the calcium hydroxide solutions used in other measurements were prepared from electrolytic

amalgams which were decomposed with boiled-out "conductivity" water. All operations were made with adequate protection against contamination by atmospheric CO_2.

In accordance with custom, we shall express hydrogen ion concentrations in terms of Sørensen's pH, which is defined by the relation $pH = \log \frac{1}{[H^+]}$.

With the type of vessel used in these titrations, considerable time was necessary at the start to thoroughly displace oxygen and to establish equilibrium stable within a small part of a millivolt. Thereafter there was found evidence that the potentials obtained after each addition of alkali rapidly became indicative of a true *electrode* equilibrium. This conclusion rests on the following evidence: The same equipment rapidly gave equilibrium potentials with systems which do not change as does the aluminium system, and it furnished smooth titration curves on rapid titration of aluminium salts.

On the other hand, with mixtures of aluminium salts and alkali, there was noted a slow drift in potential which was not in all cases entirely orderly, but which had the characteristics indicated below.

Time in minutes after adding alkali (t.)	Log t.	Potential of chain.
1	0	0.5138
3	.47	.5130
77	1.88	.5112
102	2.01	.5109
160	2.20	.5106
180	2.26	.5105

This, the smoothest relation found, shows, on graphic extrapolation, that if the drift had continued until the pH of the solution was altered 0.05 pH units it would have required about 166 hours. Generally, however, the drift was not so linear in relation to log t, but continued to decline at a continuously lower rate than that indicated above. Evidently such drifts would be overlooked by one using a cruder method of measurement. We believe them to be due to a slow shift in equilibria due to the properties of the solid phase.

In the more alkaline regions the drift was often of a serious nature, and the plotted curves can not be taken to indicate that complete equilibrium was approached in the solutions more alkaline than pH 7. The drift was of uncertain nature, and it is probably to be accounted for by the complexity of the processes occurring.

The "aluminium hydroxide" precipitated at the higher acidities is slowly redissolved on the addition of more alkali, and at the same time there is a tendency for the separation of the crystalline form of the hydroxide as noted by various observers. From this complex,

with its resulting effect on pH and, consequently, on the potential of the hydrogen electrode, about all we can do is to select values which we assume to be most nearly representative.

Assuming that studies at higher and lower temperatures might alter the drifts in potential in a way that might throw light upon the situation, we made measurements at 15° C. and 46° C. The titration

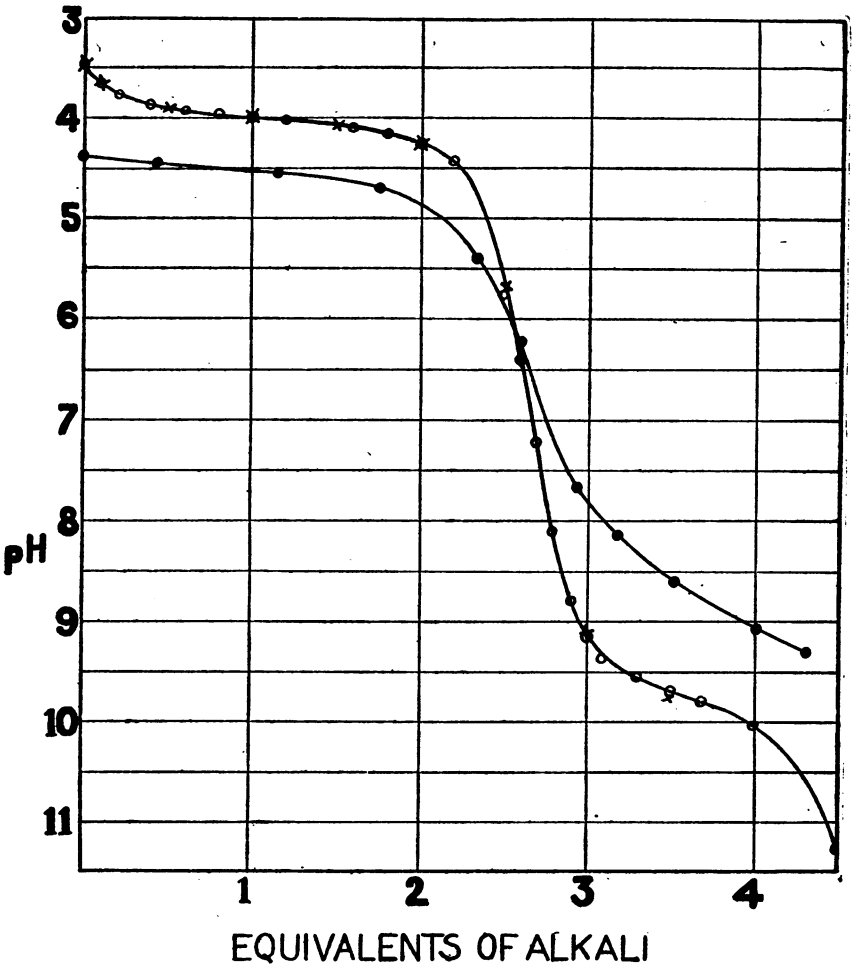

FIG. 1.—Titration curves showing the pH values of solutions of alum at successive stages of treatment with alkali.

curves at these temperatures, like those at 30° C., were fairly satisfactory at pH values less than 7.0, but the drifts in the alkaline regions were erratic and can not be interpreted with confidence.

It may be mentioned in passing that titrations were also made with calcium hydroxide. The titration curves with calcium hydroxide as a base were, in the more acid regions, identical with those made

with sodium hydroxide, with the exception of very minor differences which are of no significance and which are of an order of magnitude attributable to experimental error. In the more alkaline regions the same difficulties mentioned above were encountered.

The points mentioned above do not affect in any very serious way the conclusion that the curves in Figure 1 represent the general trend of the titration process. In Figure 1 the curve marked by blackened circles represents the relation between pH (ordinates) and equivalents of added alkali (abscissæ) in the case of a solution 0.0002 molecular with respect to Al when titrated with NaOH solution at 30° C. Upon the other curve, the circles represent the data obtained in the titration with NaOH of a solution 0.02 molecular with respect to Al. The crosses represent a duplicate series of measurements. If these curves are compared with those published by Hildebrand (1913) and by Blum (1913–14), there will be found a general agreement in the main features. However, the measurements by Hildebrand and by Blum were made with comparatively crude instruments, and for this reason the observers probably hesitated to call attention to detailed features in the titration curve which must have appeared to them very peculiar. One notable feature is the distinct slope of the curve between pH 5 and 8. This certainly can not be due to the presence of a buffering impurity, such as bicarbonate, for our solutions were made with every precaution to exclude such impurities. The fact that the steeper part of the curve should occur so distinctly ahead of the three equivalents of alkali is also food for thought. The flatness of the curve at the start is, of course, accounted for by the throwing out of one or more constituents of the equilibrium as the titration proceeds.

In several papers published on the subject it has been assumed that the isoelectric point could be determined by mere inspection of the titration curve and the selection of the middle point in the steep part of the curve. This assumption was based on a procedure legitimate for the approximate determination of isoelectric points when there is symmetry in the number of acidic and basic dissociations and complete solubility of material concerned in the equilibrium equations. None of these conditions has been shown to apply to the case at hand.

In the titration of poly acids or bases it is usually found that the titration curve exhibits the several steps of neutralization. Even when the dissociation constants are close together, a distinct inflection of the titration curve can usually be discerned. In the case at hand, there is but one inflection, and this may be considered to be between the region of acidic dissociation and the region of basic dissociation. It would, therefore, seem legitimate to neglect a distinction between

the first, second, and third basic dissociations and to consider them together. Thus if we have—

$$\frac{[Al^{+}(OH)_2][OH^{-}]}{Al(OH)_3} = K_{b_1} \quad \text{----------} \quad (1)$$

$$\frac{[Al^{++}(OH)][OH^{-}]}{[Al^{+}(OH)_2]} = K_{b_2} \quad \text{----------} \quad (2)$$

and

$$\frac{[Al^{+++}][\bar{O}H]}{[Al^{++}(OH)]} = K_{b_3} \quad \text{----------} \quad (3)$$

it is easily shown that

$$\frac{[Al^{+++}][OH^{-}]^3}{[Al(OH)_3]} = K_{b_1} K_{b_2} K_{b_3} = K_b \quad \text{----------} \quad (4)$$

The use of equation (4) and the assumption of low solubility for $Al(OH)_3$ would lead to a theoretical curve similar in its general form to the upper portions of the curves shown in Figure 1. Incidentally, the low solubility of $Al(OH)_3$ will contribute very markedly to the position of the curve on the pH axis so that such a curve can not be directly compared with those curves used to depict equilibrium conditions when all components are soluble. By the same token the presence of *any* insoluble component would greatly modify the classic type curve and give it the general form of the experimental curve. Therefore we are not justified in using equation (4) as alone representative of *actual* conditions. Without committing ourselves at all to the assumption of the reality of particular modes of ionization, but merely to deal with convenient formulas, let us assume the ionizations which are involved in the following equilibrium equations:

Acidic dissociation:

$$\frac{[Al\ \bar{O}\ (OH)_2][H^{+}]}{[Al(OH)_3]} = K_a \quad \text{----------} \quad (5)$$

Basic dissociation:

$$\frac{[Al^{+++}][\bar{O}H]^3}{[Al(OH)_3]} = K_b \quad \text{----------} \quad (6)$$

If the solution is so dilute that the ionizations of all aluminium *salts* are *complete*, then the total aluminium will be the sum of the undissociated aluminium hydroxide, and each concentration of each ion. If, furthermore, the conditions are such that solid aluminium hydroxide is present in gram mols S, then the total aluminium, T, will be—

$$T = S + \text{soluble } [Al(OH)_3] + [Al(\bar{O}H)_2O] + [Al^{+++}] \quad \text{----------} \quad (7)$$

Substituting (5) and (6) and considering that at the equilibrium state [soluble $Al(OH)_3$] is a constant, C, we have —

$$T = S + C + \frac{K_a C}{[H^+]} + \frac{K_b C}{[OH]^3}$$

or since $\left[\overset{+}{H}\right]\left[\overset{-}{OH}\right] = K_w$

$$T = S + C + \frac{K_a C}{[H^+]} + \frac{K_b C [H^+]^3}{K_w^3} \quad \text{(8)}$$

Recasting (8) and differentiating,

$$\frac{dS}{d[H^+]} = \frac{K_a C K_w^3 - 3K_b C\,[H^+]^4}{K_w^3\,[H^+]^2}.$$

There will be a minimum variation of solid with variation of

$[H^+]$ when $\frac{dS}{d[H^+]} = 0.$

This condition is fulfilled when

$$[H^+] = \sqrt[4]{\frac{K_a C K_w^3}{3K_b C}} \quad \text{(9)}$$

But $K_a C$ is the solubility product K_{as}, and $K_b C$ is the solubility product K_{bs}. Therefore

$$[H^+] = \sqrt[4]{\frac{K_{as} K_w^3}{3K_{bs}}} \quad \text{(10)}$$

We know from the graphic expression of relations that $\frac{dS}{d[H^+]}$ passes from positive to negative in passing the isoelectric point. Therefore S is a maximum at the isoelectric point. To show that $[H^+]$ in (10) is the isoelectric point, that point at which there is electrical equivalence of positively and negatively charged aluminium ions, we proceed as follows: The condition to be fulfilled is

$$\left[Al\left(\overline{OH}\right)_2 O\right] = 3\,[Al^{+++}] \quad \text{(11)}$$

Substituting in (11) the relations of (5) and (6) we have

$$\frac{K_a\,[Al(OH)_3]}{[H^+]} = \frac{3\,K_b\,[Al(OH)_3]}{\left[\overline{OH}\right]^3}$$

Also

$$[H^+]\left[\overline{OH}\right] = K_w$$

But $K_a\,[Al(OH)_3]$ and $K_b\,[Al(OH)_3]$ are the acid and base solubility products K_{as} and K_{bs}, respectively.

Substituting, we have

$$[H^+] = \sqrt[4]{\frac{K_{as} K_w^3}{3K_{bs}}}$$

This is identical with (10)

Now, Heyrovsky (1920) working at 25° C. has given for K_{as} and K_{bs} the values 35×10^{-14} and 1×10^{-33}, respectively. Using the more favorable of the experimental data obtained from our titration curves at 30° C., we find approximately $K_{as} = 1 \times 10^{-12}$ and $K_{bs} = 1 \times 10^{-32}$. Heyrovsky's values introduced into equation (10) give an isoelectric point of pH 5.49. Our values give pH 5.6. According to the assumptions, then, the isoelectric point should lie between pH 5.5 and 5.6. We place little confidence in the calculation, however, because on returning to the titration curves themselves we find that we are unable to account for several features of the curves when using the solubility products mentioned above.

Furthermore, it is found that by specifying ionizations other than those used in the elementary treatment given, we obtain a variety of equations which, upon the assumption of one or several components of small solubility, will reduce to a form giving essentially the same picture as that presented. Thus the equations we have given furnish a correct description of principles but tell nothing whatever of the actual components entering into the problem. This has become evident in our attempts to formulate the very distinct slopes of the experimental curves found between the addition of two and the addition of three equivalents of alkali. As will appear later, the pH values found on these slopes are of the very greatest importance in the practical application of alum-coagulation, and no makeshift explanation will suffice for the problem at hand. The intersection of the curves shown in Figure 1 is of undoubted significance, but attempts to find a relation between intersections at various dilutions have failed so far.

In short, then, we are presented with a problem of very great complexity, owing, undoubtedly, to the very low and consequently variable solubility of one or more components of the equilibrium state.

We have dwelt at some length upon this problem in order to indicate its general nature and to disarm those who, carrying over to the case at hand principles which furnish reliable data in other systems but which are inapplicable here, have assigned definite values to the isoelectric point. Inasmuch as a variation of 0.2 pH may have great practical significance, we shall need an accurate evaluation of the isoelectric point; and in the hope that future work will reveal it, we may now turn our attention to an indirect method of attack.

EXPERIMENTS ON RATE OF FLOC FORMATION.

We may safely assume from analogy that in any homogeneous mixture of alum solution and alkaline water, the reversible reactions proceed almost instantaneously to a state of equilibrium which would remain unaltered were there no separation of solid material. On the other hand, it is a matter of experience that the passage of a precipitable material from invisible to visible aggregations often requires very considerable time. Undoubtedly one determining factor is the following: It has repeatedly been shown for liquid drops forming in a saturated atmosphere, for crystals and so-called amorphous precipitates separating from solution, that the small aggregates are less stable than the large, their material "distilling" over to, or at least having a preferential tendency to deposit upon, the larger aggregates. In the case of raindrops it can be shown by very simple thermodynamic reasoning that the vapor pressure in equilibrium with a very small drop is greater than the vapor pressure in equilibrium with a larger drop. Therefore, a higher degree of saturation must be required to form the first minute drops than the subsequent larger ones. The same reasoning can be applied to the formation of bubbles of gas from a solution of a gas in a liquid and to the formation of a solid aggregate from a solution of the solid in a liquid. In each case appreciable time is required for migration and orientation of the material entering into the aggregate.

Now, then, if all other conditions could be held constant while the degree of supersaturation of the separable material is varied, the rate of aggregation would be proportional to the concentration in the liquid phase of the separable material. In the case at hand we could vary the degree of supersaturation of the water with $Al(OH)_3$ (assuming this to be the precipitate) either by increasing the total alum added at a given final pH value or with constant aluminium by varying pH. Under the last condition the maximum should occur at the isoelectric point. Undoubtedly the experimental attainment of the condition that "all other conditions shall remain constant" is difficult, especially since we have very little detailed information upon the mechanism of a solid separating from solution. Nevertheless, with due reservation, we should expect minimum time of flocculation at the isoelectric point. As will be shown presently, we obtain experimentally a minimum time in a zone of pH within which we have found a provisional value for the isoelectric point.

It would be difficult, however, to formulate *a priori* the precise mathematical relations, because we know little quantitatively about the forces operating in the formation of precipitates. We prefer, therefore, to describe our experimental results and to leave them

formulated by means of empirical charts and equations which are sufficient to bring out the important features.

In the study of flocculation in waters it has sometimes been the custom to ascribe certain numbers to flocs of different character. This seems to us an irrational procedure, because, aside from the inherent difficulty in obtaining any mathematical relation between the qualities to which the numbers are assigned, the observer has to carry from experiment to experiment a very precise picture of several flocs to which he has ascribed numbers. If, however, the attention is fixed upon one state, as, for instance, the very first detectable formation of floc, the remainder of the measurement may be left to the impersonal accuracy of a stop watch. It is this method that we have employed, leaving all questions of the quality of floc to incidental notes. As we shall see, this was a fortunate choice of method. The experimental method followed will be briefly described.

A definite volume of a solution of known composition was treated with varying amounts of aluminium sulphate in dilute solution. After mixing as rapidly as possible, the liquid was poured into a 100 c. c. cylinder. To increase the visibility of the floc, the cylinder was *slightly* agitated whenever observations were made. The initial turbidity, the time required for the first appearance of a "floc," the character of the "floc," and its rate of settling and its abundance were noted. Caliometric pH measurements were made with the mixture. The temperature at which the experiments were conducted did not differ appreciably from 22° C.

Following this procedure, the entire range of pH values within which a "floc" can be expected was investigated. At first the solutions used were the ordinary buffer solutions of the usual strength. In order to approach more nearly to the buffer strength of natural waters, experiments were also made with buffer solutions at various degrees of dilution. Experiments were also made using solutions of sodium hydroxide, sodium carbonate, and calcium hydroxide, although we have left for future investigation detailed studies of the effects of specific salts.

It was found to hold very strictly that the "floc" which appeared first in any given series was invariably the best as far as flocculent appearance was concerned. It was also the "floc" which appeared first which possessed the qualities of rapid settling and abundance in the highest degree.

If we select those cases in which the total salt content—in this case buffer salts—was constant and in which the concentration of aluminium varied, we find, on plotting the final pH values against the flocculation time, that we have a family of curves of the general type shown in Figure 2.

In Figure 2 the concentration of "alum" was 400, 300, 200, and 100 p. p. m. for curves A, B, C, and D, respectively. The buffer

strength (total salt) was the same in all cases. The optimum pH value for the production of a "floc" in a minimum time appears to increase slightly as the concentration of alum decreases. The following values are taken from Figure 2:

Using 400 p. p. m., the optimum pH value is about 4.95.
Using 300 p. p. m., the optimum pH value is about 5.10.
Using 200 p. p. m., the optimum pH value is about 5.25.
Using 100 p. p. m., the optimum pH value is about 5.40.

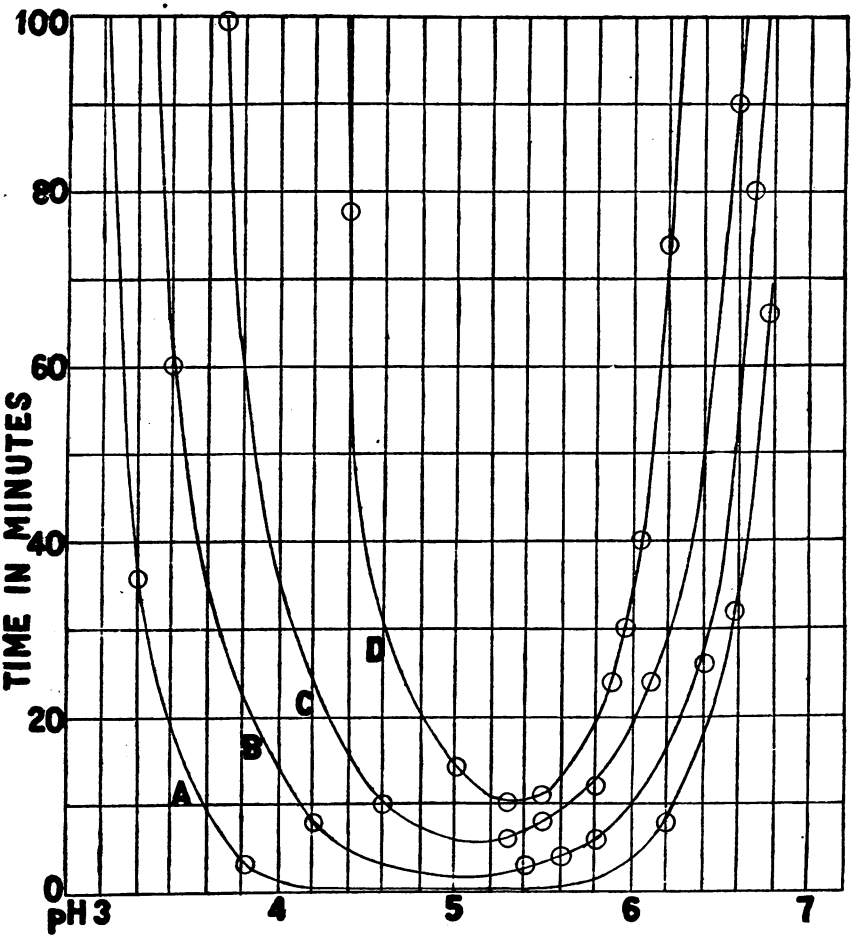

FIG. 2.—The relation between time required for the first appearance of floc in solutions buffered at various pH values when the total salt concentration is constant and the alum concentration is varied. A=400 p.p.m. of alum; B=300 p.p.m. of alum; C=200 p.p.m. of alum; D=100 p.p.m. of alum.

When less than 100 p. p. m. are used, the optimum pH hovers about a value of 5.5, and it is this value which is of particular significance, since the amounts of "alum" ordinarily used are always considerably less than 100 p. p. m. (6 g. p. g.).

It is to be noted that as the concentration of "alum" decreases, the width of the curves also decreases. Using 400 p. p. m. of alum, the final pH value might be varied over a range of about 2.0 pH units, without any appreciable effect on the flocculation time. Using 100 p. p. m., however, the width of the optimum zone would be less than 1.0 pH unit. Using less than 50 p. p. m., it is necessary to adjust the solutions quite carefully in order to secure a "floc" within a reasonable time.

As stated above, these results were obtained with only slight agitation of the liquid made at the moment of observation and in 100-c. c. cylinders. Now, it is most interesting to note that the time of flocculation can be varied by forming the mix in vessels of different size. For instance, a large, shallow tank containing a large volume of buffer solution was allowed to deliver the buffer solution through a 1-inch pipe to an inclined trough. At the upper end of this trough there was delivered a small constant stream of alum solution. At the lower end a crosspiece formed a "hydraulic jump." The mixture, as it ran off the trough, was collected in vessels varying in capacity from 10 c. c. to 5,000 c. c., care being taken to avoid a graded order of collection. It was invariably found that the time for first appearance of floc was least in the large vessels. The same result was obtained by hand mixing and subsequent pouring of the mix into vessels of different size. The difference in time required for flocculation is remarkable, a precipitate forming within one minute in a large vessel and often requiring hours to become visible in small vessels. Though we recall no published data upon this phenomenon, we know that it is well recognized by plant operators, who have frequently observed that tests in laboratory vessels do not correspond to the flocculation in the basin. We have in one case plotted the time of flocculation against volume of collecting vessel and found the curve to become flat near the 2,000-c. c. volume. While we have not pursued this problem in sufficient detail for practical application, we are confident that, if necessary, a relation could be found for calculating the basin time from a series of small-volume experiments. However, the "volume" effect was constant in our laboratory experiments, and this factor therefore does not alter our conclusions regarding *relative* pH effects.

We believe that this "volume effect" is little more than the effect of the volume-surface ratio upon circulation, for mechanical circulation will decrease the time required for floc formation. We conducted a series of experiments like those summarized in Figure 2 and, in addition, imparted to the solution a slow rotary motion. The total amount of floc produced seemed not to be affected, and the optimal pH remained the same, though, of course, the time values were altered from those shown in Figure 2.

A few experiments made with very small quantities of alum indicate that the curves relating pH and flocculation time would be of the type shown in Figure 2, but that the two branches would tend to be closer together than those shown. Since the branches of the curve tend in all cases to become parallel, it is evident that no floc would become apparent for a very long time in vessels of laboratory size when the pH lay beyond the asymptote to either branch. With *very* dilute alum solutions the region of pH within which floc might appear in laboratory vessels might well narrow to a zone less than 0.3 pH units wide. Experimentally it has been found that if a floc does not appear within a few hours with slight occasional agitation, it will not appear within a greatly reduced time when there is mechanical agitation. It would thus appear that under large-volume conditions a rigid control of the final pH is necessary for floc formation from extremely dilute alum solutions.

We stated in a former section that, without much confidence in its accuracy, we obtained a provisional value of 5.5 for the isoelectric point. With still less confidence in the sufficiency of the reasoning, we then suggested that a study of flocculation time would reveal the isoelectric point. We then arrived, by experimental methods, at the point pH 5.5 for the minimum coagulation time in dilute solution. An examination of the data of Buswell and Edwards (1922) on residual alum found under commercial conditions suggests that if there were included data for effluents of pH values lower than those observed, there would be obtained a curve relating pH and residual alum passing through a minimum residual alum point at about pH 5.5. Thus, whatever uncertainty there may be in each mode of approach, there is substantial agreement in the tentative results of each method.

Up to this point we have considered only those experiments in which the various experimental conditions were kept as constant as possible and, so far as was practicable, only the hydrogen ion concentration and the total aluminium were varied. Since experimenters in other fields have reported the effects on coagulation of the total salt, we have studied the effect of varying the concentration of the buffer solutions used.

The influence of the salt content is evident from an inspection of Figure 3. In the derivation of the experimental values, 100 p. p. m. of alum were used in all cases. The buffers for curves A, B, and C are $\frac{M}{20}$, $\frac{M}{100}$, and $\frac{M}{200}$, respectively. The width of the optimum zone decreases as the buffer concentration, i. e., total salt, decreases. We would expect that a water of low alkalinity or low total salt content should require a much more delicate adjustment of the dose of alum than a water of high alkalinity or high salt content.

In the above experiments we have avoided the use of carbonate solutions and have selected buffer salts adapted to the control of pH values within the ranges desired. Our first concern, of necessity, was to produce conditions accurately controlled for laboratory studies rather than conditions directly comparable with those obtained in natural waters. We were confident that this method of attack would, if handled with due caution, lead directly to a clarification of the commercial problem. In this we were not disappointed, as the following experiments will indicate.

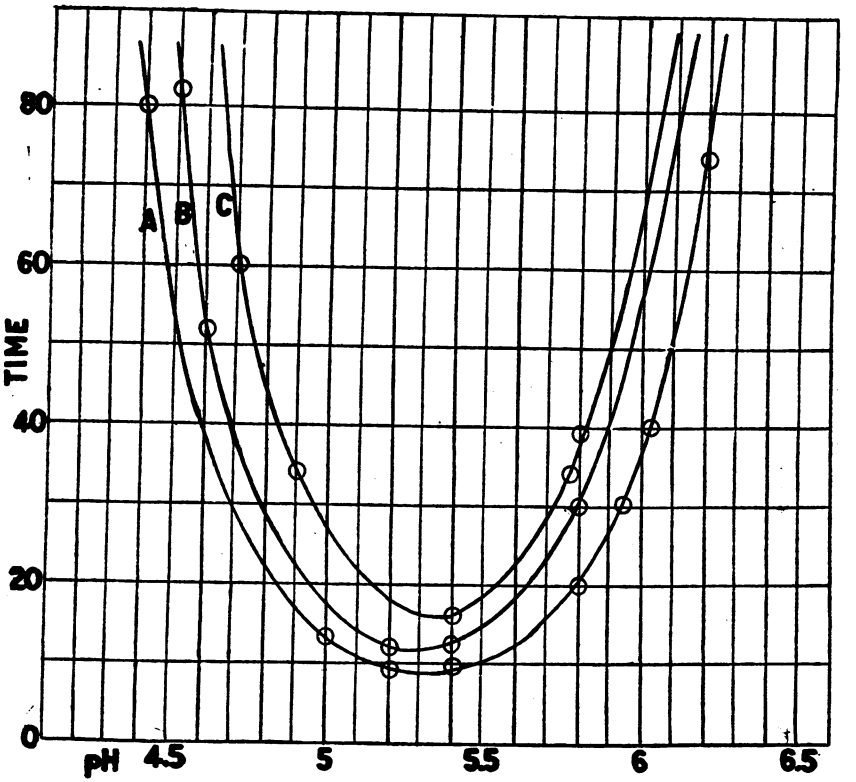

Fig. 3.—The relation between time (in minutes) required for the first appearance of floc in solutions buffered at various pH values when the total alum is constant and the total salt concentration is varied. Alum, 100 p.p.m. A=$\frac{M}{20}$ salt; B=$\frac{M}{100}$ salt; C=$\frac{M}{200}$ salt.

As will be seen from the titration curves given in Figure 1, there is sufficient slope near pH 5.5 to obtain a slight but definite buffer action with aluminium sulphate and a hydroxide. While the buffer action is by no means as marked as it is in the case where supplementary buffers, such as phosphate mixtures, are used, it is nevertheless sufficient. At acidities as high as pH 5.5 the carbon dioxide of the air is not nearly as effective in disturbing the equilibrium of dilute solutions as it is in dilute solutions nearer to neutrality. It was,

therefore, possible, by very careful manipulation, to obtain mixtures of aluminium sulphate and calcium hydroxide having definite pH values in the range from pH 4.6 to 6.0. It is obvious that in using a constant amount of alkali without supplementary buffers, it is necessary to vary the concentration of the aluminium in order to obtain different pH values. Conversely, if we use a constant amount of aluminium sulphate, we must vary the concentration of the alkali. Since the salts themselves (in this case alkalies) exert a specific

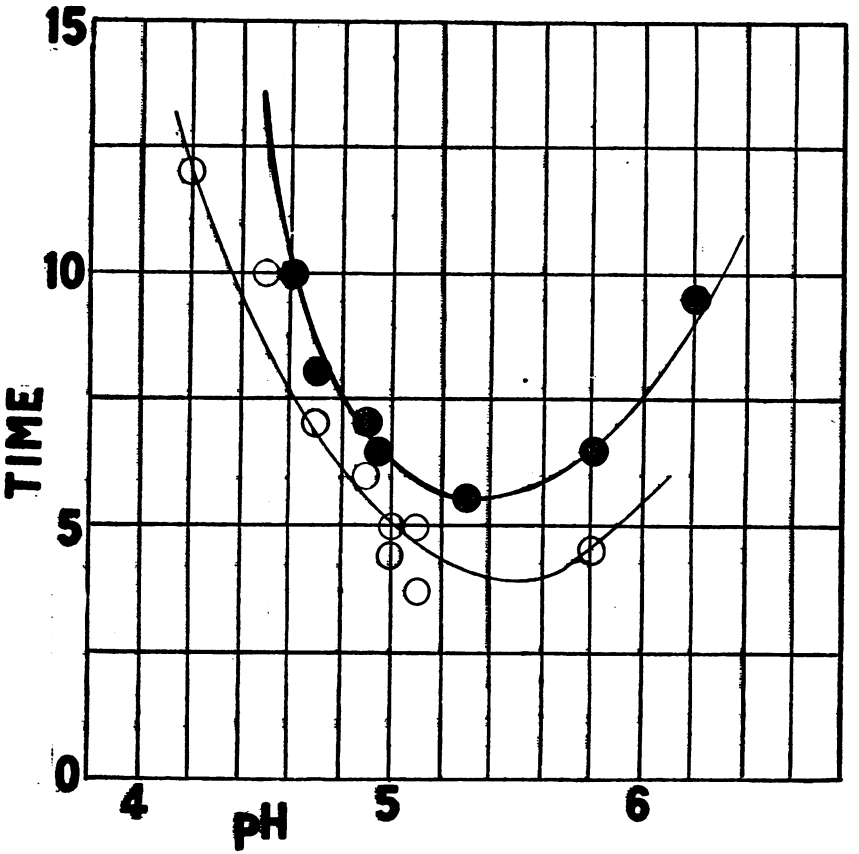

Fig. 4.—Relation of time (in minutes) required for first appearance of floc in mixtures of alum and calcium hydroxide of indicated pH values.

coagulating effect, it is obvious that one end of the series will not be strictly comparable with the other end. This results in a dissymmetry in the curves obtained, which may be overcome somewhat by the addition of a "neutral" salt, such as sodium chloride. Since we are dealing with mixtures having comparatively little buffer effect in the range in which we desire to work, it becomes a rather difficult matter to make all the adjustments necessary so that one end of a series of solutions will be more or less comparable with the other end.

Since, in general, the results with these somewhat unstable mixtures harmonized with the results obtained when more definitely controlled solutions were used, we were content for the time being to assume that the conclusions would be applicable without much, if any, change to the case of natural water. In fact, experiments using Washington, D. C., city tap water have shown that this particular water, at least, is very much easier to handle than pure solutions of hydroxides or carbonates.

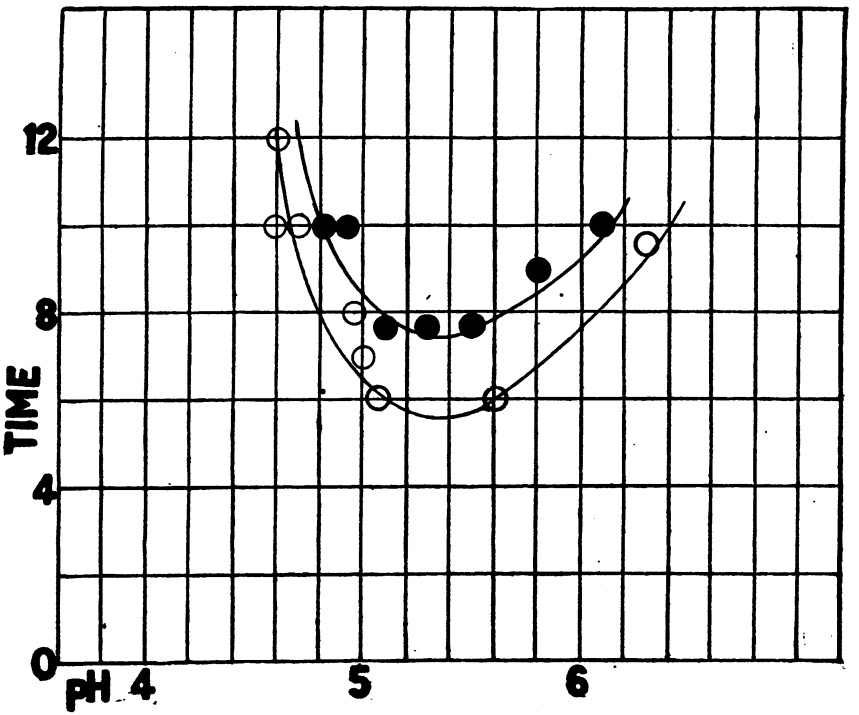

Fig. 5.—Relation of time (in minutes) required for first appearance of floc in mixtures of alum and sodium hydroxide of indicated pH values.

In Figure 4 we have presented some results obtained, using $Ca(OH)_2$ without the use of supplementary buffers. The various pH values were obtained by using different amounts of alum. The strength of the $Ca(OH)_2$ solution was about $\frac{M}{500}$. The curve could not be extended very far toward the right-hand side. The optimum pH value certainly lies between pH 5 and pH 6.

In Figure 5 we have presented results obtained, using $\frac{M}{500}$ NaOH with varying amounts of alum. The best floc was obtained at a pH value of about 5.2. It is interesting to compare this curve with the curve shown in Figure 6, in which the amount of alum added was kept constant and the concentration of alkali was varied. The

optimum in Figure 6 is around pH 5.8. We would conclude from Figures 4, 5, and 6 that the optimum pH value for the coagulation of aluminium sulphate was somewhere between pH 5 and pH 6. Using buffered solutions, we have fixed on the value of about 5.5 when less than 100 p. p. m. of alum is used.

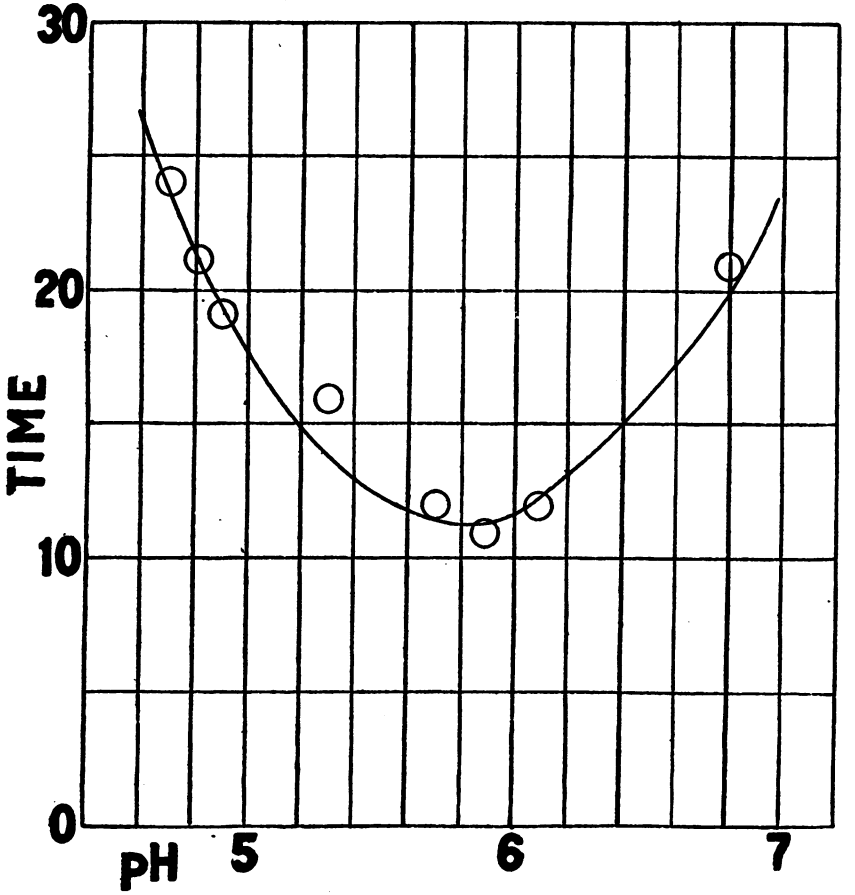

Fig. 6.—Relation of time (in minutes) required for first appearance of floc in mixtures of alum and sodium hydroxide of indicated pH values when the alum is constant in all cases.

It has been found that the results of the flocculation experiments may be represented with great fidelity by the use of expressions, the general form of which is—

$$t = k_1 e^{k_2 x^2}$$

When t = flocculation time expressed in minutes;

x = deviation of pH value from optimum = $pH - pH_0$ when $pH_0 = 5.5$;

k_2 = a constant for a given buffer strength;

k_1 = a constant for a given concentration of alum; and

e = base of Naperian logarithms.

We shall not dwell upon the constants found for the laboratory conditions, but we do call attention to the possibility that a formula of this type, if it embody constants applicable to a particular locality, may prove useful.

In conclusion, we wish to emphasize the fact that we have not concerned ourselves with relations between the precipitates formed and the nature of the coloring matters and suspensions which the floc is intended to remove under commercial conditions. We have made an attack only upon the conditions governing floc formation when the possible influence of color and suspension is left out of consideration. The laboratory results therefore have a limited range of application unless the unaccounted factors can be shown to be of negligible importance. However, the experiments decribed undoubtedly lay some of the groundwork upon which further studies may be built, and in certain respects they are directly applicable to commercial conditions. Certain of the practical conclusions are altogether too obvious to require further discussion. Others involve a detailed consideration of aspects with which we are not now concerned, and we may therefore leave their discussion to other investigators.

SUMMARY.

The outstanding features of the results of this study are as follows:

The hydrogen ion concentration of the final mixture of water and alum is of fundamental importance in the formation of floc. When other possible factors are left out of consideration, optimum conditions for floc formation will be found with a narrow zone of pH centered for dilute solutions at pH 5.5. The more dilute the water in total salt content and the less the alum added, the narrower becomes the pH zone with which optimum floc formation is to be found. Consequently, precise pH control should in favorable cases permit of great economy in alum dosage.

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SOME NEW SULFONPHTHALEIN INDICATORS.

A Preliminary Note.

By BARNETT COHEN, Associate Chemist, Hygienic Laboratory, United States Public Health Service.

For the determination of H-ion concentration by the colorimetric method, the indicator series of Clark and Lubs has been found extremely useful. Improvement of this indicator series may be sought in two ways: One is the introduction of suitable indicators to fill gaps in the pH scale not now adequately covered; the second is in the substitution of a sulfonphthalein compound for methyl red. As is well known, methyl red is much less stable than the sulfonphthalein indicators and is readily reduced. Clark and Lubs retained it in their series because methyl red was at that time indispensable in covering an important pH range.

The following new sulfonphthalein indicators are suggested as filling the above requirements. The dyes were synthesized in the usual way, complete details of which will be published later.

Chemical name.	Suggested common name.	Color change.	pH range.
m-Cresol sulfonphthalein	Meta cresol purple	Red to yellow Yellow to purple	0.5–2.5 7.6–9.2
Dibromo-dichloro-phenol sulfonphthalein.	Brom-chlor phenol blue	Yellow to blue	3.2–4.8
Tetra bromo-m-cresol sulfonphthalein.	Brom cresol green	Yellow to blue green	4.0–5.6
Dichloro phenol sulfonphthalein	Chlor phenol red	Yellow to red	5.0–6.6
Dibromo phenol sulfonphthalein	Brom phenol red	do	5.4–7.0

Brom cresol green covers almost perfectly the range of methyl red, the apparent dissociation constants in terms of pH being 5.00 and 4.95, respectively.

Brom phenol red and *chlor phenol red,* because of their color changes (yellow to red), may be used advantageously where the dichromatism of brom cresol purple is a disturbing factor.

The protein and salt errors of these new indicators remain to be determined. It is tentatively assumed that such errors are of the same magnitude as those of the other sulfonphthaleins now in use.

INFLUENZA IN THE UNITED STATES.

The following table shows the numbers of cases of influenza reported by State health officers, by telegraph, for the week ended January 27, 1923, compared with similar reports for the corresponding week of 1922, 1921, and 1920.

Similar tables covering the period from October 1, 1922, to January 20, 1923, were published in the Public Health Reports

December 29, 1922, page 3204; January 12, 1923, page 64; and January 26, 1923, page 141.

Cases of influenza reported by telegraph by State health officers for the week ended Jan. 27, 1923, compared with similar reports for the corresponding week of the years 1922, 1921, and 1920.

Division and State.	Week ended—			
	Jan. 27, 1923.	Jan. 28, 1922.	Jan. 29, 1921.	Jan. 31, 1920.
New England Division:				
Maine	25	14	7	387
Massachusetts	131	66	15	(1)
Vermont	.....	1	3	89
Connecticut	120	22	13	4,664
Middle Atlantic Division:				
New York (exclusive of New York City)	408	173	79	4,755
New York City	444	1,230	72	30,456
New Jersey	138	126	33	7,365
East North Central Division:				
Indiana	63	(1)	(1)	(1)
Illinois	350	125	19	29,156
Wisconsin	174	22	43	6,739
West North Central Division:				
South Dakota	2	1	5	(1)
Nebraska	38	.....	1	1,815
Kansas	225	121	29	(1)
South Atlantic Division:				
Delaware	38	2	4	21
Maryland	1,602	93	107	(1)
District of Columbia	100	[2]6	4	(1)
West Virginia	192	(1)	(1)	(1)
Georgia	729	64	25	617
Florida	100	6	10	1,547
South Carolina	.....	(1)	(1)	(1)
East South Central Division:				
Kentucky	(1)	[3]35	19	878
Alabama	1,681	3	.....	203
Mississippi	5,453	(1)	(1)	(1)
West South Central Division:				
Arkansas	2,415	88	37	(1)
Louisiana	501	8	10	763
Texas	390	5	.....	(1)
Mountain Division:				
Colorado (exclusive of Denver)	3	2	(1)	(1)
New Mexico	32	.....	2	260
Pacific Division:				
Washington	(1)	33	(1)	902
Oregon	30	7	(1)	(1)
California	176	48	37	6,615

[1] No report.
[2] 11 cases reported for two weeks ended Jan. 28.
[3] 69 cases reported for two weeks ended Jan. 28.

The following table shows the numbers of deaths from pneumonia (all forms) and influenza, combined, in certain large cities of the United States for the weeks ended January 13 and 20, 1923, as reported by city health officers.

A similar table covering the period from December 3, 1922, to January 6, 1923, was published in the Public Health Reports January 19, 1923, page 101.

Deaths from pneumonia (all forms) and influenza, combined, in large cities of the United States, January 7 to January 20, 1923, inclusive.

City.	Week ended— Jan. 13, 1923.	Week ended— Jan. 20, 1923.
Alabama:		
Birmingham	19	17
Mobile	5	2
California:		
Berkeley	3	3
Long Beach	3	1
Los Angeles	24	24
Oakland	6	5
Sacramento	5	4
San Diego	.....	4
San Francisco	5	8
Colorado:		
Denver	17	21
Connecticut:		
Bridgeport	7	9
Hartford	1	2
New Britain	3	10
New Haven	13	9
Waterbury	3	.....
District of Columbia:		
Washington	35	35
Florida:		
Tampa	4	0
Georgia:		
Atlanta	46	46
Augusta	.....	.....
Savannah	12	8
Illinois:		
Chicago	133	99
East St. Louis	5	5
Peoria	9	6
Rockford	2	3
Springfield	3	7
Indiana:		
Fort Wayne	2	2
Gary	5	8
Indianapolis	18	20
South Bend	1	.....
Terre Haute	4	3
Kansas:		
Topeka	3	3
Wichita	5	6
Kentucky:		
Covington	9	13
Louisville	23	24
Louisiana:		
New Orleans	13	25
Maine:		
Portland	2	4
Maryland:		
Baltimore	62	43
Massachusetts:		
Boston	63	72
Cambridge	7	8
Fall River	11	6
Haverhill	1	.....
Holyoke	3	1
Lawrence	2	3
Lowell	4	6
Lynn	3	1
New Bedford	5	8
Somerville	2	4
Springfield	5	2
Worcester	6	13
Michigan:		
Detroit	68	64
Flint	6	5
Grand Rapids	5	8
Saginaw	1	1
Minnesota:		
Duluth	2	2
Minneapolis	19	6
St. Paul	7	13
Missouri:		
Kansas City	15	25
St. Joseph	5	6
Nebraska:		
Lincoln	3	1
Omaha	20	8
New Jersey:		
Atlantic City	1	3
East Orange	.....	.....
Hoboken	5	4
Newark	17	13
Passaic	3	1
Trenton	10	8
New York:		
Buffalo	27	21
New York	195	243
Niagara Falls	5	3
Rochester	12	11
Schenectady	2	1
Syracuse	10	7
Troy	4	3
Yonkers	1	8
Ohio:		
Canton	5	5
Cincinnati	40	43
Cleveland	38	34
Columbus	25	26
Springfield	7	5
Toledo	8	15
Youngstown	4	6
Oklahoma:		
Oklahoma	8	1
Oregon:		
Portland	11	7
Pennsylvania:		
Philadelphia	183	176
Rhode Island:		
Pawtucket	.....	9
Providence	9	14
South Carolina:		
Charleston	13	4
Tennessee:		
Memphis	15	26
Nashville	16	.....
Texas:		
Dallas	8	13
El Paso	3	.....
Fort Worth	9	5
Houston	11	6
San Antonio	4	6
Utah:		
Salt Lake City	6	2
Virginia:		
Norfolk	7	3
Portsmouth	2	2
Richmond	9	13
Roanoke	5	3
West Virginia:		
Huntington	9	5
Wheeling	3	5
Wisconsin:		
Milwaukee	.....	.....
Racine	3	4

TYPHOID FEVER, MINNESOTA, 1921.—CORRECTION.

In the table on page 3206 of Public Health Reports for December 29, 1922, the number of deaths from typhoid fever in Minnesota during 1921 was given as 888. This number should have been 88. The rate given, 3.6 per 100,000 population, was computed on the basis of 88 deaths.

Examination for Entrance into the Regular Corps of the Public Health Service.

Examinations of candidates for entrance into the Regular Corps of the United States Public Health Service will be held at the following-named places on the dates specified:

Chicago, Ill., March 12, 1923.
San Francisco, Calif., March 12, 1923.
Washington, D. C., March 12, 1923.

Candidates must be not less than 23 nor more than 32 years of age, and they must have been graduated in medicine at some reputable medical college, and have had one year's hospital experience or two years' professional practice. They must pass satisfactory physical, academic, and professional examinations before boards of commissioned medical officers.

Successful candidates will be recommended for appointment by the President, with the advice and consent of the Senate.

Requests for information or permission to take this examination should be addressed to the Surgeon General, United States Public Health Service, Washington, D. C.

DEATHS DURING WEEK ENDED JANUARY 20, 1923.

Summary of information received by telegraph from industrial insurance companies for week ended January 20, 1923, and corresponding week of 1922. (From the Weekly Health Index, January 23, 1923, issued by the Bureau of the Census, Department of Commerce.)

	Week ended Jan. 20, 1923.	Corresponding week, 1922.
Policies in force	50,969,269	48,027,683
Number of death claims	10,992	9,481
Death claims per 1,000 policies in force, annual rate	11.2	10.3

Deaths from all causes in certain large cities of the United States during the week ended January 20, 1923, infant mortality, annual death rate, and comparison with corresponding week of 1922. (From the Weekly Health Index, January 23, 1923, issued by the Bureau of the Census, Department of Commerce.)

City.	Estimated population July 1, 1923.	Week ended Jan. 20, 1923. Total deaths.	Week ended Jan. 20, 1923. Death rate.[1]	Annual death rate per 1,000, corresponding week 1922.	Deaths under 1 year. Week ended Jan. 20, 1923.	Deaths under 1 year. Corresponding week 1922.	Infant mortality rate, week ended Jan. 20, 1923.[2]
Total	28,724,833	8,217	14.9	14.1	1,038	966	.....
Akron, Ohio	[3] 208,435	36	9.0	8.3	14	6	166
Albany, N. Y.	117,375	44	19.5	18.4	5	3	111
Atlanta, Ga.	222,963	104	24.3	16.4	24	12	.....
Baltimore, Md.	773,580	252	17.0	16.1	36	35	106

[1] Annual rate per 1,000 population.
[2] Deaths under 1 year per 1,000 births—an annual rate based on deaths under 1 year for the week and estimated births for 1922. Cities left blank are not in the registration area for births.
[3] Enumerated population Jan. 1, 1920.

Deaths from all causes in certain large cities of the United States during the week ended January 20, 1923, infant mortality, annual death rate, and comparison with corresponding week of 1922. (From the Weekly Health Index, January 23, 1923, issued by the Bureau of the Census, Department of Commerce.)—Continued.

City.	Estimated population July 1, 1923.	Week ended Jan. 20, 1923.		Annual death rate per 1,000, corresponding week 1922.	Deaths under 1 year.		Infant mortality rate, week ended Jan. 20, 1923.
		Total deaths.	Death rate.		Week ended Jan. 20, 1923.	Corresponding week 1922.	
Birmingham, Ala	195,901	61	16.2	16.9	9	11	.....
Boston, Mass	770,400	304	20.6	17.5	39	28	112
Bridgeport, Conn	[3] 143,555	46	16.7	15.3	7	6	97
Buffalo, N. Y	536,718	152	14.8	11.6	24	14	101
Cambridge, Mass	111,444	37	17.3	14.1	6	4	107
Camden, N. J	124,157	59	24.8	20.1	4	10	66
Chicago, Ill	[4] 2,833,288	625	11.5	12.2	81	100	.....
Cincinnati, Ohio	406,312	166	21.3	17.1	11	6	72
Cleveland, Ohio	877,992	205	12.2	12.1	28	28	77
Columbus, Ohio	261,082	102	20.4	14.0	4	9	42
Dallas, Tex	177,274	52	15.3	14.6	8	9	.....
Dayton, Ohio	165,530	40	12.6	8.7	8	6	131
Denver, Colo	272,031	89	17.1	16.4	16	7	.....
Detroit, Mich	[3] 993,678	288	15.1	11.5	54	44	108
Duluth, Minn	106,289	22	10.8	.....	2	.....	46
Erie, Pa	112,571	27	12.5	10.9	2	3	41
Fall River, Mass	120,912	44	19.0	13.4	9	7	128
Flint, Mich	117,968	26	11.5	.....	3	.....	60
Fort Worth, Tex	125,021	21	8.8	5.9	3	0	.....
Grand Rapids, Mich	145,947	46	16.4	11.3	5	2	79
Houston, Tex	154,970	39	13.1	11.8	7	5	.....
Indianapolis, Ind	340,882	92	14.1	12.7	8	9	62
Jacksonville, Fla	100,046	36	18.8	13.9	0	5	.....
Jersey City, N. J	309,034	80	13.5	14.0	11	17	74
Kansas City, Kans	115,781	37	16.7	17.0	10	3	229
Kansas City, Mo	351,319	115	17.0	14.6	15	10	.....
Los Angeles, Calif	666,853	211	16.5	14.7	18	17	67
Louisville, Ky	257,671	89	18.0	15.4	11	7	119
Lowell, Mass	115,089	40	18.1	10.9	4	1	70
Memphis, Tenn	170,067	85	26.1	20.5	12	12	.....
Milwaukee, Wis	484,595	105	11.3	11.0	20	16	99
Minneapolis, Minn	409,125	88	11.2	10.4	10	7	54
Nashville, Tenn	121,128	66	28.4	19.5	4	4	.....
New Bedford, Mass	130,072	39	15.6	13.9	6	7	89
New Haven, Conn	172,967	33	9.9	13.8	6	7	78
New Orleans, La	404,575	146	18.8	19.7	22	15	.....
New York, N. Y	5,927,625	1,453	12.8	14.1	178	208	71
Bronx Borough	840,544	153	9.5	11.4	15	19	53
Brooklyn Borough	2,156,687	475	11.5	12.9	52	75	55
Manhattan Borough	2,267,001	681	15.7	16.6	93	95	90
Queens Borough	535,844	87	8.5	10.8	12	15	64
Richmond Borough	127,549	57	23.3	21.8	6	4	109
Newark, N. J	438,699	109	13.0	13.3	9	16	42
Norfolk, Va	[4] 124,915	38	15.9	10.9	5	5	88
Oakland, Calif	240,086	69	15.0	13.4	8	4	103
Omaha, Nebr	204,382	41	10.5	18.7	8	4	87
Paterson, N. J	139,579	28	10.5	12.8	1	1	16
Philadelphia, Pa	1,922,788	708	19.2	15.4	78	62	101
Pittsburgh, Pa	[4] 607,902	247	21.2	16.6	36	41	125
Portland, Oreg	273,621	78	14.9	13.0	6	8	61
Providence, R. I	242,378	113	24.3	15.8	14	7	114
Richmond, Va	181,044	54	15.6	15.5	12	7	147
Rochester, N. Y	317,867	86	14.1	10.2	16	8	126
St. Louis, Mo	803,853	212	13.8	15.7	14	20	.....
St. Paul, Minn	241,891	53	11.4	10.4	6	3	55
Salt Lake City, Utah	126,241	33	13.6	16.4	1	4	16
San Antonio, Tex	184,727	57	16.1	.....	13	.....	.....
San Francisco, Calif	539,038	158	15.3	15.3	12	5	72
Seattle, Wash	[4] 315,312	56	9.3	9.8	7	5	62
Spokane, Wash	104,573	21	10.5	13.5	2	0	44
Springfield, Mass	144,227	31	11.2	9.7	3	2	43
Syracuse, N. Y	184,511	55	15.5	11.8	7	8	91
Tacoma, Wash	101,731	16	8.2	.....	3	.....	75
Toledo, Ohio	268,338	72	14.0	15.2	9	10	91
Trenton, N. J	127,390	53	21.7	22.1	3	15	51
Washington, D. C	[3] 437,571	152	18.1	17.9	12	18	69
Worcester, Mass	191,927	50	13.6	16.3	5	9	56
Yonkers, N. Y	107,520	25	12.1	9.4	4	4	87

[3] Enumerated population Jan. 1, 1920. [4] Estimated population July 1, 1922.

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 STATE SUMMARIES.

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

Reports for Week Ended January 27, 1923.

ALABAMA.

	Cases
Cerebrospinal meningitis	1
Chicken pox	25
Dengue	11
Diphtheria	25
Influenza	1,681
Malaria	23
Measles	28
Ophthalmia neonatorum	1
Pellagra	4
Pneumonia	157
Scarlet fever	11
Smallpox	10
Trachoma	1
Tuberculosis	25
Typhoid fever	6
Whooping cough	12

ARKANSAS.

Cerebrospinal meningitis	1
Chicken pox	55
Diphtheria	8
Hookworm disease	4
Influenza	2,415
Malaria	26
Measles	72
Mumps	6
Pellagra	6
Scarlet fever	8
Smallpox	3
Trachoma	1
Tuberculosis	12
Typhoid fever	7
Whooping cough	17

CALIFORNIA.

Cerebrospinal meningitis—Los Angeles	1
Diphtheria	166
Influenza	176
Leprosy—San Francisco	1

CALIFORNIA—continued.

	Cases.
Lethargic encephalitis:	
East San Diego	1
Los Angeles	1
Sacramento	1
San Francisco	6
Measles	110
Poliomyelitis:	
Los Angeles	1
Oakland	1
Scarlet fever	121
Smallpox	10
Typhoid fever	10

COLORADO.

(Exclusive of Denver.)

Chicken pox	46
Diphtheria	24
Influenza	3
Measles	2
Mumps	16
Pneumonia	8
Scarlet fever	25
Smallpox	4
Tuberculosis	3
Typhoid fever	2
Whooping cough	24

CONNECTICUT.

Chicken pox	56
Diphtheria	59
German measles	2
Influenza	120
Measles	485
Mumps	21
Pneumonia (lobar)	67
Scarlet fever	98
Smallpox	3
Tuberculosis (all forms)	19
Typhoid fever	3
Whooping cough	89

DELAWARE.

	Cases.
Anthrax	1
Chicken pox	6
Diphtheria	6
Influenza	38
Measles	80
Pneumonia	9
Scabies	1
Scarlet fever:	
Dover	4
Wilmington	12
Tuberculosis	1
Whooping cough	3

FLORIDA.

Diphtheria	18
Influenza	100
Malaria	13
Pneumonia	12
Scarlet fever	5
Smallpox	10
Typhoid fever	6

GEORGIA.

Cerebrospinal meningitis	1
Chicken pox	15
Dengue	1
Diphtheria	14
Hookworm disease	9
Influenza	729
Malaria	4
Measles	125
Mumps	3
Paratyphoid fever	1
Pellagra	1
Pneumonia	59
Scarlet fever	9
Septic sore throat	1
Smallpox	25
Tetanus	1
Trachoma	1
Tuberculosis (all forms)	7
Typhoid fever	5
Whooping cough	9

ILLINOIS.

Cerebrospinal meningitis:	
Adams County	1
Chicago	1
Lee County	1
Diphtheria:	
Cook County (including Chicago)	202
Chicago	183
Hancock County	24
Kane County	10
Lake County	9
Livingston County	15
Madison County	37
Stephenson County	8
Scattering	104
Influenza:	
Chicago	121
Scattering	229
Pneumonia	593
Poliomyelitis—Chicago	1

ILLINOIS—continued.

	Cases.
Scarlet fever:	
Cook County (including Chicago)	107
Chicago	90
Iroquois County	8
Peoria County	18
Whiteside County	9
Winnebago County	9
Scattering	152
Smallpox:	
Will County	48
Scattering	26
Typhoid fever	12
Whooping cough	288

INDIANA.

Diphtheria	115
Influenza	63
Pneumonia	14
Scarlet fever	123
Smallpox	46
Typhoid fever	1

IOWA.

Diphtheria	32
Scarlet fever	132
Smallpox	23

KANSAS.

Chicken pox	113
Diphtheria	122
Influenza	225
Malaria	2
Measles	49
Mumps	44
Pneumonia	105
Scarlet fever	138
Smallpox	10
Tuberculosis	28
Typhoid fever	4
Whooping cough	31

LOUISIANA.

Cerebrospinal meningitis	1
Dengue	965
Diphtheria	48
Influenza	501
Scarlet fever	5
Smallpox	26
Typhoid fever	16

MAINE.

Chicken pox	16
Conjunctivitis (infectious)	2
Diphtheria	10
Influenza	25
Lethargic encephalitis	1
Measles	58
Mumps	2
Pneumonia	19
Poliomyelitis	2
Scarlet fever	27
Smallpox	2
Tuberculosis	17
Typhoid fever	3
Whooping cough	80

MARYLAND.[1]

	Cases.
Cerebrospinal meningitis	2
Chicken pox	175
Diphtheria	66
German measles	12
Influenza	1,602
Lethargic encephalitis	2
Measles	235
Mumps	10
Ophthalmia neonatorum	1
Paratyphoid fever	1
Pneumonia (all forms)	224
Poliomyelitis	2
Scarlet fever	106
Septic sore throat	5
Tuberculosis	60
Typhoid fever	9
Vincent's angina	2
Whooping cough	124

MASSACHUSETTS.

Anthrax	1
Cerebrospinal meningitis	3
Chicken pox	189
Diphtheria	179
German measles	6
Influenza	131
Lethargic encephalitis	1
Measles	834
Mumps	213
Ophthalmia neonatorum	25
Pneumonia (lobar)	180
Poliomyelitis	2
Scarlet fever	313
Septic sore throat	3
Trachoma	3
Tuberculosis (all forms)	126
Typhoid fever	4
Whooping cough	397

MICHIGAN.

Diphtheria	166
Measles	161
Pneumonia	220
Scarlet fever	303
Smallpox	246
Tuberculosis	60
Typhoid fever	17
Whooping cough	105

MINNESOTA.

Chicken pox	16
Diphtheria	93
Measles	236
Pneumonia	7
Scarlet fever	275
Smallpox	83
Tuberculosis	87
Typhoid fever	1
Whooping cough	6

MISSISSIPPI.

Diphtheria	13
Influenza	5,453
Scarlet fever	6
Smallpox	2
Typhoid fever	5

[1] Week ended Friday.

MONTANA.

	Cases.
Diphtheria	19
Scarlet fever	24
Smallpox	10
Typhoid fever	1

NEBRASKA.

Chicken pox	20
Diphtheria:	
Omaha	12
Scattering	14
Influenza	38
Measles:	
Rushville	17
Scattering	1
Mumps	7
Pneumonia	1
Scarlet fever	52
Septic sore throat	3
Smallpox	4
Tuberculosis	3
Typhoid fever	1
Whooping cough	10

NEW JERSEY.

Cerebrospinal meningitis	2
Chicken pox	222
Diphtheria	174
Influenza	138
Malaria	1
Measles	1,290
Paratyphoid fever	1
Pneumonia	225
Poliomyelitis	1
Scarlet fever	191
Trachoma	1
Typhoid fever	3
Whooping cough	181

NEW MEXICO.

Chicken pox	1
Diphtheria:	
Albuquerque	19
Scattering	57
German measles	1
Influenza	32
Measles	1
Mumps	1
Pneumonia	19
Scarlet fever	8
Smallpox	1
Trachoma	1
Tuberculosis	20
Typhoid fever	1
Whooping cough	3

NEW YORK.
(Exclusive of New York City.)

Cerebrospinal meningitis	2
Diphtheria	176
Influenza	408
Measles	453
Pneumonia	456
Poliomyelitis	5
Scarlet fever	294
Smallpox	8
Typhoid fever	19
Whooping cough	295

NORTH CAROLINA.

	Cases.
Cerebrospinal meningitis	2
Chicken pox	67
Diphtheria	43
German measles	6
Measles	447
Ophthalmia neonatorum	1
Poliomyelitis	1
Scarlet fever	40
Septic sore throat	14
Smallpox	95
Typhoid fever	9
Whooping cough	227

OREGON.

Chicken pox	28
Diphtheria:	
Portland	17
Scattering	2
Influenza	30
Lethargic encephalitis	8
Measles	1
Mumps	5
Ophthalmia neonatorum	1
Pneumonia	[1]7
Scarlet fever	14
Septic sore throat	1
Smallpox	12
Tuberculosis	12
Typhoid fever	[1]1
Whooping cough	14

SOUTH DAKOTA.

Chicken pox	12
Diphtheria	14
Dysentery	1
Influenza	2
Measles	10
Mumps	1
Pneumonia	7
Scarlet fever	32
Smallpox	11
Tuberculosis	8
Whooping cough	5

TEXAS.

Chicken pox	9
Dengue	7
Diphtheria	38
Influenza	390
Measles	69
Pneumonia	6
Scarlet fever	17
Smallpox	4
Tuberculosis	11
Typhoid fever	1
Whooping cough	30

VERMONT.

Chicken pox	51
Diphtheria	1
Measles	15
Mumps	5
Pneumonia	1
Scarlet fever	20
Smallpox	8
Typhoid fever	1
Whooping cough	47

[1] Deaths.

VIRGINIA.

Cerebrospinal meningitis:	Cases.
Rockingham County	1
Smallpox	
Floyd County	5

WASHINGTON.

Cerebrospinal meningitis:	
Benton County	1
Chicken pox	84
Diphtheria:	
Spokane	10
Scattering	10
Lethargic encephalitis:	
Skagit County	3
Vancouver County	1
Measles	5
Mumps	5
Scarlet fever:	
Seattle	9
Tacoma	21
Scattering	24
Smallpox:	
Spokane	11
Seattle	9
Scattering	23
Tuberculosis	2
Typhoid fever	7
Whooping cough	36

WEST VIRGINIA.

Diphtheria	23
Influenza:	
Charleston	37
Huntington	20
Mannington	25
Princeton	42
Salem	32
Scattering	36
Scarlet fever	21
Typhoid fever	3

WISCONSIN.

Milwaukee:	
Cerebrospinal meningitis	1
Chicken pox	23
Diphtheria	24
Influenza	30
Measles	570
Pneumonia	24
Scarlet fever	162
Tuberculosis	15
Whooping cough	20
Scattering:	
Chicken pox	151
Diphtheria	84
Influenza	144
Measles	549
Pneumonia	44
Poliomyelitis	1
Scarlet fever	178
Smallpox	36
Tuberculosis	18
Typhoid fever	6
Whooping cough	74

WYOMING.

Chicken pox	4
Mumps	1
Smallpox	1

Reports for Week Ended January 20, 1923.

NORTH DAKOTA.

	Cases.
Chicken pox	12
Diphtheria	24
Influenza	4
Measles	5
Pneumonia	7
Scarlet fever	51
Smallpox	15
Tuberculosis	2
Typhoid fever	1
Whooping cough	12

TEXAS.

	Cases.
Chicken pox	28
Dengue	103
Diphtheria	50
Influenza	237
Measles	37
Mumps	1
Pellagra	10
Pneumonia	37
Scarlet fever	13
Trachoma	7
Tuberculosis	106
Typhoid fever	12
Whooping cough	13

SUMMARY OF CASES REPORTED MONTHLY BY STATES.

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

State.	Cerebrospinal meningitis.	Diphtheria.	Influenza.	Malaria.	Measles.	Pellagra.	Poliomyelitis.	Scarlet fever.	Smallpox.	Typhoid fever.
November, 1922.										
Pennsylvania	6	2,419	.....	.....	10,082	.....	4	1,866	1	313
December, 1922.										
Hawaii	1	28	136	.....	528	.....	.....	3	.....	8
Illinois	14	1,945	144	9	921	1	10	1,314	132	103
Indiana	.....	765	27	.....	572	.....	1	464	82	67
Iowa	1	357	.....	.....	12	.....	3	421	10	1
Kansas	1	511	33	.....	101	.....	1	578	18	15
Maryland	.....	440	270	.....	474	1	4	329	.....	49
Minnesota	3	524	1	.....	214	.....	3	1,046	182	19
Mississippi	.....	237	12,976	3,827	917	142	.....	70	95	69
Montana	.....	30	2	.....	3	.....	.....	94	36	8
New Jersey	7	1,032	120	2	3,059	.....	5	733	.....	72
Oklahoma	.....	60	24	17	2	1	.....	39	59	12
Oregon	.....	117	11	.....	16	.....	.....	73	50	18
Pennsylvania	9	2,154	.....	.....	15,005	.....	3	2,063	18	182
Rhode Island	2	78	1	.....	505	.....	1	52	.....	6
South Carolina	.....	203	3,013	11	9	7	1	17	60	6
Washington	4	85	.....	.....	19	.....	.....	158	121	25

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923.

CEREBROSPINAL MENINGITIS.

The column headed "Median for previous years" gives the median number of cases reported during the corresponding weeks of the years 1915 to 1922, inclusive. In instances in which data for the full eight years are incomplete, the median is that for the number of years for which information is available.

City.	Median for previous years.	Week ended Jan. 13, 1923.		City.	Median for previous years.	Week ended Jan. 13, 1923.	
		Cases.	Deaths.			Cases.	Deaths.
California:				Minnesota:			
Los Angeles	0	2	.....	Duluth	0	.....	1
Connecticut:				New Jersey:			
Bridgeport	0	1	1	Jersey City	0	1	.....
New Haven	0	1	1	New York:			
District of Columbia:				Mount Vernon	0	1	.....
Washington	0	1	.....	New York	4	3	1
Illinois:				Ohio:			
Chicago	3	2	.....	Columbus	0	1	.....
Iowa:				East Youngstown	.....	.....	1
Waterloo	.....	1	1	Pennsylvania:			
Maryland:				Philadelphia	1	2	.....
Baltimore	0	1	.....	Rhode Island:			
Massachusetts:				Providence	0	.....	1
Everett	0	1	.....	Wisconsin:			
Michigan:				Milwaukee	1	.....	1
Detroit	0	.....	1				

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.

DENGUE.

City.	Cases.	Deaths.
Louisiana:		
New Orleans	2	

DIPHTHERIA.

See p. 215; also Current State summaries, p. 204; and Monthly summaries by States, p. 208.

INFLUENZA.

City.	Cases.		Deaths, week ended Jan. 13, 1923.	City.	Cases.		Deaths, week ended Jan. 13, 1923.
	Week ended Jan. 14, 1922.	Week ended Jan. 13, 1923.			Week ended Jan 14, 1922.	Week ended Jan. 13, 1923.	
Alabama:				Massachusetts—Contd.			
Birmingham		63	7	Chelsea		5	1
Mobile		19	2	Dedham			1
Arizona:				Everett		28	1
Tucson			1	Fall River	2		
Arkansas:				Greenfield			1
Little Rock		49		Haverhill		1	
California:				Lawrence			1
Alameda		1		Newton	1	2	1
Berkeley	1			Northampton	1		
Los Angeles	3	11		Northbridge			1
Oakland		2		Pittsfield	1		
Riverside		1		Quincy		2	2
Sacramento		2		Springfield	1	3	2
San Francisco	3	8	1	Wakefield		2	
Santa Ana		1		Waltham		28	2
Stockton		3		Winthrop		1	
Colorado:				Woburn			1
Denver			4	Worcester	1		
Connecticut:				Michigan:			
Bridgeport		3	1	Detroit		21	4
Hartford	1		1	Grand Rapids		1	
New Britain	1			Highland Park		1	
Stonington		2		Jackson			1
District of Columbia:				Marquette		2	
Washington	3	26	1	Minnesota:			
Florida:				Minneapolis			3
Tampa	1	3		Missouri:			
Georgia:				Kansas City	2	3	1
Atlanta	2		4	St. Louis		3	
Augusta	1			Springfield			3
Macon		25		Montana:			
Rome		90		Missoula	2		
Savannah		14	6	Nevada:			
Valdosta		1		Reno	3		
Illinois:				New Jersey:			
Chicago	24	37	7	Hackensack	1		
Decatur		1		Harrison	3	1	
East St. Louis	1	3		Jersey City	1		
Jacksonville		1	1	Kearny	4	8	
Indiana:				Montclair		6	
Kokomo			1	Newark	19	22	
Kentucky:				Trenton	1	1	1
Louisville	1	39	1	New York:			
Louisiana:				Albany	5	18	
New Orleans	3	3	2	Amsterdam		15	
Maine:				Buffalo		3	4
Auburn	3	2		Jamestown		26	1
Maryland:				New York	57	143	14
Baltimore	23	88	9	Peekskill		2	
Cumberland		6		Rochester			2
Massachusetts:				Rome		1	
Belmont	1			Saratoga Springs		3	
Boston	2	35	9	Schenectady		1	1
Cambridge	2	11		Yonkers	1		

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.

INFLUENZA—Continued.

City.	Cases.		Deaths week ended Jan. 13, 1923.
	Week ended Jan. 14, 1922.	Week ended Jan. 13, 1923.	
North Carolina:			
Raleigh			5
Salisbury			1
Wilmington			1
Winston-Salem			1
Ohio:			
Akron	4	2	
Chillicothe		1	
Cincinnati		23	10
Cleveland	8	25	4
Columbus			3
Hamilton			1
Lancaster			1
Norwood		3	1
Piqua	1		
Toledo			1
Oklahoma:			
Oklahoma			1
Oregon:			
Portland			2
Pennsylvania:			
Philadelphia	4	31	30
South Carolina:			
Charleston		142	2
Greenville		19	
South Dakota:			
Sioux Falls		1	
Tennessee:			
Nashville			2
Texas:			
Corsicana		25	
Dallas	2	2	
Fort Worth	1		
Utah:			
Salt Lake City			1
Virginia:			
Charlottesville		7	
Danville			2
Petersburg		11	2
Richmond		16	4
Roanoke	2		2
West Virginia:			
Charleston		66	1
Fairmont		40	
Huntington			6
Morgantown		2	

LETHARGIC ENCEPHALITIS.

City.	Cases.	Deaths.
California:		
San Francisco	1	1
Ohio:		
Ashtabula	1	1
Oregon:		
Portland	1	1
Washington:		
Spokane	11	
Vancouver	1	

MALARIA.

Alabama:		
Mobile	2	
California:		
Alameda	1	
Louisiana:		
New Orleans	1	

MEASLES.

See p. 215; also Current State summaries, p. 204; and Monthly summaries by States, p. 208.

PELLAGRA.

City.	Cases.	Deaths.
Alabama:		
Birmingham	1	1
Georgia:		
Atlanta		2
Savannah	1	1
Texas:		
El Paso	1	
Waco		1

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.

PNEUMONIA (ALL FORMS).

City.	Cases.	Deaths.
Alabama:		
Birmingham	24	12
Mobile		3
Montgomery		5
Arizona:		
Tucson		3
Arkansas:		
Little Rock	9	
California:		
Berkeley	6	3
Long Beach		3
Los Angeles	58	24
Oakland	15	6
Pasadena	4	1
Richmond		1
Riverside		3
Sacramento		5
San Francisco	16	4
Santa Barbara		3
Santa Cruz		1
Stockton		2
Colorado:		
Denver		13
Pueblo		2
Connecticut:		
Bridgeport	12	6
Derby		1
Greenwich	1	
Hartford	4	
Milford		1
New Haven		13
New London		2
Orange	1	
Waterbury		3
District of Columbia:		
Washington		34
Florida:		
St. Petersburg		1
Tampa		4
Georgia:		
Atlanta		42
Brunswick	2	
Savannah		6
Valdosta		1
Illinois:		
Alton		1
Aurora		3
Centralia	1	
Champaign	1	
Chicago	322	126
Decatur	11	1
East St. Louis	6	5
Elgin	3	1
Evanston	3	
Freeport	4	2
Galesburg	3	2
Jacksonville	3	2
Kewanee	1	
Mattoon	4	2
Oak Park	2	1
Peoria		9
Quincy		1
Springfield	8	3
Indiana:		
Anderson		2
Bloomington		2
East Chicago		5
Gary		5
Hammond		4
Indianapolis		18
Kokomo		2
Laporte	2	
Mishawaka		3
Muncie		2
South Bend		1
Terre Haute		4
Iowa:		
Burlington	2	1
Council Bluffs		3
Kansas:		
Coffeyville	3	
Kansas City	11	
Parsons	1	
Topeka		35
Wichita		
Kentucky:		
Covington		9
Henderson		4
Lexington		3
Louisville	34	22
Louisiana:		
New Orleans	13	11
Maine:		
Biddeford		3
Lewiston		1
Portland		2
Sanford		1
Maryland:		
Baltimore	116	53
Cumberland		1
Frederick	2	1
Massachusetts:		
Amesbury		1
Arlington	1	
Attleboro		2
Belmont	3	
Beverly		1
Boston	58	54
Cambridge	16	7
Chelsea	5	1
Clinton		1
Danvers	1	
Everett	2	1
Fall River		11
Fitchburg		1
Framingham		2
Greenfield		3
Haverhill	5	1
Holyoke		3
Lawrence	7	1
Leominster		2
Lowell	5	4
Lynn	7	3
Malden		1
Medford		1
Melrose		3
Methuen		3
New Bedford		5
Newburyport	2	1
Newton		5
North Adams		1
Northampton	2	
Plymouth		2
Quincy		6
Somerville	5	2
Springfield	4	3
Taunton		2
Wakefield		1
Waltham	6	2
Watertown	1	
Webster	1	
Winthrop	4	2
Worcester		6
Michigan:		
Alpena	1	
Ann Arbor	5	
Battle Creek	5	1
Detroit	122	64
Flint		6
Grand Rapids	9	5
Hamtramck		2
Highland Park	8	
Jackson	1	
Kalamazoo	1	
Marquette	1	
Muskegon	5	2
Pontiac	10	
Port Huron		3
Saginaw		1

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.

PNEUMONIA (ALL FORMS)—Continued.

City.	Cases.	Deaths.
Minnesota:		
Duluth		2
Faribault		1
Minneapolis		16
St. Paul		7
Winona		2
Missouri:		
Kansas City	31	14
St. Joseph		5
Springfield		4
Montana:		
Billings		1
Butte		4
Great Falls		1
Helena		2
Missoula	3	2
Nebraska:		
Lincoln		3
Omaha		20
New Hampshire:		
Concord		1
Nashua		1
New Jersey:		
Atlantic City	3	1
Bayonne	1	
Clifton	2	
East Orange	9	
Elizabeth		6
Garfield	4	2
Hackensack		1
Harrison	1	
Hoboken		5
Jersey City	4	
Kearny	2	1
Montclair	4	1
Morristown	5	2
Newark	74	17
Orange		6
Passaic		3
Paterson	25	
Perth Amboy		1
Plainfield	8	1
Summit		1
Trenton	10	9
West Hoboken		2
West New York		1
West Orange	2	
New York:		
Albany	23	
Amsterdam	2	
Auburn	2	1
Buffalo	47	23
Cohoes		1
Hudson	4	
Ithaca		1
Jamestown	6	
Lockport	2	
Mount Vernon	6	2
New York	391	181
Niagara Falls		5
Olean	5	1
Port Chester	3	2
Rochester	20	10
Rome	2	1
Saratoga Springs	1	
Schenectady	4	1
Watertown	9	
White Plains		2
Yonkers		1
North Carolina:		
Durham		2
Greensboro		2
Raleigh		2
Rocky Mount		2
Wilmington		2
Winston-Salem		4
Ohio:		
Akron	9	
Barberton	2	
Canton		5
Chillicothe	1	
Ohio—Continued.		
Cincinnati		30
Cleveland	70	34
Cleveland Heights	1	
Columbus		22
Hamilton		1
Lancaster		3
Lorain	1	
Mansfield	4	
New Philadelphia	1	
Newark		2
Niles		1
Norwood		1
Piqua	5	
Sandusky	2	1
Springfield		7
Tiffin	1	
Toledo		7
Youngstown		4
Zanesville	1	
Oklahoma:		
Oklahoma		7
Oregon:		
Portland		9
Pennsylvania:		
Philadelphia	203	153
Rhode Island:		
Newport		2
Providence		9
South Carolina:		
Charleston		11
Greenville		2
South Dakota:		
Sioux Falls	1	
Tennessee:		
Memphis		15
Nashville		14
Texas:		
Beaumont		1
Corpus Christi		1
Dallas		8
El Paso	4	3
Fort Worth		9
Galveston		1
Houston		11
San Antonio		4
Waco		1
Utah:		
Salt Lake City		5
Vermont:		
Burlington		1
Virginia:		
Alexandria		2
Charlottesville		1
Lynchburg		2
Norfolk		7
Petersburg		1
Portsmouth		2
Richmond		5
Roanoke	7	3
West Virginia:		
Bluefield		2
Charleston		3
Huntington		3
Parkersburg		1
Wheeling		3
Wisconsin:		
Ashland		1
Beloit	2	
Fond du Lac	2	
Janesville		1
Kenosha		2
Madison		1
Marinette		2
Oshkosh		2
Racine		3
Sheboygan		2
Superior		1
Wyoming:		
Cheyenne		1

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.

POLIOMYELITIS (INFANTILE PARALYSIS).

The column headed "Median for previous years" gives the median number of cases reported during the corresponding weeks of the years 1915 to 1922, inclusive. In instances in which data for the full eight years are incomplete, the median is that for the number of years for which information is available.

City.	Median for previous years.	Week ended Jan. 13, 1923.	
		Cases.	Deaths.
Massachusetts:			
Boston	0	1	.....
Waltham	0	1	.....
Minnesota:			
St. Paul	0	1	.....
New York:			
Jamestown	0	1	.....
New York—Continued.			
New York	1	1	.....
Pennsylvania:			
Pittsburgh	0	1	.....
Washington:			
Tacoma	0	1	.....

RABIES IN ANIMALS.

City.	Cases.
California:	
Los Angeles	11
Pasadena	1
Georgia:	
Savannah	2
Massachusetts:	
Arlington	1
Massachusetts—Continued.	
Holyoke	1
Missouri:	
Kansas City	1
Texas:	
Beaumont	3

SCARLET FEVER.

See p. 215; also Current State summaries, p. 204; and Monthly summaries, by States, p. 208.

SMALLPOX.

The column headed "Median for previous years" gives the median number of cases reported during the corresponding weeks of the years 1915 to 1922, inclusive. In instances in which data for the full eight years are incomplete, the median is that for the number of years for which information is available.

City.	Median for previous years.	Week ended Jan. 13, 1923.	
		Cases.	Deaths.
Alabama:			
Mobile	0	1	.....
California:			
Los Angeles	2	7	.....
Oakland	0	4	.....
Colorado:			
Denver	8	1	2
Florida:			
St. Petersburg	.....	2	.....
Georgia:			
Valdosta	0	1	.....
Illinois:			
Champaign	0	1	.....
Freeport	0	6	.....
Kewanee	0	1	.....
Indiana:			
East Chicago	0	1	.....
Elwood	0	2	.....
Gary	0	4	.....
Indianapolis	1	6	.....
Kokomo	0	1	.....
Laporte	.....	1	.....
Muncie	1	1	.....
Iowa:			
Council Bluffs	1	2	.....
Davenport	1	3	.....
Des Moines	6	4	.....
Marshalltown	2	1	.....
Waterloo	0	1	.....
Kansas:			
Lawrence	1	1	.....
Salina	0	1	.....
Michigan:			
Battle Creek	1	1	.....
Detroit	6	6	.....
Grand Rapids	1	1	.....
Minnesota:			
Duluth	1	7	.....
Minneapolis	15	9	.....
St. Paul	25	18	.....
Missouri:			
Joplin	0	1	.....
St. Joseph	3	1	.....
Montana:			
Great Falls	1	2	.....

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.

SMALLPOX—Continued.

City.	Median for previous years.	Week ended Jan. 13, 1923.	
		Cases.	Deaths.
Nebraska:			
Omaha	6	3	.....
New York:			
Jamestown	0	21	.....
Niagara Falls	0	4	.....
North Carolina:			
Raleigh	0	1	.....
Winston-Salem	1	15	.....
Ohio:			
Dayton	0	3	.....
Lancaster	0	1	.....
Piqua	0	1	.....
Sandusky	0	2	.....
Steubenville	0	1	.....
Toledo	3	3	.....
Oregon:			
Portland	5	8	.....
Pennsylvania:			
Philadelphia	0	2	.....
South Carolina:			
Greenville	0	1	.....
South Dakota:			
Sioux Falls	2	1	.....
Tennessee:			
Knoxville	0	6	.....
Memphis	0	5	.....
Texas:			
El Paso	0	1	.....
Utah:			
Salt Lake City	5	4	.....
Washington:			
Hoquiam	.....	1	.....
Seattle	5	3	.....
Tacoma	0	1	.....
Vancouver	1	1	.....
West Virginia:			
Bluefield	1	1	.....
Parkersburg	0	1	.....
Wisconsin:			
Green Bay	0	1	.....
Stevens Point	.....	3	.....
Superior	1	33	.....

TETANUS.

City.	Cases.	Deaths.
Alabama:		
Birmingham	1	1
Mobile	.....	1
Georgia:		
Savannah	1	1
Missouri:		
St. Louis	1	.....
New York:		
New York	1	1
Pennsylvania:		
Philadelphia	1	1
Tennessee:		
Nashville	.....	1
Texas:		
Galveston	.....	1

TUBERCULOSIS.

See p. 215, also Current State summaries, p. 204.

TYPHOID FEVER.

The column headed "Median for previous years," gives the median number of cases reported during the corresponding weeks of the years 1915 to 1922, inclusive. In instances in which data for the full eight years are incomplete, the median is that for the number of years for which information is available.

City.	Median for previous years.	Week ended Jan. 13, 1923.	
		Cases.	Deaths.
Alabama:			
Birmingham	2	1	.....
Arkansas:			
Little Rock	0	2	.....
California:			
Los Angeles	1	2	.....
Oakland	0	2	.....
Riverside	0	1	.....
Colorado:			
Trinidad	0	.....	1
Florida:			
Tampa	0	3	.....
Georgia:			
Atlanta	1	.....	1
Illinois:			
Chicago	4	4	.....
Indiana:			
Anderson	0	.....	2
Indianapolis	0	1	.....
Iowa:			
Sioux City	0	1	.....
Kansas:			
Wichita	0	1	.....
Kentucky:			
Louisville	1	2	1
Louisiana:			
New Orleans	1	9	3

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.

TYPHOID FEVER—Continued.

City.	Median for previous years.	Week ended Jan. 13, 1923. Cases.	Deaths.
Maine:			
Portland	0	1	
Maryland:			
Baltimore	3	2	2
Massachusetts:			
Fall River	1		1
Fitchburg	0	1	
Lynn	0	1	1
Medford	0	1	
Michigan:			
Grand Rapids	0		1
Muskegon	0	1	
Saginaw	0	1	
Minnesota:			
Rochester	0	1	
Missouri:			
St. Louis	2	5	1
Montana:			
Billings	0	2	
Nebraska:			
Omaha	0	1	
New Jersey:			
Newark	0	1	
Orange	0	1	
New York:			
Buffalo	2		1
New York	15	14	3
Rochester	0	1	
North Carolina:			
Greensboro	0		1
Ohio:			
Cleveland	3	2	2
Columbus	0	1	
Youngstown	0	2	1
Zanesville	0	1	
Oklahoma:			
Oklahoma	0		1
Pennsylvania:			
Chester	0	1	
Johnstown	0	5	
Mckeesport	0	2	
New Kensington	0	1	
Philadelphia	3	5	
Pittsburgh	3	2	
South Carolina:			
Columbia	0	1	
Texas:			
El Paso	0	1	
Virginia:			
Portsmouth	0	1	
Richmond	0	1	
Washington:			
Tacoma	1	1	
West Virginia:			
Bluefield	0		1
Wheeling	0	1	
Wisconsin:			
Kenosha	0	1	
Milwaukee	1	1	

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS.

City.	Population Jan. 1, 1920.	Total deaths from all causes.	Diphtheria. Cases.	Diphtheria. Deaths.	Measles. Cases.	Measles. Deaths.	Scarlet fever. Cases.	Scarlet fever. Deaths.	Tuberculosis. Cases.	Tuberculosis. Deaths.
Alabama:										
Birmingham	178,806	65	6	1	2		1		24	4
Mobile	60,777	27	2	1					1	1
Montgomery	43,464	15								
Tuscaloosa	11,996		1							
Arizona:										
Tucson	20,292	20								6
Arkansas:										
Hot Springs	11,695	4								
Little Rock	65,142		3						3	
North Little Rock	14,048				1					
California:										
Alameda	28,806	7	2							
Berkeley	56,036	15			1		6		2	3
Long Beach	55,593	19	3		9		3		1	1
Los Angeles	576,673	245	57	1	13		30	1	76	30
Oakland	216,261	55	12		1		3		4	2
Pasadena	45,354	16	1		1				3	
Richmond	16,843	2					1		1	
Riverside	19,341	12	3	1			4			1
Sacramento	65,908	24	2		2		5		4	5
San Bernardino	18,721	11					1			3
San Diego	74,683	16	6		12		16		1	2
San Francisco	506,676	153	37	3	4		15	1	29	17
Santa Ana	15,485	7	2		1		2			1
Santa Barbara	19,441	8								
Santa Cruz	10,917	2								
Stockton	40,296	13	6						2	1
Vallejo	21,107	0	1							
Colorado:										
Denver	256,491	84	36	1	5		31			6
Pueblo	43,050	9	3				2			
Trinidad	10,906		1	1			1			

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Population Jan. 1, 1920.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Connecticut:										
Bridgeport	143,555	35	6	.....	63	.....	16	.....	12	4
Bristol	20,620	3	.....	.....	13	.....	.....	.....	.....	.....
Derby	11,238	3	.....	.....	.....	.....	.....	.....	.....	.....
Fairfield (town)	11,475	0	4	.....	39	.....	2	.....	.....	.....
Greenwich (town)	22,123	.....	.....	.....	2	.....	.....	.....	.....	.....
Hartford	138,036	33	17	1	8	.....	5	.....	4	1
Manchester (town)	18,370	2	2	.....	.....	.....	1	.....	1	.....
Milford (town)	10,193	3	.....	.....	1	.....	.....	.....	.....	.....
New Haven	162,537	50	4	.....	55	.....	8	.....	3	1
New London	25,688	13	2	.....	.....	.....	.....	.....	.....	2
Stonington (town)	10,236	3	1	.....	3	.....	1	.....	.....	.....
Waterbury	91,715	20	4	.....	5	.....	13	.....	1	2
District of Columbia:										
Washington	437,571	163	26	2	20	.....	29	.....	20	9
Florida:										
St. Petersburg	14,237	5	.....	.....	1	.....	.....	.....	.....	1
Tampa	51,608	25	3	1	.....	.....	2	.....	1	4
Georgia:										
Atlanta	200,616	102	6	.....	.....	.....	6	.....	.....	7
Brunswick	14,413	2	.....	.....	.....	.....	.....	.....	2	1
Macon	52,995	6	2	.....	10	.....	2	.....	2	.....
Rome	13,252	.....	1	.....	.....	.....	.....	.....	.....	.....
Savannah	83,252	42	3	.....	.....	.....	1	.....	2	1
Valdosta	10,783	3	1	.....	.....	.....	.....	.....	.....	.....
Idaho:										
Boise	21,393	2	1	.....	.....	.....	2	.....	.....	.....
Pocatello	15,001	3	.....	.....	.....	.....	.....	.....	.....	.....
Illinois:										
Alton	24,682	7	5	.....	.....	.....	3	.....	2	2
Aurora	36,397	19	11	2	2	.....	2	.....	4	.....
Centralia	12,491	5	.....	.....	.....	.....	.....	.....	.....	.....
Champaign	15,873	.....	3	.....	2	.....	1	.....	.....	.....
Chicago	2,701,705	812	183	20	192	2	114	2	130	50
Decatur	43,818	10	2	.....	.....	.....	3	.....	.....	.....
East St. Louis	66,767	19	1	.....	1	.....	1	.....	2	2
Elgin	27,454	5	.....	.....	.....	.....	1	.....	.....	.....
Evanston	37,234	10	2	.....	8	.....	1	.....	1	.....
Forest Park	10,768	.....	1	.....	.....	.....	.....	.....	.....	.....
Freeport	19,669	6	2	1	1	.....	1	.....	.....	.....
Galesburg	23,834	8	.....	.....	1	.....	.....	.....	1	.....
Jacksonville	15,713	11	2	.....	.....	.....	1	.....	.....	.....
Kewanee	16,026	6	1	.....	.....	.....	.....	.....	.....	.....
La Salle	13,050	7	.....	.....	22	.....	.....	.....	1	.....
Mattoon	13,552	8	1	.....	.....	.....	.....	.....	.....	.....
Oak Park	39,858	15	3	.....	6	.....	2	.....	.....	.....
Peoria	76,121	31	.....	.....	.....	.....	11	1	.....	.....
Quincy	35,978	6	.....	.....	.....	.....	.....	.....	.....	.....
Springfield	59,183	24	8	.....	15	.....	3	.....	3	2
Indiana:										
Anderson	29,767	9	2	.....	2	.....	.....	.....	.....	.....
Bloomington	11,595	5	.....	.....	.....	.....	.....	.....	.....	.....
Crawfordsville	10,139	2	.....	.....	.....	.....	1	.....	.....	.....
East Chicago	35,967	14	1	.....	.....	.....	1	.....	.....	1
Elwood	10,790	8	.....	.....	.....	.....	1	.....	.....	.....
Frankfort	11,585	.....	.....	.....	.....	.....	2	.....	.....	.....
Gary	55,378	16	2	1	.....	.....	4	.....	.....	1
Hammond	36,004	8	.....	.....	2	.....	3	.....	.....	.....
Huntington	14,000	3	1	.....	.....	.....	.....	.....	.....	.....
Indianapolis	314,194	110	28	4	1	.....	7	.....	4	3
Kokomo	30,067	8	2	.....	.....	.....	1	.....	.....	1
La Fayette	22,486	9	.....	.....	.....	.....	2	.....	1	.....
Laporte	15,158	3	2	.....	.....	.....	.....	.....	2	.....
Logansport	21,626	3	.....	.....	2	.....	.....	.....	.....	.....
Mishawaka	15,195	9	1	.....	23	.....	3	.....	1	.....
Muncie	36,524	11	3	.....	.....	.....	.....	.....	.....	1
South Bend	70,983	8	1	.....	65	.....	6	.....	1	.....
Terre Haute	66,083	18	6	.....	1	.....	3	.....	.....	.....
Iowa:										
Burlington	24,057	8	2	.....	.....	.....	3	.....	2	.....
Cedar Rapids	45,566	.....	1	.....	.....	.....	2	.....	.....	.....
Clinton	24,151	.....	8	.....	.....	.....	.....	.....	.....	.....
Council Bluffs	36,162	9	.....	.....	.....	.....	2	.....	.....	.....
Davenport	56,727	.....	6	.....	.....	.....	2	.....	.....	.....
Des Moines	126,468	.....	6	1	.....	.....	27	1	.....	.....

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Population Jan. 1, 1920.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Iowa—Continued.										
Dubuque	39,141				21		1			
Iowa City	11,267						1			
Marshalltown	15,731						2			
Mason City	20,065	5	5							
Muscatine	16,068	9					1		1	
Ottumwa	23,003	1	1				1			
Sioux City	71,227	1	2				3		1	1
Waterloo	36,230	1					3			
Kansas:										
Atchison	12,630		1				2			
Coffeyville	13,452	3					2			
Hutchinson	23,298								1	
Kansas City	101,177		3		2		8		4	
Lawrence	12,456	5	3							
Leavenworth	16,912		1							
Parsons	16,028	5			1					
Salina	15,085	3					1		1	
Topeka	50,022	28	7	1	2		4	1	5	3
Wichita	72,217	31	25	1					1	
Kentucky:										
Covington	57,121	32	4				1			3
Henderson	12,169	4			15					
Lexington	41,534	23	6				1			2
Louisville	234,891	89	12		1		1		16	6
Paducah	24,735				72					
Louisiana:										
New Orleans	387,219	124	23	3			3		23	15
Maine:										
Auburn	16,985	3					2			
Bath	14,731	0								
Biddeford	18,008	7								
Lewiston	31,791	8								
Portland	69,272	11	3		50					
Sanford (town)	10,691	3	2							
Waterville	13,351		2							
Maryland:										
Baltimore	733,826	275	49	6	48		35		30	28
Cumberland	29,837	10			9					
Frederick	11,056	8							2	
Massachusetts:										
Adams (town)	12,967	3						1		
Amesbury (town)	10,036	4	1							
Arlington (town)	18,665	4					3			
Attleboro	19,731	10			13				1	
Belmont (town)	10,749	3			3					
Beverly	22,561	7			1					1
Boston	748,060	265	75	7	53	1	56		41	11
Braintree (town)	10,580	3			7		3			1
Brookline	37,748	9	1		1		1		1	
Cambridge	109,694	30	6		24		8		3	4
Chelsea	43,184	24			25		5		3	2
Chicopee	36,214	4	1				1	1		
Clinton	12,979	3								
Danvers	11,108		1		1					
Dedham	10,792	5								
Everett	40,120	5	2		15		1			
Fall River	120,485	54	13		56	5	3	1	1	1
Fitchburg	41,029	13	7	1	1					1
Framingham	17,033	8			1					
Gardner	16,971	3					1			
Greenfield	15,462	7			1					
Haverhill	53,884	21	2		3		3		1	1
Holyoke	60,203	20	3				3		2	1
Lawrence	94,270	29	2	1	2		1		1	1
Leominster	19,744	5					2			
Lowell	112,759	41	2		13		3		3	3
Lynn	99,148	26	2		125		3		3	
Malden	49,103	11	4				3		4	1
Medford	39,038	8			4		1			
Melrose	18,204	7	1				5			
Methuen	15,189	5			2				1	
Milford	13,471	0								
New Bedford	121,217	35	4		283	3	6		8	2
Newburyport	15,618	5			13					

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Population Jan. 1, 1920.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Massachusetts—Continued.										
Newton	46,054	24			7		6		2	
North Adams	22,282	8					3		1	2
Northampton	21,951	8								1
Northbridge	10,174	4					9		3	1
Pittsfield	41,763	7	2							
Plymouth	13,045	6					7		4	
Quincy	47,876		1				13		3	
Somerville	93,091	29	3	1	9		1			
Southbridge	14,245	3	1	1			12		4	2
Springfield	129,614	36	2		2		4		1	3
Taunton	37,137	11			15		3			
Wakefield	13,025	2	2				4		1	
Waltham	30,915	12	6				6			
Watertown	21,457		1		1		2		1	1
Webster	13,258	4							2	
West Springfield	13,443	2								
Westfield	18,604	7							2	
Winthrop	15,455				1		1			1
Woburn	16,574	5								
Worcester	179,754	58	6			1	17	1	4	2
Michigan:										
Alpena	11,101		1				5			
Ann Arbor	19,516	13	5							1
Battle Creek	36,164	1	8				6			
Benton Harbor	12,233		5		7		1			
Detroit	993,678	279	69	2	19		95	3	55	22
Flint	91,599	33	14	1	16		23		5	2
Grand Rapids	137,634	45	3		2		20	1	1	1
Hamtramck	48,615	8								
Highland Park	46,499	5	3				12		3	
Jackson	48,374	11					4			2
Kalamazoo	48,487	19	7				14		2	2
Marquette	12,718	2	1						4	
Muskegon	36,570	7	2		1		2			
Pontiac	34,273	9			2		1			1
Port Huron	25,944	11					4			1
Saginaw	61,903	19	2				10	1		1
Sault Ste. Marie	12,096	2								
Minnesota:										
Duluth	98,917	16	4		54		12		6	3
Faribault	11,089	4								
Hibbing	15,089	3					12			
Minneapolis	380,582	106	29	3	1	1	78	2	16	11
Rochester	13,722	14	1							1
St. Cloud	15,873		1				1			
St. Paul	234,698	80	25	2	14		65	2	14	3
Virginia	14,022		1				1		1	
Winona	19,143	10	1				1			
Missouri:										
Joplin	29,902		1							
Kansas City	324,410	100	12		2		10		8	4
St. Joseph	77,939	31	7	1			4			
St. Louis	772,897	202	44	4	42		23	1	24	13
Springfield	39,631	22								1
Montana:										
Anaconda	11,668	1								
Billings	15,100	3					5			
Butte	41,611	22	1				1			1
Great Falls	24,121	6								
Helena	12,037	8								
Missoula	12,668	9					3		1	1
Nebraska:										
Lincoln	54,948	12	4	1						
Omaha	191,601	66	12	1			4			1
Nevada:										
Reno	12,016	5					1			
New Hampshire:										
Berlin	16,104	0								
Concord	22,167	9								
Dover	13,029	4					2			
Keene	11,210	5	2				1			
Nashua	28,379	6								

CITY REPORTS FOR WEEK ENDED JANUARY, 13, 1923—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Population Jan. 1, 1920.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
New Jersey:										
Asbury Park	12,400	2								
Atlantic City	50,707	13			61		2			
Bayonne	76,754		2				1		2	
Bloomfield	22,019	2			10		11			
Clifton	26,470	3			17	1	2			
East Orange	50,710				20		1			
Elizabeth	95,783		8		122	2	6		2	2
Englewood	11,627	1			4		3			
Garfield	19,381	6			6					
Hackensack	17,667	7	5				1			
Harrison	15,721				1					
Hoboken	68,166	22	1	1			1		3	1
Jersey City	298,103		30		1		14		10	
Kearny	26,724	6	2		1				1	
Long Branch	13,521	3	2						1	
Montclair	28,810	5			2		2			
Morristown	12,548	6	1		60					
Newark	414,524	120	34	3	160	2	19		24	5
Orange	33,268	14	1		10		2		1	
Passaic	63,841	16	2		21		4		1	1
Paterson	135,875		9		6		5		2	
Perth Amboy	41,707	5	2				7		2	
Phillipsburg	16,923	3	1						2	
Plainfield	27,700	7			4					
Summit	10,174	3					1			1
Trenton	119,289	44	36	4	1		24		3	5
Union (town)	20,651				1		2			
West Hoboken	40,074	4	1				1			
West New York	29,926	7	1		1					
West Orange	15,573	4			23		3			
New Mexico:										
Albuquerque	15,157	5		1						1
New York:										
Albany	113,344		4		1		5		5	
Amsterdam	33,524	1	1						1	
Auburn	36,192	9	3	1						1
Buffalo	506,775	157	18	2	131	1	25		20	7
Cohoes	22,987	5	1							
Geneva	14,648	3								
Hornell	15,025	4							1	
Hudson	11,745	4								
Ithaca	17,004	7					2			
Jamestown	38,917	9			2		3			
Lockport	21,308	1					1			
Mount Vernon	42,726	16	1		33	1	2			1
New York	5,620,048	1,430	237	17	221	5	238	3	[1] 300	[1] 106
Niagara Falls	50,760	18	7		1		2		3	1
North Tonawanda	15,482	6								
Olean	20,506	9	1		13		4		1	
Peekskill	15,868	2					5			
Port Chester	16,573	4								
Rochester	295,750	64	6	1	96		9		15	2
Rome	26,341	11	1		1		2			
Saratoga Springs	13,181	1					1		2	
Schenectady	88,723	23	3				13		6	1
Watertown	31,285	11	1							
White Plains	21,031	5			1		5		3	
Yonkers	100,176	19	2	1	6		5			1
North Carolina:										
Durham	21,719	8	1						1	1
Greensboro	15,861	12								
Raleigh	24,418	22	1		1					1
Rocky Mount	12,742	6								
Salisbury	13,884	5								
Wilmington	33,372	10	1							
Winston-Salem	48,395	19	1				1		1	1
North Dakota:										
Fargo	21,961	1					2	1		
Grand Forks	14,010						1			
Ohio:										
Akron	208,435	32	11		5		10		1	
Ashtabula	22,082	7	1							

[1] Pulmonary tuberculosis only.

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Population Jan. 1, 1920.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Ohio—Continued.										
Barberton	18,811	2	1				2			
Bucyrus	10,425	1			3					
Cambridge	13,104	4	4		3		1			
Canton	87,091	11	5		1		5			
Chillicothe	15,831	5					2		1	
Cincinnati	401,247	157	18	1	12		24	3	19	8
Cleveland	796,841	210	58	5	60		146	3	45	12
Cleveland Heights	15,236		1		1		3		1	1
Columbus	237,031	105	12		10		6		3	3
Coshocton	10,847				2		1			
Dayton	152,559	48	5		1		9			
East Youngstown	11,237	1								
Findlay	17,021	6			42					
Fremont	12,468	4								
Hamilton	39,675	14			11					
Kenmore	12,683		3		2		1		1	
Lancaster	14,706	7	3							
Lorain	37,295		3		23		1		2	
Mansfield	27,824	4	4		46		3			1
Marion	27,891				1		1			
Martins Ferry	11,634	7	2		14					
New Philadelphia	10,718		1		1					
Newark	26,718	10	1				1			1
Niles	13,080	1	1							
Norwood	24,966	5	1				1			
Piqua	15,044	6	1		1					1
Salem	10,305	5	2							
Sandusky	22,897	5	2							1
Springfield	60,840	24	6	1	2		3		1	3
Steubenville	28,508	11								
Tiffin	14,375	9								1
Toledo	243,164	72	14	2	482	3	20		3	6
Youngstown	132,358	20	22		6		6		1	3
Zanesville	29,569	9		1	21				1	
Oklahoma:										
Oklahoma	91,295	32	4		2		6			1
Oregon:										
Portland	258,288	52	8	1	1		4		11	4
Pennsylvania:										
Allentown	73,502		8		81		7		1	
Altoona	60,331		5		39					
Ambridge	12,730		2		6				1	
Beaver Falls	12,802				7					
Berwick	12,181		3				2		3	
Bethlehem	50,358		12		3		4		5	
Braddock	20,879				2		1			
Bradford	15,525								1	
Bristol	10,273		8		7					
Canonsburg	10,632				4				1	
Carbondale	18,640		1							
Carnegie	11,516		1		24				1	
Carrick	10,504				1					
Chambersburg	13,171				4		3			
Chester	58,030		1		47		1			
Coatesville	14,515				10		1			
Columbia	10,836		1		25		1			
Connellsville	13,804		2				1			
Dickson	11,049		2		5					
Donora	14,131		1		1					
Dubois	13,681		1						1	
Duquesne	19,011		1		65				1	
Easton	33,813		2		6					
Erie	93,372		8		2		17		6	
Farrell	15,586				6		2		1	
Greensburg	15,033		1		15		1			
Harrisburg	75,917		7		74		4			
Hazelton	32,277		1		1				5	
Homestead	20,452		1		10					
Jeannette	10,627				1					
Johnstown	67,327		1		4		7			
Lancaster	53,150		1		19		23		1	
Lebanon	24,643		3		34					
McKees Rocks	16,713		6		16					
McKeesport	46,781				8		3			

CITY REPORTS FOR WEEK ENDED JANUARY 13, 1923—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Population Jan. 1, 1920.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Pennsylvania—Continued.										
Mahony City	15,599				2					
Meadville	14,568		1		1		1			
Monessen	18,179		2							
Mount Carmel	17,469		1		1					
New Castle	44,938		1							
New Kensington	11,987		1		3		1			
Norristown	32,319				66		1			
Oil City	21,274				11				2	
Philadelphia	1,823,779	729	74	12	1,012	40	61		88	48
Phoenixville	10,484				47					
Pittsburgh	588,343		31		328		45		16	
Pittston	18,497		1		6					
Plymouth	16,500		1							
Pottstown	17,431				9					
Pottsville	21,876		1		2				1	
Reading	107,784		9		160				2	
Scranton	137,783		11		57		1			
Shamokin	21,204		1		3				1	
Sharon	21,747				2					
Shenandoah	24,726		2							
Steelton	13,428				57					
Sunbury	15,721				1					
Swissvale	10,908				9					
Tamaqua	12,363				8					
Washington	21,480						2			
West Chester	11,717		2		51		4			
Wilkes-Barre	73,833		2				1			
Wilkinsburg	24,403				12		1			
Williamsport	36,198		1				1			
Woodlawn	12,495		1		18		1		2	
York	47,512				4		8		1	
Rhode Island:										
Newport	30,255	5								
Pawtucket	64,248	14			3					1
Providence	237,595	81	7	4	92	2	8			3
South Carolina:										
Charleston	67,957	38	3							1
Greenville	23,127	6			1					1
South Dakota:										
Sioux Falls	25,202	6	1				3			
Tennessee:										
Knoxville	77,818						2		5	5
Memphis	162,351	70	5		117		2		11	3
Nashville	118,342	61	3		2		3		6	5
Texas:										
Beaumont	40,422	11	3		1				1	2
Corpus Christi	10,522	3	2							
Corsicana	11,356	7								1
Dallas	158,976	45	7				3		6	2
El Paso	77,560	39			36	1			82	12
Fort Worth	106,482	29	4				3		2	2
Galveston	44,255	15	5				3		1	2
Houston	138,276	41	5							1
San Antonio	161,379	48	1				1			9
Waco	38,500	12								
Utah:										
Salt Lake City	118,110	32	11	1	1		4		1	
Vermont:										
Barre	10,008						1			
Burlington	22,779	7					2			
Rutland	14,954	1								
Virginia:										
Alexandria	18,060	6								1
Charlottesville	10,688	3	1							2
Danville	21,539	8							2	
Lynchburg	30,070	11	4	1	4				1	1
Norfolk	115,777		9				6		7	3
Petersburg	31,012	8							4	
Portsmouth	54,387	10	1		1		1			1
Richmond	171,667	61	5		1		15		17	7
Roanoke	50,842	17	7		3				2	1

CITY REPORTS FOR WEEK ENDED JANUARY, 13, 1923—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Population Jan. 1, 1920.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Washington:										
Bellingham	25,585		1				1			
Everett	27,644				1					
Seattle	315,312		3		5		12			
Spokane	104,437		2							
Tacoma	96,965		3		2		8			
Vancouver	12,637						2			
Yakima	18,539						3			
West Virginia:										
Bluefield	15,282	5					3			
Charleston	39,608	18	3		6		1			1
Clarksburg	27,869	2	3		1					
Fairmont	17,851		6				4			
Huntington	50,177	25	3				1			
Martinsburg	12,515				1					
Morgantown	12,127		2		2		2			
Moundsville	10,669	3	2		2					
Parkersburg	20,050	6	2				3			
Wheeling	56,208	14	1		83		7		2	
Wisconsin:										
Appleton	19,561	8	4						1	
Ashland	11,334	5							1	1
Beloit	21,284	4	2		4		12			1
Eau Claire	20,905		1		1		1		1	
Fond du Lac	23,427	3	2				1			
Green Bay	31,017				2		2			
Janesville	18,293	6			25		1			
Kenosha	40,472	8	3	1	106		2			
La Crosse	30,421				24				3	
Madison	38,378	3	1		2		5			
Manitowoc	17,563		2							
Marinette	13,610	9					2			
Milwaukee	457,147	121	28	1	942		137	1	16	3
Oshkosh	33,162	10					1			
Racine	58,593	8	1		19		6		1	
Sheboygan	30,955	11	8						11	
Stevens Point	11,371						1			
Superior	39,671	6	1							
Wausau	18,661						2		2	
West Allis	13,745	1	2		12		7		1	1
Wyoming:										
Cheyenne	13,829	8					1		2	2

FOREIGN AND INSULAR.

AZORES.

Plague—Island of Fayal.[1]

Under date of December 30, 1922, plague was reported with several cases at Castelo Branco, Island of Fayal, Azores.

CUBA.

Communicable Diseases—Habana.

Communicable diseases have been notified at Habana as follows:

Disease.	Jan. 1–10, 1923.		Remaining under treatment Jan. 10, 1922.
	New cases.	Deaths.	
Chicken pox	3	.....	3
Diphtheria	2	.....	3
Leprosy	.....	.....	10
Malaria	32	1	[1] 47
Measles	1	.....	2
Paratyphoid fever	.....	.....	5
Scarlet fever	3	.....	2
Typhoid fever	17	2	[2] 79

[1] From the interior, 25; from abroad, 2. [2] From the interior, 18; from abroad, 1.

Quarantine Disinfection Measures.

On December 13, 1922, special disinfection measures were ordered to be enforced at Cuban ports against arrivals from certain countries, including Hawaii and the Philippine Islands.

GREECE.

Cerebrospinal Meningitis—Smallpox—Typhus Fever.

Under date of January 17, 1923, cerebrospinal meningitis and typhus fever were reported present in sporadic form at Leucadia, Prevesa, and Zante, Greece. On the same date smallpox was reported in epidemic form.

[1] Public Health Reports, Jan. 12, 1923, p. 87.

GUADELOUPE (WEST INDIES).

"Alastrim" or Kaffir Pox—Basse Terre.

Under date of January 13, 1923, "alastrim" or Kaffir pox was reported present at Basse Terre, Guadeloupe, West Indies, with 33 cases in hospital. The disease was stated to have reached Basse Terre about November 7, 1922.[1]

POLAND.

Communicable Diseases—October 29–November 4, 1922.

Communicable diseases have been notified in Poland as follows:

October 29–November 4, 1922.

Disease.	Cases.	Deaths.[a]	Localities of highest mortality.
Cerebrospinal meningitis	10	9	Lodz; Warsaw City.
Diphtheria	109	12	Lemberg; Posen; Volhynia.
Measles	449	21	Lwow; Stanislawow; Warsaw City.
Scarlet fever	337	40	Lwow; Warsaw City.
Smallpox	6	.....	
Tuberculosis	82	132	Lodz; Lwow; Warsaw City.
Typhoid fever	475	30	Lodz; Warsaw City.
Typhus fever	132	11	Lwow; Nowogrodek.
Typhus fever, recurrent	207	4	Nowogrodek.
Whooping cough	169	17	Stanislawow.

[a] Total mortality from all causes, 330; population, estimated, 27,500,500.

Dysentery.

During the same period 64 cases of dysentery with 10 deaths were reported in Poland, the highest mortality being reported in the districts of Krakow, Lublin, and Nowogrodek.

UNION OF SOUTH AFRICA.

Smallpox—Typhus Fever—November, 1922.

During the month of November, 1922, smallpox and typhus fever were reported in the Union of South Africa as follows: *Smallpox.*—12 cases among the colored population; 4 cases among the white population. *Typhus fever.*—1,100 cases, 107 deaths, colored population; among the white population, 3 cases with 1 death. (For distribution of occurrence according to States of the Union, see p. 226.)

Typhoid Fever Outbreak—Frere—Natal.

A sudden and virulent outbreak of typhoid fever was reported during the week ended November 25, 1922, among the boarders and staff of St. John's School, Frere, Estcourt district, Natal, with 52 cases (39 in pupils, 13 in members of staff), in a total of 50 pupils and 21 staff in the main school.

[1] Public Health Reports, Jan. 26, 1923, p. 174.

VIRGIN ISLANDS.

Disease Prevalence—December, 1922.

Prevalence of disease has been reported in the Virgin Islands as follows:

December, 1922.

Island and disease.	Cases.	Remarks.
St. Thomas and St. John:		
Chancroid	4	Imported, 3.
Chicken pox	1	
Dengue	5	
Dysentery	1	Unclassified.
Gonococcus infection	5	Imported, 4.
Syphilis	3	Imported, 2.
Trachoma	2	
St. Croix:		
Chicken pox	25	
Dengue	1	
Filariasis	2	Bancrofti.
Gonococcus infection	3	Imported, 2.
Tuberculosis	2	Chronic pulmonary.

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

The reports contained in the following tables must not be considered as complete or final, either as regards the list of countries included or the figures for the particular countries for which reports are given.

Reports Received During Week Ended February 2, 1923.[1]

CHOLERA.

Place.	Date.	Cases.	Deaths.	Remarks.
India:				
Calcutta	Dec. 3-9	16	9	
Madras	Dec. 10-16	1	1	
Rangoon	Nov. 26-Dec. 9	9	6	

PLAGUE.

Azores:				
Fayal Island—				
Castelo Branco	Dec. 30			Several cases reported present.
British East Africa:				
Tanganyika Territory	Oct. 29-Nov. 18	1	4	
Ceylon:				
Colombo	Dec. 3-9	7	2	
China:				
Hongkong	Nov. 13-19	3	1	
Egypt				Jan. 1-Dec. 28, 1922: Cases, 485; deaths, 228.
Province—				
Assiout	Dec. 12	1	1	Septicemic.
India:				
Bombay	Nov. 26-Dec. 2	8	6	
Karachi	Dec. 10-16	1	1	
Madras Presidency	do	451	280	
Rangoon	Nov. 26-Dec. 9	10	10	
Java:				
East Java—				
Soerabaya	Nov. 12-18	8	8	
Tocloeng-Agoeng	Oct. 29-Nov. 11	17	17	Not a seaport.

SMALLPOX.

Arabia:				
Aden	Dec. 17-23		1	
British East Africa:				
Tanganyika Territory	Oct. 29-Nov. 18	161	7	
Uganda	Sept. 1-30	1	1	
Canada:				
Ontario—				
Ottawa	Jan. 7-13	8		
Ceylon:				
Colombo	Dec. 3-9	2		

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

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

Reports Received During Week Ended February 2, 1923—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
China:				
Amoy	Dec. 10-16			Present.
Chungking	do			Do.
Foochow	do			Do.
Manchuria—				
Mukden	do			Do.
Dominican Republic:				
Puerto Plata	Dec. 24-30	1		
Great Britain:				
London	Dec. 17-23	2		
Nottingham	Dec. 3-9	1		
Greece:				
Zante	Jan. 17			Epidemic.
India:				
Bombay	Nov. 26-Dec. 2	2	2	
Calcutta	Dec. 3-9	4	3	
Karachi	Dec. 10-16	1		
Madras	Dec. 10-16	12	6	
Rangoon	Nov. 26-Dec. 9	4		
Java:				
West Java—				
Batavia	Nov. 25-Dec. 1	2		
Mexico:				
Guadalajara	Dec. 1-31	4		
Poland				Oct. 29-Nov. 4, 1922: Cases, 6.
Portugal:				
Lisbon	Dec. 17-30	78		
Oporto	Dec. 24-30	2	1	
Spain:				
Huelva	Nov. 24-30		1	
Switzerland:				
Berne	Dec. 17-23	32		
Syria:				
Aleppo	Dec. 24-30			Present.
Turkey:				
Constantinople	Dec. 10-16	49	9	
Union of South Africa				Nov. 1-30, 1922: Cases, 12 (colored); white population, cases, 4.
Cape Province				Nov. 1-30, 1922: Cases, 12 (colored); white, 4.
Do	Nov. 19-Dec. 2			Outbreaks.

TYPHUS FEVER.

Chile:				
Talcahuano	Dec. 17-23	2		
Greece:				
Leucadia	Jan. 17			Present.
Prevesa	do			Do.
Zante	do			Do.
Palestine:				
Jerusalem	Dec. 26-Jan. 1	1		
Poland				Oct. 29-Nov. 4, 1922: Cases, 132; deaths, 11. Recurrent typhus: Cases, 207; deaths, 4.
Rumania:				
Chisinau	Nov. 1-30	5		
Union of South Africa				Nov. 1-30, 1922: Cases 1,100; deaths, 107 (colored); cases, 3, deaths 1 (white).
Cape Province				Nov. 1-30, 1922: Cases, 982; deaths, 86 (colored); cases, 1, deaths, 1 (white).
Do	Nov. 19-25			Outbreaks.
Natal				Nov. 1-30, 1922: Cases, 62; deaths, 14 (colored); white, 1 case.
Frere	Nov. 19-25	52		Boys' school Estcourt district; among pupils and staff.
Orange Free State				Nov. 1-30, 1922: Cases, 39; deaths, 2, (colored); white, 1 case.
Do	Nov. 19-25			Outbreaks.
Transvaal				Nov. 1-30, 1922: Cases, 17; deaths, 5.
Do	Nov. 19-25			Outbreaks.

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

Reports Received from December 30, 1922, to January 26, 1923.[1]

CHOLERA.

Place.	Date.	Cases.	Deaths.	Remarks.
China:				
Liutaoku	Sept. 22	60	20	
Chosen (Korea):				
Yalu River Region				Sept. 22, 1922: 30 deaths reported.
India				Sept. 24–Nov. 11, 1922: Cases, 6,574; deaths, 4,386.
Bombay	Oct. 27–Nov. 4	1		
Calcutta	Nov. 12–Dec. 2	34	21	
Madras	Nov. 19–Dec. 9	3	1	
Rangoon	Nov. 12–25	5	3	
Philippine Islands:				
Province—				
Laguna	Oct. 12–18	1		
Russia				Jan. 1–Oct. 7, 1922: Cases, 83,367.
Archangel (government)	Oct. 1–7	7		
Tashkent	do	27		Turkestan Republic: 3 cases reported on waterways.
Ukraine				Sept. 1–30, 1922: Cases, 119.
Donetz (Government)	Sept. 1–30	29		
Tchernigov (Government)	do	36		
Siam:				
Bangkok	Oct. 29–Nov. 4	1		

PLAGUE.

Azores:				
Fayal Island—				
Castelo Branco	Dec. 2		2	Vicinity of Horta.
Pico Island—				
Lages	Nov. 27–Dec. 15		8	1 case present Dec. 15, 1922.
St. Michaels Island				Nov. 12–Dec. 9, 1922: Cases, 66; deaths, 24. At localities 3 9 miles from Ponta Delgada.
Ponta Delgada	Nov. 26–Dec. 9	3		
Brazil:				
Bahia	Oct. 29–Nov. 18	1	1	
Porto Alegre	Nov. 19–25	1		
British East Africa:				
Kenya Colony—				
Tanganyika Territory	Oct. 15–21		1	
Ceylon:				
Colombo	Nov. 12–Dec. 2	13	9	Plague rodents, 5.
China:				
Hongkong	Nov. 5–Dec. 2	9	8	
Ecuador:				
Guayaquil	Nov. 1–Dec. 15	1	1	Rats examined, 12,830; found infected, 58.
Egypt				Jan. 1–Dec. 21, 1922; Cases, 485; deaths, 228.
City—				
Alexandria	Nov. 19–25		2	
Port Said	Nov. 19–27	4	2	
Suez	Nov. 18–Dec. 5	3	4	
Province—				
Assiout	Nov. 19	1		
Dakahlieh	Dec. 3	1	1	Pneumonic.
Minieh	Nov. 18–27	2	1	
India				Oct. 1–Nov. 11, 1922: Cases, 10,644; deaths, 8,636.
Bombay	Oct. 27–Nov. 25	22	19	
Madras Presidency	Nov. 19–Dec. 9	1,044	692	
Madras	Nov. 19–25	1	1	
Rangoon	Nov. 12–25	16	15	
Japan:				
Osaka				July 1–Nov. 30, 1922: Cases, 70.
Java				Oct. 1–31, 1922: Cases, 454; deaths, 338.
East Java—				
Soerabaya	Oct. 22–28	1	1	
Soerakarta—				
Klaten	Nov. 4			Present in epidemic form.

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

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

Reports Received from December 30, 1922, to January 26, 1923—Continued.

PLAGUE—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Madagascar:				
Province—				
Moramanga				To Oct. 30, 1922: Cases, 21; deaths, 18. Pneumonic.
Tananarive				To Oct. 30, 1922: Cases, 7; deaths, 7. Septicemic. Occurring in Fenoarivo region. (See Public Health Reports, Dec. 29, 1922, p. 3237.)
Do	Oct. 23-29		1	Septicemic.
Mesopotamia:				
Bagdad	Oct. 1-31	7		
Palestine:				
Jaffa	Nov. 27-Dec. 4	1		
Peru				Nov. 1-30, 1922: Cases, 83; deaths, 42.
Localities—				
Cañete	Nov. 16-30	16	7	
Chepen	Nov. 1-15			Present.
Chiclayo	Nov. 16-30	11	7	
Eten	do	3		
Guadaloupe	Nov. 1-30	11	5	
Huacho	Nov. 16-30	2	1	
Huaral	do	1		
Jayanca	do	3	2	
Lambayeque	do	5	3	
Lima (Suburb)	Nov. 1-30	6	1	
Lima (City)	do	3	3	
Magdelena del Mar	Nov. 16-30	1		
Mosche	do	2	1	
Piura	do	8	5	
San Pedro	Nov. 1-30	5	3	
Sullana	Nov. 16-30	3	3	
Trujillo	Nov. 1-15		1	
Tuman	Nov. 16-30	3		
Portugal:				
Lisbon	Nov. 10-29	4	2	
Portuguese West Africa:				
Angola—				
Loanda	Oct. 1-28		27	Fatal cases among white population.
Siam:				
Bangkok	Nov. 12-18	2	1	
Spain:				
Barcelona	Nov. 15-Dec. 18	1		Sept. 24-Nov. 14, 1922: Cases, 23; deaths, 9.
Syria:				
Beirut	Nov. 6-12	2	1	
Turkey:				
Constantinople	Nov. 22-28	2		

SMALLPOX.

Algeria:				
Algiers	Dec. 1-10	1		
Arabia:				
Aden	Nov. 19-Dec. 16	7	2	
Brazil:				
Bahia	Nov. 5-11	1		
Rio de Janeiro	Nov. 25-Dec. 16	27	5	
Sao Paulo	Oct. 16-22	1	1	
British East Africa:				
Kenya Colony—				
Tanganyika Territory	Oct. 8-28	12	2	
Canada:				
Manitoba—				
Winnipeg	Dec. 10-30	14		
Ontario				Dec. 1-31, 1922: Cases, 51; deaths, 1.
Hamilton	Dec. 31-Jan. 6	2		
Niagara Falls	Dec. 3-30	10		
Do	Dec. 31-Jan. 6	5		
Ottawa	Dec. 10-23	6		
Toronto	Dec. 10-30	2		
Saskatchewan—				
Regina	Dec. 3-23	2		

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

Reports Received from December 30, 1922, to January 26, 1923—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Ceylon:				
Colombo	Nov. 12-Dec. 2	6	3	
Chile:				
Concepcion	Oct. 30-Nov. 20		3	
Valparaiso	Oct. 2-Nov. 5		51	
China:				
Amoy	Nov. 5-18		2	Nov. 26-Dec. 2, 1922: Present.
Antung	Nov. 13-Dec. 10	2		
Canton	Oct. 1-Nov. 30			Prevalent.
Chungking	Nov. 5-11			Present.
Foochow	Nov. 12-Dec. 2			Do.
Hongkong	Nov. 5-11		1	
Manchuria—				
Harbin	Nov. 20-26	5		
Mukden	Nov. 19-Dec. 2			Do.
Nanking	Nov. 5-Dec. 9			Do.
Chosen:				
Chemulpo	Oct. 1-Nov. 30	52	29	
Fusan	Nov. 1-30	1		
Seoul	Oct. 1-Nov. 30	6		
Czechoslovakia				Oct. 1-31, 1922: Cases, 3.
Province—				
Bohemia	Oct. 1-31	1		
Moravia	do	1		
Slovakia	do	1		
Dominican Republic:				
Puerto Plata	Dec. 14-20	1		
Santo Domingo	Dec. 3-16			Present.
Ecuador:				
Guayaquil	Dec. 1-15	6		
France:				
Paris	Dec. 1-10	1		
Germany:				
Bremen	Dec. 3-9	1		
Great Britain:				
Liverpool	Dec. 11-17	1		From vessel.
London	Nov. 26-Dec. 2	1		
Greece:				
Saloniki	Nov. 6-Dec. 10	3	1	
India				Nov. 5-18, 1922: Cases, 1,390; deaths, 276.
Bombay	Nov. 5-25	3	3	
Calcutta	Nov. 12-Dec. 2	13	8	
Karachi	Nov. 26-Dec. 9	3		
Madras	Nov. 12-Dec. 9	31	15	
Rangoon	Nov. 5-25	5	2	
Java:				
East Java—				
Soerabaya	Nov. 5-11	4		
West Java—				
Batavia	Nov. 11-17	21		Province.
Mesopotamia:				
Bagdad	Oct. 1-31	285	153	
Mexico:				
Chihuahua	Dec. 4-17		4	
Mexico City	Nov. 12-Dec. 16	31		Including municipalities in Federal District.
Nogales	Dec. 10-19		1	
Do	Dec. 31-Jan. 6		1	
Sonora, State				Nov. 1-30, 1922: Present in northern section.
Empalme	Nov. 1-30	4	1	
Torreon	Dec. 1-31		1	
Peru:				
Callao	Nov. 1-15	2		
Lima (country)	do	2	1	
Poland				Oct. 1-28, 1922: Cases, 48; deaths, 14.
Portugal:				
Lisbon	Nov. 19-Dec. 16	65	6	
Oporto	Oct. 15-Dec. 23	22	11	
Russia:				
Province—				
Esthonia	Oct. 1-Nov. 30	42		
Lettonia	Oct. 1-31	1		
Ukraine				Jan.-Sept., 1922: Cases, 8,714.

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

Reports Received from December 30, 1922, to January 26, 1923—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Spain:				
Corunna	Nov. 26-Dec. 2		1	
Seville	Nov. 27-Dec. 17		24	
Valencia	Nov. 26-Dec. 23	3		
Switzerland:				
Berne	Nov. 19-Dec. 9	39		
Zurich	Nov. 19-Dec. 2	14		
Syria:				
Aleppo	Nov. 19-Dec. 23	38	20	Dec. 3-9, 1922: Present.
Damascus	Nov. 1-30	82	16	
Tunis:				
Tunis	Dec. 1-22	2	1	
Turkey:				
Constantinople	Nov. 19-Dec. 9	73	25	
Union of South Africa				Oct. 1-31, 1922: Cases, 17. Natives.
Cape Province				Oct. 1-31, 1922: Cases, 9.
Do	Oct. 29-Nov. 18			Outbreaks.
Southern Rhodesia	Nov. 9-15	3		
Transvaal				Oct. 1-31, 1922: Cases, 8.
Do	Oct. 29-Nov. 4			Outbreaks.
Yugoslavia:				
Serbia—				
Belgrade	Nov. 12-18	2	1	
On vessel:				
S. S. Huntress	Nov. 11	1		At Fremantle, Australia, from Cape Town, South Africa.
———	Dec. 17-23	1		At Liverpool.

TYPHUS FEVER.

Algeria:				
Algiers	Nov. 11-20	1	1	
Brazil:				
Porto Alegre	Nov. 19-Dec. 16	3		
Chile:				
Antofagasta	Nov. 12-Dec. 23	21	5	Nov. 11-Dec. 5, 1922: Cases, 10; deaths, 2.
Concepcion	Oct. 17-Nov. 27		8	
Talcahuano	Nov. 12-Dec. 16	8	6	
China:				
Antung	Nov. 13-Dec. 10	7		
Manchuria—				
Harbin	Nov. 20-26	7		
Cuba:				
Matanzas	Dec. 25-31	1	1	
Czechoslovakia:				
City—				
Prague	Nov. 19-25	1		
Province—				
Ruthenia	Oct. 1-31	1		
Egypt:				
Alexandria	Nov. 19-25	1	1	
Cairo	Oct. 1-21	6	4	
Germany:				
Coblenz	Dec. 10-16	1		
Dresden	....do	1		
Ireland:				
Belmullet	June 15-Dec. 14	20		In county Mayo.
Mexico:				
Mexico City	Nov. 12-Dec. 16	63		Including municipalities in Federal District.
Palestine				Dec. 5-11, 1922: Cases, 2; in northern section.
Jaffa	Dec. 12-18	2		
Persia:				
Teheran	Sept. 24-Oct. 24	1		
Poland				Oct. 1-28, 1922: Cases, 515; deaths, 39. Recurrent typhus: Cases, 725; deaths, 16.
Portugal:				
Oporto	Oct. 15-Dec. 2	1	1	

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

Reports Received from December 30, 1922, to January 26, 1923—Continued.

TYPHUS FEVER—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Russia				July 30-Sept. 23, 1922: Cases, 23,803.
Esthonia	Nov. 1-30	1		Oct. 1-Nov. 30, 1922: Recurrent typhus: Cases, 7.
Lettonia	Oct. 1-31	19		Recurrent typhus: Cases, 1.
Ukraine	Jan.-Sept	307,329		
Ukraine, Tartar Republic and Siberia	June 1-30	35,926		Provisional figures.
Do	July 1-31	17,262		Do.
Do	Aug. 1-31	6,864		Do.
Do	Sept. 1-30	2,388		Do.
Spain:				
Barcelona	Nov. 30-Dec. 6		2	
Syria:				
Aleppo	Dec. 10-16	1	1	
Turkey:				
Constantinople	Nov. 27-Dec. 2	3		
Union of South Africa				Oct. 1-31, 1922: Cases, 890; deaths, 78 (white—cases 4, deaths 1; colored—cases 886, deaths 77).
Cape Province				Oct. 1-31, 1922: Cases, 817; deaths, 60 (colored); white—2 cases.
Do	Oct. 29-Nov. 18			Outbreaks.
Natal				Oct. 1-31, 1922: Cases, 45; deaths, 13 (colored); white—1 case.
Orange Free State				Oct. 1-31, 1922: Cases, 19; deaths, 4 (colored); white—1 case, 1 death.
Do	Nov. 12-18			Outbreaks.
Transvaal				Oct. 1-31, 1922: Cases, 5 (colored).
Do	Oct. 29-Nov. 18			Outbreaks.

YELLOW FEVER.

West Africa:				
Senegal—				
Saltpond				Reported present Dec. 21, 1922.
Warrai				Do.