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A PRELIMINARY REPORT ON THE USE OF CREOSOTE OIL AS A MOSQUITO REPELLENT.

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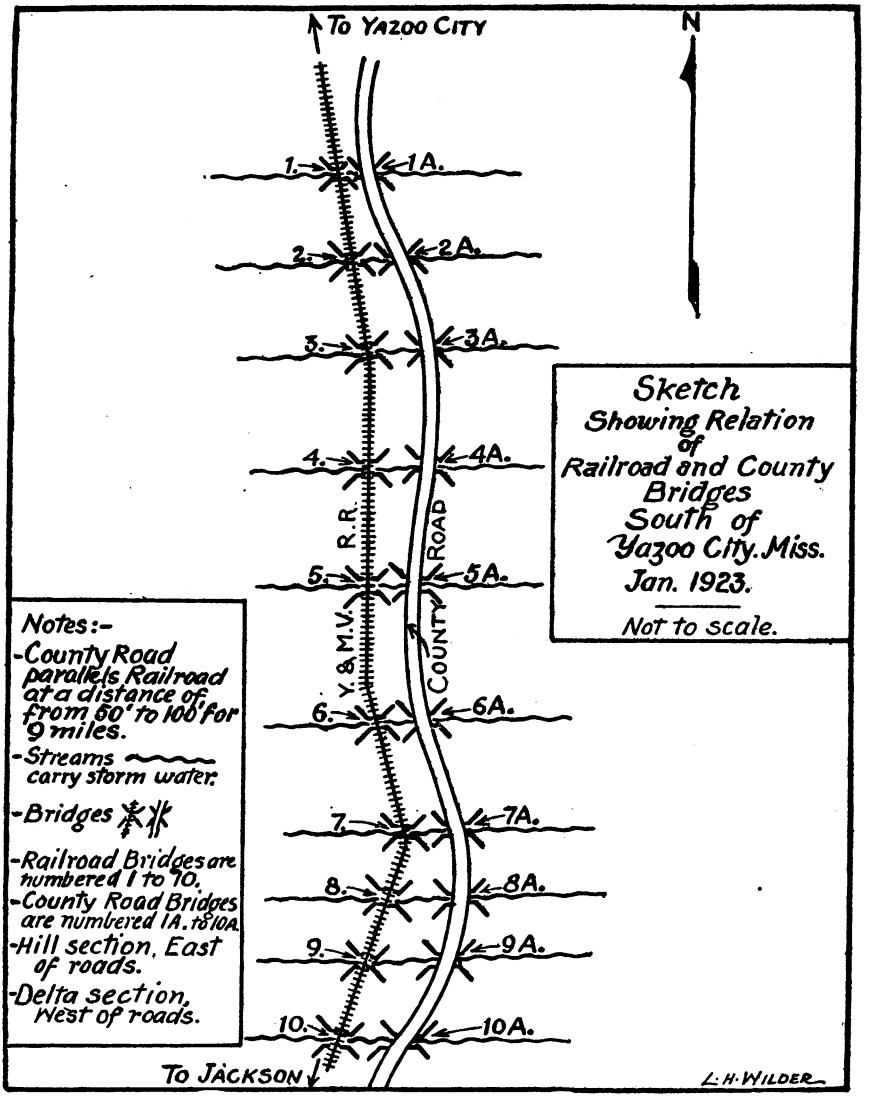
During the course of a study of rural malaria in Yazoo County, Miss., which was being conducted by the United States Public Health Service in cooperation with the State and county health authorities, certain observations were made by the author relative to the resting habits of anopheline mosquitoes as affected by creosote oil. Because of the possibility of their practical bearing upon rural malaria control, these observations are deemed worthy of a preliminary report at this time.

The period covered was from April 1 to November 1, 1922, during which time approximately 99 per cent of all mosquitoes encountered in this locality were *Anopheles quadrimaculatus*. The remaining 1 per cent of mosquitoes collected consisted of *A. crucians* and *A. punctipennis*, the latter predominating. *Aëdes (calopus) aegypti* and *Culex quinquefasciatus* were encountered with extreme rarity and, therefore, were not considered of sufficient numerical importance to be included in the tabulations of mosquitoes counted or collected.

An unusual opportunity presented itself for observing and collecting anopheline mosquitoes underneath many small bridges in the vicinity of Yazoo City. The county road leading south from Yazoo City parallels the Yazoo & Mississippi Valley Railroad for a distance of about 9 miles, the county road and the railroad being from 50 to 100 feet apart throughout this entire distance. The railroad for at least four-fifths of the 9 miles is laid on a fill as a protection against high water. In building the county road, advantage was taken of the hillside excavations made by the railroad contractors in procuring dirt and gravel for the railroad fills. Because of the artificial embankment upon which the railroad rests, it was necessary to place 35 culverts, including small bridges, within the 9 miles, in order to provide for the run-off of storm water. The number of culverts and small bridges on the county road is slightly less than the number on the railroad; but, since they were installed for the same purpose, naturally they were placed in close proximity to the culverts and bridges on the railroad.

In making catches of adult anopheline mosquitoes under these bridges early in the summer, it was noted that there was a marked difference between the number of anopheline mosquitoes found under the railroad bridges and the number found under the county road bridges only a few yards away. The only noticeable difference in



conditions detected between the railroad bridges and the county road bridges was that the timbers of all the railroad bridges had been treated with creosote oil before being put in place, whereas the timbers in the county bridges had not been so treated. Further observation revealed no other important differences between the

railroad and county road bridges, which lay generally in pairs throughout the 9 miles under observation. Being in close proximity, their relationship to and distance from near-by mosquito producing areas were approximately the same. The remarkable difference noted in relative abundance of mosquitoes resting under these bridges remained fairly constant throughout the summer, it being observed that whereas the county road bridges served as daily resting places for great numbers of anopheline mosquitoes, the numbers of mosquitoes found under the near-by railroad bridges were, by comparison, extremely small.

In order to continue and check these observations, a series of 10 county road bridges and 10 near-by railroad bridges were selected for further observation and study (see sketch). Regular visits at 5-day intervals were made to these 20 bridges. Ten visits were made to each bridge beginning June 12 and terminating August 26. *Anopheles* found resting under the bridges were carefully counted without being disturbed. Table I shows the number found and counted under the bridges at each visit.

TABLE I.—*Number of Anopheles found and counted under county-road bridges and railroad bridges.*

COUNTY-ROAD BRIDGES—UNTREATED LUMBER USED.

Bridge number.	Dates of inspections.										Total mosquitoes found.
	July 12.	July 17.	July 22.	July 27.	Aug. 1.	Aug. 6.	Aug. 11.	Aug. 16.	Aug. 21.	Aug. 26.	
1A	103	112	325	402	174	161	186	106	89	148	1,806
2A	91	66	636	608	355	379	204	113	191	106	2,749
3A	29	21	39	113	14	73	129	59	27	36	540
4A	31	19	32	71	17	29	94	118	36	52	499
5A	116	92	33	106	21	82	26	19	87	91	673
6A	152	56	64	208	118	101	82	32	44	37	894
7A	12	31	46	16	9	16	17	14	8	21	190
8A	26	12	19	29	18	21	20	7	11	32	195
9A	125	107	194	197	97	79	68	51	126	29	1,073
10A	472	302	108	216	308	321	254	207	409	308	2,905
Total.	1,157	818	1,496	1,966	1,131	1,262	1,080	726	1,028	860	11,524

RAILROAD BRIDGES—CREOSOTED LUMBER USED.

1	0	1	4	1	0	2	2	1	0	3	14
2	2	2	6	5	1	3	1	0	3	1	24
3	4	4	5	7	2	2	4	1	0	0	29
4	3	2	2	7	0	1	3	2	1	2	23
5	1	3	7	9	0	5	1	0	4	3	33
6	2	4	4	1	1	3	0	0	2	1	18
7	0	1	1	0	0	0	2	0	1	0	5
8	0	0	0	0	0	1	2	0	0	1	4
9	2	1	7	2	3	0	2	2	4	0	23
10	2	4	6	10	4	6	3	5	7	3	50
Total.	16	22	42	42	11	23	20	11	22	14	223

Upon the completion of this series of observations, two county road bridges, 2A and 10A, were selected for further study. A supply of creosote oil similar to that used in creosoting the railroad bridges was secured from the railroad company. A section underneath bridge 2A, 18 inches wide and 12 feet long, was sprayed with 1 pint of this creosote oil. A section underneath 10A, 18 inches wide and 12 feet long, was sprayed with one quart of the creosote oil. A 3-gallon pressure spray pump was used in spraying the oil.

It was readily observed that the application of the creosote oil as made in both instances was by no means agreeable to the mosquitoes resting under the bridges. At observations made on the afternoon of the same day and at subsequent observations made during the next few days, no mosquitoes were found resting on the surfaces treated with the creosote oil, or in close proximity to them. It was evident that a great reduction had taken place in the number of resting mosquitoes under these two bridges after the application of the creosote oil, and that the mosquitoes which remained were massed at the other side of the bridge as far away from the creosote oil as it was possible for them to get.

It was inferred from these observations that possibly creosote oil might be used in a practical way as a mosquito repellent in the simply constructed tenant houses commonly found in the rural districts of the South. Houses of this type can not be properly screened because of faulty construction and heretofore no practicable method has been known which would protect the people living in homes of this character from being bitten by mosquitoes and infected with malaria.

In order to continue these observations on as large a scale as was possible with the limited time at the disposal of the investigator, 25 houses were selected in different sections of Yazoo County, the construction of which was such as would render proper screening impossible. The houses usually consisted of one room, this room being approximately of the following dimensions and construction: 14 by 14 feet, with ceiling 8 feet from the floor; two doors; one fireplace; and one or two openings which inadequately served as windows. These houses were all located within easy flight range of some prolific *Anopheles* producing area. Three successive inspections were made of each house before the creosote oil was applied and three after the creosote oil was applied. The observations made before applying the oil were at five-day intervals, and those made after applying the oil were at approximately three-week intervals. At each one of the six visits, careful search was made for resting mosquitoes, which were caught and subsequently counted.

After the first series of observations had been made and the resting mosquitoes collected and counted, an application of creosote oil was made to the room or rooms in question. All of the occupants'

household effects were removed to the porch or yard, and a generous application of creosote oil was made to the walls and ceilings of the room with a 3-gallon pressure spray pump, the floor being incidentally covered with oil in making the applications to the walls and ceilings. Approximately 2 gallons of creosote oil were used to each room.

Table II shows the location of the houses under observation, the number of anopheline mosquitoes found at each of the three inspections previous to the application of creosote oil, the dates of applying the oil, and the number of anopheline mosquitoes found at each of the three inspections subsequent to the application of the oil.

The creosote oil used in these experiments was the common commercial product so widely employed in creosoting heavy bridge and building timbers for preservative purposes. It is commonly obtained as a by-product in the distillation of coal for the manufacture of coke and gas.

The cost of the creosote oil employed in these observations was 35 cents a gallon, or approximately 70 cents a room. It is understood, however, that commercial creosote oil can be purchased in large quantities at from 12 to 15 cents per gallon, at which price the cost of the material for creosoting a house of the type dealt with in these observations would not be more than 30 cents.

Another interesting observation relative to the deterrent effect of creosote on the selection of a place for egg-laying by mosquitoes, made at the time of the observations recorded above, is reported here, because of the possibility of its practical bearing upon the control of mosquito production in proximity to occupied houses. While making a house inspection in Yazoo County, three rain-water barrels were observed which were used to catch rain water for washing purposes, this being a common practice throughout the Southern States. Two of the water barrels were found to contain mosquito larvæ in great abundance, while the other barrel contained an equal amount of water but no mosquito larvæ. Several subsequent inspections were made of these water barrels, and at each visit the findings were the same—abundant mosquito larvæ in two barrels and none in the other barrel.

The occupant of the house, a negro woman, stated that there had never been any wiggletails in the third barrel since she had first brought it home four years ago. Upon inquiry as to where this particular barrel came from, she stated that it had been given to her by a railroad man who was painting the bridges.

It appeared that the barrel had been used to hold creosote oil, and although there was no film on the water in the barrel at the time these observations were made, a very faint odor of creosote could be detected.

TABLE II.—*Number of Anopheles found in houses before and after applying creosote.*

Location of house.	House No.	Inspection. First. Date.	First. Number of Anopheles found.	Second. Date.	Second. Number of Anopheles found.	Third. Date.	Third. Number of Anopheles found.	Date creosote oil was applied.	Inspection. Fourth. Date.	Fourth. Number of Anopheles found.	Fifth. Date.	Fifth. Number of Anopheles found.	Sixth. Date.	Sixth. Number of Anopheles found.
Norway Plantation	1	July 24	13	July 29	13	Aug. 3	14	Aug. 7	Aug. 22	0	Sept. 11	0	Oct. 6	0
Do	2	...do...	7	...do...	12	...do...	11	...do...	...do...	0	...do...	0	...do...	0
Do	3	...do...	26	...do...	33	...do...	37	...do...	...do...	0	...do...	0	...do...	0
Do	4	...do...	11	...do...	16	...do...	21	...do...	...do...	0	...do...	0	...do...	0
Do	5	...do...	19	...do...	18	...do...	16	...do...	...do...	0	...do...	0	...do...	0
Ragan Plantation	6	...do...	33	...do...	19	...do...	22	...do...	...do...	0	...do...	0	...do...	0
Sixteenth Section	7	July 28	42	July 31	56	Aug. 5	71	Aug. 15	...do...	0	...do...	0	...do...	0
Do	8	...do...	8	Aug. 2	19	...do...	16	...do...	...do...	0	...do...	0	...do...	0
Do	9	...do...	14	...do...	21	...do...	31	...do...	...do...	0	...do...	0	...do...	0
Do	10	...do...	17	...do...	34	...do...	8	...do...	...do...	0	...do...	0	...do...	0
Eldorado	11	July 20	3	Aug. 3	7	Aug. 8	89	Aug. 18	Aug. 30	0	Sept. 15	0	Oct. 7	0
McGraw Plantation	12	...do...	21	...do...	13	...do...	21	...do...	...do...	0	...do...	0	...do...	0
Do	13	...do...	14	...do...	20	...do...	32	...do...	...do...	0	...do...	0	...do...	0
Captain Butler Plantation	14	...do...	9	...do...	18	...do...	17	...do...	...do...	0	...do...	0	...do...	0
Do	15	...do...	4	...do...	9	...do...	8	...do...	...do...	0	...do...	0	...do...	0
Rialto Plantation	16	Aug. 1	76	Aug. 7	103	Aug. 12	89	Aug. 19	...do...	0	...do...	0	...do...	0
Do	17	...do...	13	...do...	21	...do...	36	...do...	...do...	0	...do...	0	...do...	0
Do	18	...do...	27	...do...	41	...do...	32	...do...	...do...	0	...do...	0	...do...	0
Do	19	...do...	13	...do...	19	...do...	9	...do...	...do...	0	...do...	0	...do...	0
Do	20	...do...	13	...do...	34	...do...	33	...do...	...do...	0	...do...	0	...do...	0
Do	21	...do...	16	...do...	17	...do...	24	...do...	...do...	0	...do...	0	...do...	0
Sam Coker Plantation	22	...do...	8	...do...	19	...do...	6	Aug. 21	...do...	0	...do...	0	...do...	0
Do	23	...do...	4	...do...	3	...do...	11	...do...	...do...	0	...do...	0	...do...	0
Do	24	...do...	9	...do...	8	...do...	21	...do...	...do...	0	...do...	0	...do...	0
Do	25	...do...	7	...do...	9	...do...	26	...do...	...do...	0	...do...	0	...do...	0

SUMMARY.

These observations indicate that creosote oil, when applied to the walls and ceilings of certain houses in the quantity of 1 gallon to 420 square feet, will noticeably repel anopheline mosquitoes. The duration of its effectiveness is yet to be determined. Observations made of certain of the creosoted houses 10 weeks after the creosote had been applied seem to indicate that the creosote oil was still effective.

It appears that creosote oil as a mosquito repellent is particularly applicable to and desirable for use in houses of poor construction, where screening and other antimosquito measures can not be effectively employed.

Apparently colored people who commonly live in houses of this type in the Southern States do not object to the application of creosote oil in the quantities employed in these observations. Unquestionably it is less objectionable than the smudges of rags, leather, and feathers, so universally used by these people to keep the mosquitoes away while they secure a few hours' sleep.

Apparently the employment of creosote oil in the quantity and manner indicated above is perfectly safe. No ill effects were noted upon any of those who slept in the rooms subsequent to the application of creosote oil.

One observation seems to indicate that creosote may be used to prevent mosquitoes from laying eggs in water barrels.

STUDIES ON OXIDATION-REDUCTION.[1]

I. INTRODUCTION.

By W. MANSFIELD CLARK, Chief of Division of Chemistry, Hygienic Laboratory, United States Public Health Service.

Upon that great problem, biological oxidation, the attack has been continuous from 1774, when Joseph Priestley isolated "dephlogisticated air" and with it conducted animal experiments. In 1775 Lavoisier published his discovery of oxygen, and two years later his studies on respiration gave new meaning to the fact that the life of a man hangs, moment to moment, upon the maintenance of a line of communication between his tissues and the air. This knowledge of the physiological importance of oxygen has had a profound psychological effect. It has inclined all investigators to state the

[1] Joint contribution from the Dairy Division, Department of Agriculture, and the Division of Chemistry, Hygienic Laboratory, United States Public Health Service. The experimental data to be given in subsequent papers were obtained for the most part by methods worked out in principle during a preliminary study in the Dairy Division.

The present article is the first of a series of papers on the subject that is to be published in the Public Health Reports.

facts of biological oxidation in terms of the conduct of the element oxygen itself. The facts of anaerobiosis brought to light by Pasteur have been twisted to fit preconceptions, and Ehrlich's suggestive studies on the reduction of dyes by tissues have been interpreted in terms of oxygen demand. As a consequence of this attitude the main problem has been regarded to be the discovery of the *mechanism* by which the oyxgen of our atmosphere enters the chemistry of life.

There are many reasons for believing the dominance of this emphasis to have been unfortunate. Since the mechanism of the simplest chemical reaction is still obscure, there has not been established satisfaction with any one of the several generalizations intended to describe the mechanism of biological oxidation. Contesting schools offer postulates which are easily interchanged without revealing any decisive addition to our knowledge. Their observations are largely of a qualitative nature, and the impartial student despairs of finding the quantitative data which alone can establish the relative importance of the differing viewpoints.

When, therefore, in 1920, Gillespie published some suggestive data upon the electrode potentials induced by bacterial reduction, there was hope that a method had been revealed whereby it might be possible to accumulate *quantitative* data and, step by step, build up exact evidence upon one of the manifold aspects of the general problem. I have repeated Gillespie's work and confirmed its main features. However, upon extending the method to the study of important bacteriological problems, it was found that the electrode potentials, observed under the conditions then used, were uncertain, and that some of the remarkable relations suggested were altogether too important to justify their acceptance without more rigid confirmation. Indeed, it has become ever more evident that there is need of a supplementary method with which to check electrode measurements of reduction intensity.

Accordingly, biological studies were partially suspended and there was begun a study of the potentials of various dyes in equilibrium with their reduction products—systems which can be used as indicators of oxidation-reduction intensity in a manner comparable to the use of acid-base indicators in hydrogen ion studies.

A preliminary paper (Clark 1920) gave a brief description of the system methylene blue-methylene white and of the system indigotin sulfonate–reduced indigotin sulfonate.

We are now prepared to publish the results of further investigations. These have led to a system of oxidation-reduction indicators, but they have also revealed certain striking effects of hydrion concentration and certain important facts relating to the conduct of electrodes. Since the various aspects of the subject are somewhat

complicated, it has seemed best to preface the description of experimental data by a review of elementary principles and a theoretical analysis of relations between electrode potentials and pH.

In this introductory paper I shall review first principles, since they are unfamiliar to many of those who have occasion to apply the consequences. In the following paper it will be shown how the electrode potential should vary with the hydrion concentration of the solution when the ratio of total reductant to total oxidant is kept constant. This will prepare the way for the concise statement of experimental data.

THE MEANING OF OXIDATION AND OF REDUCTION.

The element iron is known in aqueous solution in two states, each recognized by specific reactions. The one is called the ferrous, the other the ferric state. Ferrous iron may be converted to ferric iron by any one of a group of reagents, among which are oxygen, chlorine, and permanganate. Fixing attention for the moment upon the first and second states of the iron, we find each to be the same, even though the transforming agents vary. We then seek the factor common to the three agents. The first agent is oxygen, the third contains oxygen. If, now, we assume that chlorine reacts with water to liberate oxygen,

$$H_2O + Cl_2 = HCl + HClO$$
$$2HClO = 2HCl + O_2$$
$$\text{or } H_2O + Cl_2 \rightleftharpoons 2HCl + O,$$

we can assume that in each case the agent common to the transformation of ferrous to ferric iron is oxygen.

It was Lavoisier's recognition of the true nature of Priestley's discovery and his experiments, both chemical and physiological, that elevated oxygen to a place of utmost importance in chemical philosophy. Thus it was that a great many transformations came to be systematized in terms of the participation of oxygen, as in the instance cited above. All such transformations that could be so systematized were termed "oxidations."

In the progressive action of oxygen the products were known as higher and higher states of oxidation. The reverse process was then looked upon as leading to lower states, to reduced states, and was termed *reduction*. "Reduction," however, was a term applied not only to the removal of oxygen but also to the addition of hydrogen. In this extension we find a breach in the systematic classification. This breach is of no serious consequence to the systematist, because he can always devise a way in which to show that the addition of

hydrogen is equivalent to the removal of oxygen; but it is of considerable significance to the experimentalist. Given the liberty of avoiding a roundabout expression of experimental facts, the experimentalist will avoid any consideration of oxygen in describing the reduction of indigo to indigo white and, by the same token, the transformation of a ferrous chloride to a ferric chloride solution by chlorine, will be written

$$FeCl_2 + Cl \rightarrow FeCl_3$$

with no reference to either oxygen or hydrogen.

As a matter of fact, the best evidence indicates that the iron in a ferrous solution exists largely as the ions Fe^{++}, the two plus signs indicating that the atom of iron has lost two electrons. (The electron is the unit, negative, electric charge.) Likewise the iron in a ferric solution exists largely as the ions Fe^{+++}. Ferrous chloride and ferric chloride ionize as indicated by the downward arrows shown below and the effect of chlorine is indicated by the horizontal arrow.

$$\begin{array}{ccc} FeCl_2 & & FeCl_3 \\ \downarrow & & \downarrow \\ Fe^{++} + 2\overline{Cl} + Cl & \rightarrow & Fe^{+++} + 3\overline{Cl} \end{array}$$

If, then, we confine our attention to the two states of iron, the transformation may be written

$$Fe^{++} - \text{electron} \rightarrow Fe^{+++} \qquad (1)$$

The chlorine is thus merely the absorbent of electrons, and we can conceive of any agent which induces reaction (1) to act merely by withdrawing electrons to itself. The reverse process, the transformation of Fe^{+++} to Fe^{++} could be conceived as due to any agent which contributes electrons to Fe^{+++}.

The case under discussion is a reversible reaction, as may be expressed by means of the double arrows in (2),

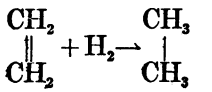
$$Fe^{+++} + e \rightleftharpoons Fe^{++} \qquad (2)$$

When (2) proceeds from right to left, an oxidation is said to be taking place. When (2) proceeds from left to right, a reduction is said to be taking place. In general, the addition of electrons results in the reduction of a substance, whereas the withdrawal of electrons results in its oxidation.

Thus has the breach in the original systematic classification been widened until there has entered a meaning quite foreign to the original terms "oxidation" and "reduction."

There have been occasional attempts to reform the terminology so that it might be brought into closer harmony with the ionic theory. These attempts have not succeeded, partly because of the momentum given to the original meanings, but also because any terminology which will seem to exclude the possible direct participation of oxygen or hydrogen, and so set up as the only possible process an exchange of electrons between ions, will offend the good sense of chemists.

Let us regard equation (2) as a *convenient* mode of expression, not necessarily descriptive of the actual mechanism. Let us also admit that the hydrogenation of ethylene may be written as shown below:



Nothing need be implied regarding the mechanism. Whatever the actual mechanisms in these two cases may be, it is possible to systematize them in terms of electron transfer, hydrogenation, or oxygenation. Very often, indeed in the majority of cases, experimental methods have not become sufficiently decisive to reveal which scheme in any given case corresponds most closely to actual fact.

We therefore abandon the original specific meanings of the terms oxidation and reduction and sense rather than define the intent in their use. If required to define the terms we can say that oxidation may be regarded as the withdrawal of electrons from a substance with or without the addition of oxygen or elements analogous to oxygen; or as the withdrawal of electrons with or without the withdrawal of hydrogen or elements analogous to hydrogen. Reduction is the reverse of oxidation as defined above.

OXIDATION-REDUCTION EQUILIBRIA.

Since the ion Fe^{++} is capable of losing an electron it may be regarded as a reducing agent. Since Fe^{+++} is capable of taking up an electron it may be regarded as an oxidizing agent. Now it is practically impossible to prepare a solution absolutely pure with respect to either oxidant or reductant, and in many instances it is desirable to know the degree to which a mixture of oxidant and reductant is oxidized or reduced by another system. Our interest then centers upon the ratio of reductant to oxidant and upon the conditions under which this ratio assumes different values.

As suggested in the previous section we can regard the reversible transformation of ferric to ferrous iron to proceed through any one of a number of possible courses such as the following:

$$2Fe^{+++} + H_2 \rightleftharpoons 2Fe^{++} + 2H^+$$
$$2Fe^{+++} + 2\bar{O} \rightleftharpoons 2Fe^{++} + O_2$$
$$Fe^{+++} + e \rightleftharpoons Fe^{++}$$

If we express concentrations by means of brackets, the equations expressing the equilibrium condition for the cases mentioned are as follows:

$$\frac{[Fe^{+++}]^2[H_2]}{[Fe^{++}]^2[H^+]^2} = K_1, \text{ or } \frac{[Fe^{+++}]}{[Fe^{++}]} = \sqrt{\frac{K_1[H^+]^2}{[H_2]}}. \quad (3)$$

$$\frac{[Fe^{+++}]^2[\bar{O}]^2}{[Fe^{++}]^2[O_2]} = K_2, \text{ or } \frac{[Fe^{+++}]}{[Fe^{++}]} = \sqrt{\frac{K_2[O_2]}{[\bar{O}]^2}} \quad (4)$$

$$\frac{[Fe^{+++}][e]}{[Fe^{++}]} = K_3, \text{ or } \frac{[Fe^{+++}]}{[Fe^{++}]} = \frac{K_3}{[e]}, \quad (5)$$

For any given ratio of $\frac{[Fe^{+++}]}{[Fe^{++}]}$,

$$\sqrt{\frac{K_1[H^+]^2}{[H_2]}} = \sqrt{\frac{K_2[O_2]}{[\bar{O}]^2}} = \frac{K_3}{[e]},$$

This procedure is capable of indefinite expansion and shows that from the schematic point of view we are at liberty to choose any hypothetical scheme with which to express the equilibrium state. In aqueous solutions there are measurable concentrations of $[H^+]$. If the system is such that sufficient hydrogen is liberated to produce a finite pressure of molecular hydrogen, we might choose relation (3) as one amenable to experimental test.

As a matter of fact a mixture of titanous and titanic ions can be brought to equilibrium with a finite and measurable hydrogen pressure at a given value of $[H^+]$. In this case, then, a relation comparable to (3) might be chosen, namely,

$$\frac{[Ti^{++++}]}{[Ti^{+++}]} = \sqrt{\frac{K_T[H^+]^2}{[H_2]}} \quad (4)$$

On the other hand, it can be shown that the hydrogen pressure in equilibrium with an equimolecular mixture of ferrous and ferric iron

at $[H^+] = 10^{-1}$ normal is of the order of 10^{-27} atmosphere, a value quite beyond the reach of direct measurement. It would therefore be ridiculous to use (3) in an actual experimental test. Some other formulation might be sought, but it is evident that any formulation could be recast into *terms of* (3).

No further discussion is necessary to show that we are at liberty to choose any scheme for the formulation of the equilibrium state, that even the discovery of finite values for the chosen terms does not prove that the selected species are alone involved in the actual mechanism and that values representing no actuality are still useful for purposes of calculation. The purpose in choosing a fixed scheme of formulation will presently be made clear, but lest it be thought that we are plunging into a maze of artificialities it may be emphatically stated that we shall presently arrive at a result eminently adapted to experimental test.

It will be found convenient to use the following systematic treatment.[1]

In a solution containing ferrous and ferric ions there can be a continuous exchange of electrons, as represented by the reversible reaction

$$Fe^{+++} + e \rightleftharpoons Fe^{++}.$$

It is improbable that the mechanism of this exchange is such that there are present at any instant an appreciable number of "free" electrons. On the other hand, the solution certainly possesses the ability to "reduce" certain bodies brought in contact with it. This ability can be expressed in *terms of* an electron-escaping tendency, or "fugacity." We shall not do great violence to the subject if in this discussion we replace "fugacity" by the more familiar term "concentration" and formulate the equilibrium state of the reaction in accordance with the mass law as follows

$$\frac{[Fe^{+++}]\,[e]}{[Fe^{++}]} = K$$

In general, for any reversible oxidation-reduction reaction involving the transfer of n electrons, the equilibrium state is formulated by

$$\frac{[Ox]\,[e]^n}{[Red]} = K \qquad (6)$$

Here [Ox] represents the concentration of the species of the oxidant that can be considered the active agent, and [Red] represents the concentration of the species of the reductant that can be considered the active agent under the assumption that the reaction takes place by

[1] See Clark (1922).

electron transfer. The importance of so identifying the active agents assumed will become very evident in the next paper of this series.

Now let the equilibria of one system be formulated by

$$\frac{[\text{Red}]}{[\text{Ox}]} = \frac{[e]}{K'},$$

and those of another system be formulated by

$$\frac{[\text{Red}']}{[\text{Ox}']} = \frac{[e']}{K'}.$$

Let the two systems be brought together and interact until a simultaneous equilibrium is reached and the solution is at a given [e] value. Since [e] is now common to both equilibria,

$$\frac{[\text{Red}]}{[\text{Ox}]} = \frac{K'[\text{Red}']}{K[\text{Ox}']} \tag{7}$$

If the values of K′ and K were known, or if only their relative values as expressed by the ratio were known, we could at once predict what ratio of a given oxidant and its reduction product could exist with a given ratio of another oxidant and its reduction product. For instance, if $\frac{[\text{Red}]}{[\text{Ox}]} = 1$, the relation $\frac{K'}{K}$ determines whether the second system is practically completely reduced, practically completely oxidized, or at some intermediate stage. This would enable us to arrange the relative positions of all systems on an oxidation-reduction scale. The position of a system on such a scale would show its oxidizing or reducing tendency with respect to other systems.

In equation (7) we already find [e] eliminated as would be the case whatever the component might be that is chosen as the common constituent of two equilibria brought to the simultaneous states. We still have use for [e] however.

ELECTRODE POTENTIALS.

An evidence of some actual state of which [e] is representative is found in the fact that a noble metal placed in a solution containing an oxidation-reduction system acquires an electron charge increasing in intensity with increase of the reducing tendency, the electron fugacity, or, as we choose to say, the [e] value of the solution.

The noble metal is known to contain free electrons. To their concentration in the metal we assign the symbol $[e_m]$.

The work, W, required to transfer isothermally one faraday of electrons (96,500 coulombs) from concentration $[e_m]$ to concentration $[e_s]$ ($[e_s]$ being the postulated electron concentration in the solution) is

$$W = RT\, ln\, \frac{[e_m]}{[e_s]} \tag{8}$$

Here R is the gas constant, T the absolute temperature, and *ln* the symbol for Napierian logarithm.

W may be factored into the faraday, F, and the electrode potential difference, E.

Then,

$$E = \frac{RT}{F} ln\,[e_m] - \frac{RT}{F} ln\,[e_s] \tag{9}$$

Without discussing the reasons why $[e_m]$ *appears* to be constant under actual experimental conditions, we shall consider it constant. Therefore (9) becomes

$$E = C' - \frac{RT}{F} ln\,[e_s]. \tag{10}$$

Now write the equilibrium equation for any oxidation-reduction reaction (see (6))

$$\frac{[Ox]\,[e]^n}{[Red]} = K$$

$$e = \sqrt[n]{K\,\frac{[Red]}{[Ox]}}. \tag{11}$$

Substitution of (11) in (10) yields

$$E = C' - \frac{RT}{nF} ln\,K\,\frac{[Red]}{[Ox]}. \tag{12}$$

Equation (12) may be written

$$E = C' - \frac{RT}{nF} ln\,K - \frac{RT}{nF} ln\,\frac{[Red]}{[Ox]}.$$

It is then evident that if n is known, if the ratio $\frac{[Red]}{[Ox]}$ is determinable and if E and T are measured, the constant terms $C' - \frac{RT}{nF} ln\,K$ are established for a given system. For another system there would be established $C' - \frac{RT}{nF} ln\,K_2$. The difference gives $\frac{RT}{nF} ln\,\frac{K}{K_2}$ from which may be calculated $\frac{K}{K_2}$. This *ratio*, as we have already seen, permits the arrangement of different systems in their *relative* positions on a scale.

Now it is impracticable to determine the single potential differences represented by E, but it is eminently practicable to set up two half-cells and to measure the difference between the potential differences at the two electrodes. One of these half-cells may be selected as a standard of comparison and for convenience arbitrarily given a zero

electrode potential value. The standard selected for schematic purposes, though not the standard selected for actual operations, is the normal hydrogen electrode. This is defined as a platinized platinum electrode held under one atmosphere of hydrogen and immersed in a solution normal with respect to the hydrogen ions. To the potential difference at such an electrode is assigned the arbitrary value zero.

For the equilibrium between hydrion concentration, $[H^+]$, and hydrogen at partial pressure, P, we may write

$$\frac{[H^+]^2\,[e]^2}{P} = K. \tag{13}$$

Solving for [e], substituting in (10), and combining constants we obtain

$$E_H = C_H - \frac{RT}{F}\, ln\, \frac{\sqrt{P}}{[H^+]}. \tag{14}$$

Equation (14) is the general equation for a hydrogen electrode. When $P = 1$ and $[H^+] = 1$, E_H = zero (by definition), and thus C_H = zero.

Combine such a half-cell with one for which equation (12) applies. The EMF of the cell will now be

$$EMF = E - E_H = C - C_H - \frac{RT}{nF}\, ln\, \frac{[Red]}{[Ox]} + \frac{RT}{F}\, ln\, \frac{\sqrt{P}}{[H^+]}$$

or

$$E = C - \frac{RT}{nF}\, ln\, \frac{[Red]}{[Ox]}.$$

Then we have equation (12) again, but with the qualification that E is defined as the difference of potential between the electrode and a normal hydrogen electrode. To make this clear it is written E_h. Since C is expressed in volts, it will be written E_o.

$$E_h = E_o - \frac{RT}{nF}\, ln\, \frac{[Red]}{[Ox]}. \tag{15}$$

We have now arrived at a result amenable to experimental test and successfully submitted to such tests in a wide variety of instances. To be sure we need not have followed the path taken to arrive at equation (15). However, we have taken a devious path to arrive at this result because the postulate involved will be useful in further developments.

When $\frac{[Red]}{[Ox]} = 1$, $E_h = E_o$. If then it is possible to fix $\frac{[Red]}{[Ox]}$ and to determine experimentally definite E_h values in any given system, it is possible to express *relative oxidation-reduction intensities in terms of*

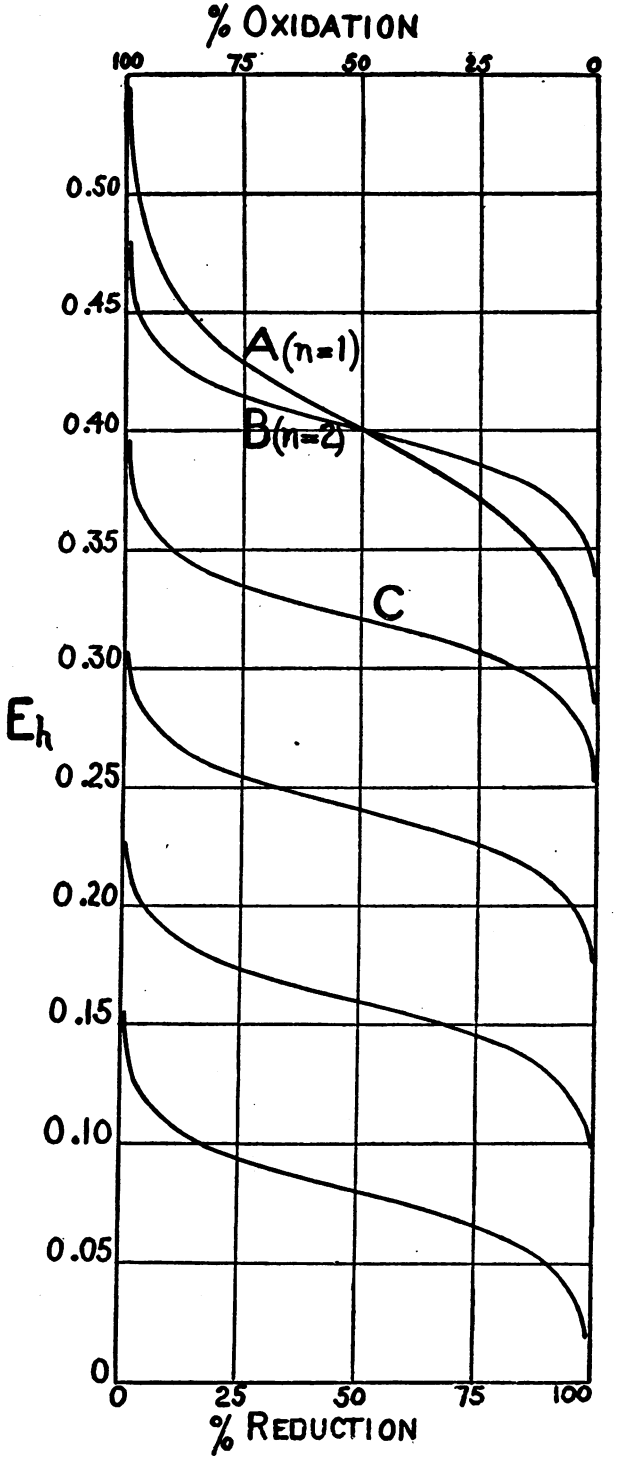


FIG. 1.—Relation between percentage reduction and E_h in systems having different E_o values.

electrode potential. This is illustrated in Figure 1, where E_h values are plotted as ordinates, and, instead of $\frac{[Red]}{[Ox]}$, there are plotted as abscissas the corresponding percentages of reduction or oxidation.

Since $E_h = E_o$ when $\frac{[Red]}{[Ox]} = 1$, the middle point of each curve is at an E_h value corresponding to the E_o of a given case.

The distinctly different slopes of curves A and B are determined by the value of n in equation (15).

It will be noted in Figure 1 that the position of a system on the potential scale depends upon the constant, E_o; and that within the system, E_h depends upon the *ratio* of reductant to oxidant, or percentage reduction, and not upon the total concentration so far as our treatment up to this point has revealed.

E_h is a measure of oxidation-reduction *intensity*, a matter quite apart from the *capacity* of a solution to oxidize or reduce. This is an important distinction which has not infrequently been overlooked. Indeed, the distinction in oxidation-reduction is quite analgous to the distinction between the capacity and intensity factors in acidity-basicity. In the acid-base system, percentage neutralization may be plotted against pH or the E_h of a hydrogen electrode, and there is then obtained a picture of different systems analogous to Figure 1. pH is a measure of acid *intensity*.

It will be noted that when the ratio $\frac{[Red]}{[Ox]}$ approaches 1 (50 per cent reduction), the E_h is stabilized, and, depending of course upon the concentration of the material, a greater or lesser amount of an oxidizing or a reducing agent is required to displace the E_h. This stabilizing action is comparable to the so-called buffer action found in the acid-base system; and to distinguish the effect with which we are now concerned I have suggested the term *poising action.* A solution may be said to be poised when it tends to resist change in E_h on addition of an oxidizing or reducing agent.

Let a solution be well poised at $E_h = 0.32$, the system being one which gives curve C, Figure 1. It will tend to oxidize any system having an E_h value more negative than 0.32, and will tend to reduce any system more positive than $E_h = 0.32$.

The charting of all systems on Figure 1 would then systematize the subject thoroughly were it not for difficulties which will appear in subsequent papers.

We have outlined a concept which has been of inestimable value in coordinating the oxidation-reduction reactions of inorganic chemistry. It has been extended to organic systems by Haber and Reuss (1904), Clark (1920), Granger (1920), Biilmann (1921), LaMer

(1922), Conant (1922), and others;[2] but, with few exceptions (*cf.* Clark 1920), it has not been extended among organic systems beyond derivatives of quinone and anthraquinone. Indeed, there is serious doubt of its universal application, and from the literature many instances could be cited to show that the concept has proved unprofitable when applied to very important oxidation-reduction reactions of organic chemistry. But the same is true of certain inorganic reactions, so that no sharp dividing line may be drawn where organic and inorganic chemistry are artificially partitioned. The reasons for the success of the electrode measurements in one case and the failure in another case are often obscure, but in some cases they can easily be explained. The frank recognition of the difficulties can not dissuade us from pursuing the consequences of the concept outlined, nor will the possible limitations of its application prevent our taking full advantage of accumulating data. These will be shown to have value amply sufficient to justify further systematic studies, and we are quite content to leave to the test of experimentation, questions upon which it would now be idle to speculate.

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[2] A more complete list of references will appear in a later paper.

CHANGES IN A SMALL TOWN BROUGHT ABOUT BY THE HEALTH DEPARTMENT.[1]

By B. B. Bagby, M. D., West Point, Va.

The State board of health was reorganized in 1907 with Dr. E. G. Williams as chairman. Since that time our summer practice has become very different from what it was previous to that time. But so gradual has been the change that few of us realize how great it has been.

I have kept a careful record of all my patients since I began to practice medicine. I moved to West Point in the spring of 1909. It is interesting and surprising to note the change that has taken place in my practice since that time. Recently I have tabulated all of the town cases that I had during the five summer months of 1909 and compared them with the same five months of 1922. You notice that I say my town practice. I have left out my country practice as my car has made too great a change in my country practice for me to take that into consideration.

TYPHOID FEVER, MALARIA, AND CHOLERA INFANTUM DISAPPEAR.

During the five summer months of 1909 I saw 158 town patients. During the same period of 1922 I saw 202 town patients. Of the 158 patients seen in 1909, 96 had well-defined cases of malaria, with chills, fever, sweats, etc.; 15 had cholera infantum, ileocolitis, or dysentery, with two deaths, and 7 had typhoid fever, making a total of 108 cases out of 158 that should have been prevented.

During the five summer months of 1922 I did not have in town a single typical case of malaria, typhoid fever, or cholera infantum. I had one atypical case of malaria that was most probably contracted out of town. I had only one case of ileocolitis that lasted over five days, and this was the only case of dysentery or infectious diarrhea in town this summer. There has not been a case of typhoid fever in West Point since February, 1919. Dr. A. S. Hudson, the other physician in West Point, says he has not had a case of malaria, cholera infantum, or typhoid fever this summer. So malaria, typhoid, and infantile diarrhea have about disappeared in West Point.

TYPICAL SANITARY CONDITIONS OF 1909.

In 1909 our city fathers boasted of having the healthiest town in the State. But let us see how very insanitary it was. Not a dwelling in town was completely screened. The negroes and poorer people had no screens at all. Every dwelling in town had an old-fashioned open privy. No thought had ever been given to draining

[1] Read at the fifty-third annual meeting of the Medical Society of Virginia in Norfolk, Oct. 31-Nov. 3, 1922, and originally published in the Virginia Medical Monthly, vol. 49, No. 9, December, 1922.

the marshes to rid the town of malarial mosquitoes; and the chief dairyman of the town spent a part of every night cleaning out the open privies. The contract for cleaning these was let to the lowest bidder, and the dairyman took the job at a very low figure, as he needed the refuse to fertilize his dairy farm land. He did his scavenger work late at night or early in the morning and went directly from that work to milking his cows, bottling and delivering milk. This was done with the full knowledge and consent of the town authorities for several years before I came to West Point.

MODERN SANITARY METHODS APPLIED.

Now 80 per cent of our milk is put up under thoroughly sanitary conditions. Even the poorest Negro tenements of our town now have good window and door screens. The town and State authorities spent about $6,000 a few years ago to drain our marshes and there has not been a single case of malaria contracted in our town since that time.

Four years ago our town put in a complete water and sewerage system and the law now compels every house to connect with this system. Our water comes from artesian wells about 400 feet deep and is almost sterile. It is as perfect a water and sewerage system as could be obtained. The improvements in the health of our town have paid us (the citizens) many times over for the money expended in putting in the waterworks and draining our marshes.

To get these results has been no easy task. As soon as I moved to West Point I determined to get every home in town screened and I began to urge each malaria patient to take quinine for eight weeks after missing his chill. This brought down the malaria cases very rapidly. But it would have been impossible to have eradicated the disease if the State board of health had not helped us to drain our marshes.

RESULTS JUSTIFY THE WORK.

We work so hard and apparently accomplish so little from day to day for the betterment of humanity that all of us at times get discouraged in our work. But after looking over my records of 13 years I am made to feel that our work in West Point has not been in vain, but rather a great blessing to humanity. And I am sure that ours has been the experience of many other physicians and towns in Virginia. I have not found a case of hookworm in five years. When I began to practice medicine in 1904, some sections in King and Queen County showed a hookworm infection of nearly 100 per cent among the school children, and many adults were sallow, anemic, sick, and thin. Thanks to the State board of health these same people are now healthy, prosperous, and happy. I know of several

families of prosperous farmers that are now enjoying touring cars of their own, who a few years ago, on account of hookworm, were more or less dependent on charity.

MORE WORK TO BE DONE.

But our health work has only begun. We still have in my country practice many privies that are not fly proof, many wells that are open, much stagnant water that should be drained, and many dwellings that are not properly screened. Only a very small part of the population has been vaccinated against typhoid or diphtheria. At least 75 per cent of my rural practice still have infected teeth or tonsils, and need a great deal more education to convince them of the injurious effects of these infections. Nothing has been done to eradicate syphilis, the most fatal of all infectious diseases. Syphilis has caused more deaths in my practice in West Point than the following diseases all combined: Measles, mumps, whooping cough, chicken pox, smallpox, diphtheria, scarlet fever, true pneumonia, malaria, and typhoid fever, and several more deaths than tuberculosis.

COUNTY HEALTH OFFICER THE GREAT NEED OF RURAL VIRGINIA.

There is greater work than ever for the health officer. We hear a great deal about the need of country physicians. The legislature appropriated last year $5,000 a year to the University of Virginia to educate rural physicians. We may need a few more rural physicians in other parts of the State; none are needed in this section. But we do need very badly more rural health officers. The people in my section that are crying loudest for more rural physicians are the ones that are most bitterly opposed to employing a county health officer.

If we had a competent health unit in each county, instead of needing more rural physicians we could do away with many that we now have, and our people would be far healthier and much better off financially.

I predict that the time will soon come when each county will have a complete public-health unit, and then typhoid fever, cholera infantum, smallpox, and hookworm will, in time, be completely wiped out of Virginia, and syphilis, tuberculosis, diphtheria, rheumatism, and arteriosclerosis will be on the rapid decline.

If each member of this society will do his best to help the State board of health, this goal will be reached much sooner than many of us now even hope.

INFLUENZA IN THE UNITED STATES.

CASES REPORTED BY STATES FOR THE WEEK ENDED MARCH 3, 1923.

The following table shows the number of cases of influenza reported by State health officers, by telegraph, for the week ended March 3, 1923, as compared with similar reports for the corresponding week of 1922, 1921, and 1920.

Cases of influenza reported by State health officers for the week ended March 3, 1923, and corresponding week of the years 1922, 1921, and 1920.

Division and State.	Week ended—			
	March 3, 1923.	March 4, 1922.	March 5, 1921.	March 6, 1920.
New England division:				
Maine	381	487	.....	1,130
Massachusetts	257	904	20	1,144
Vermont	0	2	1	481
Connecticut	317	711	18	571
Middle Atlantic division:				
New York (exclusive of New York City)	1,542	1,774	47	4,030
New York City	2,159	592	101	489
New Jersey	587	512	85	764
East North Central division:				
Indiana	253	.....	.....	1,289
Illinois	748	809	19	1,344
Wisconsin	1,679	129	24	994
West North Central division:				
Minnesota	4	71	2	692
Iowa	.....	.....	.....	86
Missouri	441	406	23	.....
South Dakota	.....	.....	.....	495
Nebraska	36	66	.....	2,007
Kansas	713	626	5	3,332
South Atlantic division:				
Delaware	.....	.....	19	50
Maryland	1,985	612	368	2,052
District of Columbia	19	9	4	21
West Virginia	174	446	.....	.....
North Carolina	.....	.....	.....	3,800
Georgia	169	179	32	3,677
Florida	35	68	6	580
East South Central division:				
Kentucky	.....	1,088	53	4,099
Alabama	315	31	7	3,885
Mississippi	1,041	.....	.....	1,798
West South Central division:				
Arkansas	523	371	63	2,576
Louisiana	1,051	469	.....	2,541
Texas	3,176	353	.....	134
Mountain division:				
Montana	.....	178	.....	514
Colorado (exclusive of Denver)	32	67	.....	.....
New Mexico	63	304	.....	186
Pacific division:				
Washington	.....	389	.....	1,260
Oregon	27	782	.....	309
California	675	9,917	143	918

DEATHS DURING WEEK ENDED FEBRUARY 24, 1923.

Summary of information received by telegraph from industrial insurance companies for week ended February 24, 1923, and corresponding week of 1922. (From the Weekly Health Index, February 27, 1923, issued by the Bureau of the Census, Department of Commerce.)

	Week ended Feb. 24, 1923.	Corresponding week, 1922.
Policies in force	51,328,620	49,029,550
Number of death claims	11,906	10,575
Death claims per 1,000 policies in force, annual rate	12.1	11.2

Deaths from all causes in certain large cities of the United States during the week ended February 24, 1923, infant mortality, annual death rate, and comparison with corresponding week of 1922. (From the Weekly Health Index, February 27, 1923, issued by the Bureau of the Census, Department of Commerce.)

City.	Estimated population July 1, 1923.	Week ended Feb. 24, 1923.		Annual death rate per 1,000, corresponding week 1922.	Deaths under 1 year.		Infant mortality rate, week ended Feb. 24, 1923.[2]
		Total deaths.	Death rate.[1]		Week ended Feb. 24, 1923.	Corresponding week 1922.	
Total	29,079,983	10,216	18.3	17.3	1,235	1,249	.....
Akron, Ohio	[3] 208,435	35	8.8	11.0	7	9	83
Albany, N. Y.	117,375	47	20.9	13.5	5	2	111
Atlanta, Ga.	222,963	84	19.6	17.3	14	5	.....
Baltimore, Md.	773,580	339	22.9	16.8	44	29	130
Birmingham, Ala.	195,901	48	12.8	13.6	6	8	.....
Boston, Mass.	770,400	271	18.3	22.3	37	51	106
Bridgeport, Conn.	[3] 143,555	35	12.7	18.5	5	10	69
Buffalo, N. Y.	536,718	193	18.8	14.5	36	28	151
Cambridge, Mass.	111,444	31	14.5	19.3	2	7	36
Camden, N. J.	124,157	64	26.9	21.4	9	8	149
Chicago, Ill.	2,886,121	986	17.8	13.5	148	102	.....
Cincinnati, Ohio.	406,312	152	19.5	22.0	15	24	99
Cleveland, Ohio.	888,519	287	16.8	15.4	35	37	96
Columbus, Ohio.	261,082	111	22.2	16.7	9	13	94
Dallas, Tex.	177,274	48	14.1	14.3	2	8	.....
Dayton, Ohio.	165,530	55	17.3	14.2	6	6	99
Denver, Colo.	272,031	113	21.7	20.7	13	7	.....
Detroit, Mich.	[3] 995,668	347	18.2	14.6	56	73	112
Duluth, Minn.	106,289	24	11.8	.....	4	.....	91
Erie, Pa.	112,571	34	15.7	14.8	6	7	122
Fall River, Mass.	120,912	46	19.8	25.5	11	14	156
Flint, Mich.	117,968	38	16.8	.....	5	.....	99
Fort Worth, Tex.	125,021	21	12.9	15.0	4	5	.....
Grand Rapids, Mich.	145,947	56	20.0	10.9	8	2	126
Houston, Tex.	154,970	40	13.5	11.8	4	3	.....
Indianapolis, Ind.	340,882	148	22.6	18.5	11	9	85
Jacksonville, Fla.	100,046	37	19.3	16.0	1	5	.....
Jersey City, N. J.	309,034	118	19.9	20.5	16	14	107
Kansas City, Kans.	115,781	55	24.8	22.9	10	9	229
Kansas City, Mo.	351,819	151	22.4	25.8	18	20	.....
Los Angeles, Calif.	666,853	243	19.0	21.6	22	14	82
Louisville, Ky.	257,671	74	15.0	24.2	12	7	129
Lowell, Mass.	115,089	44	19.9	21.0	14	3	243
Memphis, Tenn.	170,067	107	32.8	20.8	5	14	.....
Milwaukee, Wis.	484,595	167	18.0	10.1	27	18	134
Minneapolis, Minn.	409,125	115	14.7	11.1	10	7	54
Nashville, Tenn.	121,128	42	18.1	20.8	6	4	.....
New Bedford, Mass.	130,072	50	20.0	17.2	14	5	208
New Haven, Conn.	172,967	65	19.6	21.8	5	7	65
New Orleans, La.	404,575	180	23.2	17.1	17	7	.....
New York, N. Y.	5,927,625	2,141	18.8	17.8	224	287	90
Bronx Borough.	840,544	268	16.6	14.7	17	28	60
Brooklyn Borough.	2,156,687	700	16.9	17.2	68	94	72
Manhattan Borough.	2,267,001	955	22.0	19.9	118	144	115
Queens Borough.	535,844	145	14.1	13.3	17	16	91
Richmond Borough.	127,549	73	29.8	25.1	4	5	73
Newark, N. J.	438,699	167	19.8	20.9	26	31	122
Norfolk, Va.	159,089	39	12.8	19.6	6	10	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 bank 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 February 24, 1923, infant mortality, annual death rate, and comparison with corresponding week of 1922. (From the Weekly Health Index, February 27, 1923, issued by the Bureau of the Census, Department of Commerce.)—Continued.

City.	Estimated population July 1, 1923.	Week ended Feb. 24, 1923.		Annual death rate per 1,000, corresponding week 1922.	Deaths under 1 year.		Infant mortality rate, week ended Feb. 24, 1923.
		Total deaths.	Death rate.		Week ended Feb. 24, 1923	Corresponding week 1922.	
Oakland, Calif	240,086	66	14.3	15.4	7	6	90
Omaha, Nebr	204,382	69	17.6	16.1	7	0	76
Paterson, N. J	139,579	49	18.3	22.6	4	11	64
Philadelphia, Pa	1,922,788	652	17.7	17.0	62	79	80
Pittsburgh, Pa	613,442	297	25.2	23.2	48	47	167
Portland, Oreg	273,621	76	14.5	16.7	7	7	71
Providence, R. I	242,378	73	15.7	24.4	6	19	49
Richmond, Va	181,044	53	15.3	21.6	7.	8	86
Rochester, N. Y	317,867	104	17.1	13.6	14	12	110
St. Louis, Mo	803,853	211	13.7	17.4	16	21	.....
St. Paul, Minn	241,891	86	18.5	13.5	13	6	120
Salt Lake City, Utah	126,241	35	14.5	16.8	4	6	65
San Antonio, Tex	184,727	58	16.4	.....	4	.....	.....
San Francisco, Calif	539,058	178	17.2	25.6	7	14	42
Seattle, Wash	[a] 315,312	66	10.9	13.9	8	5	71
Spokane, Wash	104,573	26	13.0	14.0	2	4	44
Springfield, Mass	144,227	51	18.4	12.7	7	7	100
Syracuse, N. Y	184,511	51	14.4	13.3	9	4	117
Tacoma, Wash	101,731	28	14.4	.....	2	.....	50
Toledo, Ohio	268,338	104	20.2	12.2	9	2	91
Trenton, N. J	127,390	38	15.6	23.3	4	10	68
Washington, D. C	[a] 437,571	183	21.8	17.6	18	19	103
Wilmington, Del	117,728	51	22.6	16.7	13	8	264
Worcester, Mass	191,927	69	18.7	18.0	7	9	79
Yonkers, N. Y	107,520	33	16.0	12.9	3	6	65
Youngstown, Ohio	[a] 132,358	51	20.1	18.5	12	10	163

[a] Enumerated population Jan. 1, 1923.

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.

Reports for Week Ended March 3, 1923.

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

ALABAMA.

	Cases.
Chicken pox	71
Diphtheria	17
Influenza	315
Malaria	43
Measles	310
Mumps	4
Ophthalmia neonatorum	2
Pellagra	6
Pneumonia	105
Poliomyelitis	1
Scarlet fever	9
Smallpox	5
Tuberculosis	32
Typhoid fever	7
Whooping cough	53

ARKANSAS.

Cerebrospinal meningitis	1
Chicken pox	27
Diphtheria	8
Influenza	523
Malaria	29
Measles	119
Mumps	6
Pellagra	4
Scarlet fever	8
Smallpox	1
Tuberculosis	7
Whooping cough	5

CALIFORNIA.

Cerebrospinal meningitis:	
Inglewood	1
Oakland	1
San Francisco	1
Diphtheria	83
Influenza	675
Leprosy—Fresno County	1

CALIFORNIA—continued.

	Cases.
Lethargic encephalitis:	
San Francisco	1
Measles	208
Scarlet fever	115
Smallpox	22
Typhoid fever	2

COLORADO.

(Exclusive of Denver.)

Chicken pox	24
Diphtheria	119
Influenza	32
Measles	1
Mumps	42
Pneumonia	22
Scarlet fever	26
Typhoid fever	1
Whooping cough	6

CONNECTICUT.

Cerebrospinal meningitis	2
Chicken pox	33
Conjunctivitis	1
Diphtheria	49
Dysentery (amebic)	1
Influenza	317
Lethargic encephalitis	10
Measles	322
Mumps	43
Paratyphoid fever	1
Pneumonia (lobar)	89
Scarlet fever	96
Trachoma	1
Tuberculosis (all forms)	30
Typhoid fever	2
Whooping cough	69

DISTRICT OF COLUMBIA.

	Cases.
Chicken pox	48
Diphtheria	5
Influenza	19
Measles	161
Scarlet fever	22
Smallpox	2
Tuberculosis	23
Whooping cough	53

FLORIDA.

Diphtheria	5
Influenza	35
Malaria	5
Pneumonia	9
Scarlet fever	4
Smallpox	12
Typhoid fever	9

GEORGIA.

Chicken pox	25
Diphtheria	9
Hookworm disease	19
Influenza	169
Malaria	7
Measles	392
Mumps	2
Paratyphoid fever	1
Pneumonia	23
Scarlet fever	2
Septic sore throat	2
Smallpox	11
Tuberculosis (all forms)	8
Typhoid fever	2
Whooping cough	11

ILLINOIS.

Cerebrospinal meningitis:	
Henry County	1
Macoupin County	1
Warren County	1
Diphtheria:	
Cook County (including Chicago)	183
Chicago	170
Scattering	83
Influenza:	
Chicago	333
Scattering	415
Pneumonia	932
Scarlet fever:	
Cook County (including Chicago)	126
Chicago	105
Morgan County	10
Scattering	99
Smallpox	23
Typhoid fever	16
Whooping cough	291

INDIANA.

Diphtheria	58
Influenza	253
Measles	230
Pneumonia	40
Scarlet fever	67
Smallpox	23
Typhoid fever	3

IOWA.

	Cases.
Diphtheria	27
Scarlet fever	145
Smallpox	5
Typhoid fever	1

KANSAS.

Chicken pox	58
Diphtheria	32
Influenza	713
Lethargic encephalitis	1
Malaria	1
Measles	176
Mumps	36
Pneumonia	174
Scarlet fever	79
Smallpox	6
Tuberculosis	57
Whooping cough	68

LOUISIANA.

Diphtheria	39
Influenza	1,051
Scarlet fever	4
Smallpox	36
Typhoid fever	8
Whooping cough	10

MAINE.

Chicken pox	56
Diphtheria	8
German measles	24
Influenza	381
Lethargic encephalitis	2
Measles	95
Mumps	2
Pneumonia	118
Poliomyelitis	1
Scarlet fever	23
Tuberculosis	11
Typhoid fever	2
Whooping cough	68

MARYLAND.[1]

Chicken pox	143
Diphtheria	57
German measles	11
Influenza	1,985
Lethargic encephalitis	6
Measles	372
Mumps	67
Paratyphoid fever	3
Pneumonia (all forms)	315
Poliomyelitis	1
Scarlet fever	78
Septic sore throat	3
Tuberculosis	67
Typhoid fever	2
Vincent's angina	1
Whooping cough	117

MASSACHUSETTS.

Cerebrospinal meningitis	3
Chicken pox	146
Diphtheria	123
German measles	6

[1] Week ended Friday.

MASSACHUSETTS—continued.

	Cases.
Influenza	257
Lethargic encephalitis	16
Malaria	2
Measles	893
Mumps	211
Ophthalmia neonatorum	35
Pneumonia (lobar)	247
Poliomyelitis	2
Scarlet fever	317
Trachoma	3
Tuberculosis (all forms)	130
Typhoid fever	5
Whooping cough	377

MICHIGAN.

Diphtheria	149
Measles	229
Pneumonia	344
Scarlet fever	400
Smallpox	32
Tuberculosis	88
Typhoid fever	11
Whooping cough	234

MINNESOTA.

Cerebrospinal meningitis	2
Chicken pox	3
Diphtheria	51
Influenza	4
Lethargic encephalitis	8
Measles	421
Pneumonia	11
Scarlet fever	199
Smallpox	58
Tuberculosis	58
Typhoid fever	4
Whooping cough	13

MISSISSIPPI.

Diphtheria	12
Influenza	1,041
Poliomyelitis	1
Scarlet fever	4
Smallpox	1
Typhoid fever	4

MISSOURI.

Cerebrospinal meningitis	1
Chicken pox	73
Diphtheria	63
Epidemic sore throat	8
Influenza	441
Measles	403
Mumps	16
Ophthalmia neonatorum	1
Pneumonia	31
Scarlet fever	61
Smallpox	11
Trachoma	4
Tuberculosis	38
Typhoid fever	2
Whooping cough	29

MONTANA.

Diphtheria	22
Poliomyelitis—Missoula	1
Scarlet fever	21
Smallpox	18

NEBRASKA.

	Cases.
Chicken pox	11
Diphtheria:	
Omaha	8
Scattering	8
Influenza	36
Measles	6
Mumps	27
Pneumonia	4
Scarlet fever	42
Smallpox	6
Tuberculosis	1
Typhoid fever	1
Whooping cough	10

NEW JERSEY.

Cerebrospinal meningitis	3
Chicken pox	163
Diphtheria	139
Dysentery	1
Influenza	587
Measles	1,078
Pneumonia	419
Scarlet fever	241
Trachoma	1
Typhoid fever	4
Whooping cough	126

NEW MEXICO.

Chicken pox	13
Conjunctivitis	5
Diphtheria	26
Influenza	63
Measles	15
Mumps	1
Pneumonia	23
Scarlet fever	21
Smallpox	1
Tuberculosis	2
Typhoid fever	2
Whooping cough	2

NEW YORK.

(Exclusive of New York City.)

Cerebrospinal meningitis	5
Diphtheria	117
Influenza	1,542
Lethargic encephalitis	9
Measles	929
Pneumonia	819
Scarlet fever	350
Smallpox	8
Typhoid fever	13
Whooping cough	323

NORTH CAROLINA.

Cerebrospinal meningitis	1
Chicken pox	148
Diphtheria	31
German measles	6
Measles	1,422
Scarlet fever	32
Septic sore throat	3
Smallpox	164
Typhoid fever	9
Whooping cough	406

OREGON.

	Cases.
Cerebrospinal meningitis	1
Chicken pox	12
Diphtheria	13
Influenza	27
Lethargic encephalitis:	
Oregon City	1
Portland	[1]3
Measles	1
Mumps	6
Pneumonia	[1]12
Scarlet fever:	
Clackamas County	12
Scattering	9
Septic sore throat	8
Smallpox:	
Portland	18
Scattering	5
Tuberculosis	14
Typhoid fever	1

SOUTH DAKOTA.

Cerebrospinal meningitis	1
Chicken pox	8
Diphtheria	7
Measles	17
Pneumonia	15
Scarlet fever	45
Smallpox	11
Tuberculosis	1
Typhoid fever	1
Whooping cough	8

TEXAS

Anthrax	3
Chicken pox	83
Dengue	35
Influenza	3,176
Measles	162
Mumps	3
Pellagra	2
Pneumonia	38
Scarlet fever	14
Smallpox	11
Trachoma	1
Tuberculosis	88
Whooping cough	60

VERMONT.

Chicken pox	40
Diphtheria	9
Measles	16
Mumps	8
Pneumonia	11
Scarlet fever	14
Smallpox	2
Whooping cough	34

VIRGINIA.

Smallpox—Dinwiddie County	2

WASHINGTON.

Chicken pox	102
Diphtheria	14
Lethargic encephalitis:	
Everett	1
Spokane	4
Vancouver	1

[1]Deaths.

WASHINGTON—continued.

	Cases.
Measles	6
Mumps	24
Pneumonia	10
Poliomyelitis—Centralia	1
Scarlet fever:	
Seattle	14
Scattering	30
Smallpox:	
Seattle	15
Scattering	30
Tuberculosis	26
Typhoid fever	4
Whooping cough	63

WEST VIRGINIA.

Diphtheria	19
Influenza:	
Morgantown	69
Salem	57
Scattering	48
Measles:	
Wellsburg	27
Wheeling	105
Scarlet fever	10
Typhoid fever	3

WISCONSIN.

Milwaukee:	
Chicken pox	14
Diphtheria	15
German measles	1
Influenza	2
Lethargic encephalitis	1
Measles	163
Pneumonia	19
Scarlet fever	213
Tuberculosis	17
Typhoid fever	2
Whooping cough	46
Scattering:	
Cerebrospinal meningitis	1
Chicken pox	64
Diphtheria	43
German measles	8
Influenza	1,677
Lethargic encephalitis	4
Measles	899
Ophthalmia neonatorum	1
Pneumonia	97
Scarlet fever	137
Smallpox	57
Tuberculosis	24
Typhoid fever	2
Whooping cough	74

WYOMING.

Chicken pox	3
Diphtheria	1
German measles	2
Pneumonia	1
Scarlet fever	1
Smallpox	2

Reports for Week Ended February 24, 1923.

DISTRICT OF COLUMBIA.

	Cases.
Chicken pox	37
Diphtheria	7
Influenza	16
Measles	100
Scarlet fever	31
Tuberculosis	26
Whooping cough	65

NORTH DAKOTA.

	Cases.
Chicken pox	5
Diphtheria	22
Influenza	52
Lethargic encephalitis	1
Measles	10
Pneumonia	16
Scarlet fever	19
Smallpox	22
Tuberculosis	2
Whooping cough	5

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.										
Wyoming	.....	22	.....	.....	3	.....	.....	17	3	7
December, 1922.										
New Mexico	.....	125	1	.....	3	.....	.....	38	4	20
Wyoming	.....	1	.....	.....	.....	.....	.....	11	4	.....
January, 1923.										
Alabama	.....	108	5,607	71	66	15	.....	71	18	38
Arkansas	1	68	9,747	127	120	18	1	15	32	39
Maine	.....	46	.....	.....	221	.....	2	134	6	6
Montana	5	62	20	.....	38	.....	1	100	47	8
Rhode Island	2	75	8	.....	819	.....	1	53	.....	6
South Carolina	3	258	4,047	.....	81	18	.....	26	31	9
South Dakota	1	78	4	.....	62	.....	.....	225	56	8
Virginia	8	454	45,778	108	1,289	6	7	433	22	30

CITY REPORTS FOR WEEK ENDED FEBRUARY 17, 1923.

ANTHRAX.

City.	Cases.	Deaths.
New York:		
New York	1	.....

CEREBROSPINAL MENINGITIS.

The column headed "Median for previous years" gives the median number of cases reported during the corresponding week 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 Feb. 17, 1923.		City.	Median for previous years.	Week ended Feb. 17, 1923.	
		Cases.	Deaths.			Cases.	Deaths.
Alabama:				Illinois:			
Mobile	0	1	.....	Aurora	0	1	.....
California:				Freeport	0	.....	1
Los Angeles	0	1	.....	Kentucky:			
Connecticut:				Louisville	0	.....	2
Bridgeport	0	1	1	Louisiana:			
Meriden	0	3	.....	New Orleans	1	1	1

CITY REPORTS FOR WEEK ENDED FEBRUARY 17, 1923—Continued.

CEREBROSPINAL MENINGITIS—Continued.

City	Median for previous years.	Week ended Feb. 17, 1923.	
		Cases.	Deaths.
Maryland:			
Baltimore	0	1	
Massachusetts:			
Boston	0	2	
Salem	0		1
Missouri:			
St. Louis	1		1
New York:			
Buffalo	0	1	
Middletown	0	1	1
New York	6	4	2
New York—Continued.			
Poughkeepsie	0	1	1
Troy	0	1	1
Ohio:			
Cleveland	0	1	
Pennsylvania:			
Allentown	0	1	
Philadelphia	1	4	1
Wisconsin:			
Milwaukee	1	1	

DIPHTHERIA.

See p. 474; also Current State summaries, p. 462, and Monthly summaries by States, p. 466.

INFLUENZA.

City.	Cases.		Deaths, week ended Feb. 17, 1923.
	Week ended Feb. 18, 1922.	Week ended Feb. 17, 1923.	
Alabama:			
Anniston	1		
Birmingham	1	11	4
Mobile		9	1
Montgomery	1		
Tuscaloosa	2	10	
Arkansas:			
Fort Smith	1	4	
Hot Springs		4	
Little Rock	20	7	
California:			
Bakersfield		1	
Berkeley	495		
Eureka	42		
Long Beach	20		
Los Angeles	770	153	3
Oakland	185	23	1
Pasadena	53		
Riverside	4		
Sacramento	89		
San Diego	15	21	3
San Francisco	1,034	108	14
Santa Ana	44		
Santa Cruz	45	13	
Stockton	13		
Colorado:			
Denver			3
Connecticut:			
Bridgeport	94		
Bristol	4	17	2
Fairfield	2		
Greenwich	10		
Hartford	19		3
Manchester	23		
Meriden	11	1	
New Britain	235		
New Haven	11		2
New London	2	9	
Norwich	1		
Waterbury	12		
District of Columbia:			
Washington	8	19	14
Florida:			
St. Petersburg		2	
Tampa	2	2	2
Georgia:			
Atlanta	11	5	
Augusta	10		
Macon		5	
Rome	2	378	
Savannah	14	28	2
Illinois:			
Aurora	6	4	
Champaign	1		
Chicago	400	454	36
Cicero	8	6	1
Danville	2		
Decatur	2	7	
East St. Louis	10	2	2
Elgin		2	
Evanston	2	2	
Freeport	1		
Mattoon	1		
Oak Park	4	3	
Peking	5		
Peoria			3
Quincy		3	
Rockford	1		
Springfield	4	4	4
Indiana:			
Elkhart	2		
Fort Wayne			1
Hammond			1
Indianapolis			4
Terre Haute			2
Kansas:			
Coffeyville		3	
Fort Scott		3	
Hutchinson		3	
Kansas City	19		
Lawrence	12		1
Salina	6	12	
Topeka		1	
Wichita	19	1	4
Kentucky:			
Covington	15		1
Lexington	5	3	1
Louisville	154	55	3
Owensboro	18		

CITY REPORTS FOR WEEK ENDED FEBRUARY 17, 1923—Continued.

INFLUENZA—Continued.

City.	Cases.		Deaths, week ended Feb. 17, 1923.
	Week ended Feb. 18, 1922.	Week ended Feb. 17, 1923.	
Louisiana:			
Baton Rouge	50		
New Orleans	6	40	11
Maine:			
Auburn	12		1
Bangor		4	
Bath	5	2	
Biddeford		18	
Lewiston	6		
Portland	13	46	
Sanford	28		
Maryland:			
Baltimore	136	736	22
Cumberland	11	187	1
Frederick		17	
Massachusetts:			
Adams		8	
Arlington	14		
Attleboro	59		
Belmont	9		
Beverly	2		1
Boston	462	38	5
Braintree	12	30	
Brockton	4	1	
Brookline		2	
Cambridge	120	2	1
Chelsea	4		
Chicopee		1	
Danvers	1	1	
Everett	72	2	
Fall River	44	2	
Framingham	18		
Haverhill	82	5	
Holyoke	12		
Lawrence	1		
Leominster	18	3	
Lowell	35	2	
Lynn	16	1	1
Malden	20		1
Medford		2	
Melrose	1		
Natick	1		
New Bedford	4	3	
Newburyport	4	6	1
Newton	11		
Northampton	1		
Pittsfield	1	2	
Quincy	4		
Salem		1	
Saugus	25		
Somerville	50	1	
Southbridge	3		
Springfield	12	10	6
Waltham		114	1
Watertown	1		
Weymouth			1
Winthrop	6	10	1
Worcester	86		2
Michigan:			
Battle Creek		5	
Detroit	18	27	9
Flint	15	4	
Grand Rapids		13	
Highland Park		6	
Kalamazoo			1
Pontiac		3	1
Saginaw	4		
Minnesota:			
Duluth	3		
Minneapolis			10
Rochester	1		
St. Paul	2		1
Winona	1		
Missouri:			
Kansas City	27	27	14
St. Joseph	7		
St. Louis	20	3	2
Montana:			
Great Falls	3		
Missoula		3	
Nevada:			
Reno	2		
New Jersey:			
Asbury Park	2		
Bayonne		11	
Bloomfield	3		
Clifton	4	2	
East Orange	17	11	1
Garfield	10	5	
Harrison	2	16	
Hoboken	1		
Jersey City	10	11	
Kearny	61	62	
Long Branch		1	
Montclair	56	9	
Morristown	2	3	
Newark	721	275	10
Orange	18		
Passaic	89	17	
Paterson	205		
Plainfield	7		
Trenton	37	3	2
Union		2	
West Hoboken		1	
West Orange	4	13	
New York:			
Albany	114	221	
Amsterdam		13	1
Auburn		3	
Binghamton	10		
Buffalo	9	10	9
Cohoes	185	8	
Elmira	3		
Ithaca	2		
Jamestown	50		
Lockport		23	
Middletown	42	24	
Mount Vernon	156	55	1
New York	3,284	3,608	125
Newburgh			1
North Tonawanda	1	1	1
Olean			1
Peekskill	41		
Port Chester	1		
Poughkeepsie	8	1	1
Rochester		8	6
Saratoga Springs	11	81	
Schenectady	6	6	4
Syracuse	16	2	3
Troy		2	2
Yonkers	3		
Ohio:			
Akron	9	7	
Ashtabula		72	1
Cambridge	1		
Canton			1
Chillicothe		1	
Cincinnati	69	10	25
Cleveland	44	117	
Cleveland Heights		2	
Columbus			15
Dayton	1		
East Cleveland	1		
Findlay			2
Hamilton	8	1	1
Lima		5	

CITY REPORTS FOR WEEK ENDED FEBRUARY 17, 1923—Continued.

INFLUENZA—Continued.

City.	Cases.		Deaths, week ended Feb. 17, 1923.
	Week ended Feb. 18, 1922.	Week ended Feb. 17, 1923.	
Ohio—Continued.			
Mansfield		2	
Marion		2	
Newark			2
Norwood			1
Sandusky		2	
Springfield		9	2
Steubenville	1		
Toledo		7	8
Youngstown	1		
Oklahoma:			
Oklahoma			3
Oregon:			
Portland	47	1	
Pennsylvania:			
Philadelphia	126	31	36
Rhode Island:			
Cranston		2	
Pawtucket		1	1
Providence	143		1
South Carolina:			
Charleston	13	1	
Tennessee:			
Memphis			3
Texas:			
Amarrillo		8	2
Beaumont	4		1
Dallas	19	1	4
Ft. Worth		1	1
San Antonio		1	
Virginia:			
Danville	6		
Norfolk	160		
Petersburg		2	
Richmond		3	3
Roanoke	17		2
Washington:			
Aberdeen	161		
Spokane	23		
Walla Walla	9		
West Virginia:			
Charleston	4	1	
Clarksburg	6		1
Fairmont	6	26	
Huntington	1	20	
Morgantown	22	20	
Parkersburg			2
Wheeling	1	1	
Wisconsin:			
Eau Claire		2	
Manitowoc		1	
Marinette		300	
Milwaukee		17	4
Racine			1
Sheboygan		2	
Wausau	2		
Wyoming:			
Casper	37		
Cheyenne	13		

LETHARGIC ENCEPHALITIS.

City.	Cases.	Deaths.
California:		
San Francisco	1	1
Massachusetts:		
Braintree	1	
Oregon:		
Portland	4	1
Washington:		
Vancouver	1	
Wisconin:		
Madison	1	

MALARIA.

City.	Cases.	Deaths.
Arkansas:		
Little Rock	1	
Georgia:		
Macon	1	
Savannah	5	
Louisiana:		
New Orleans	1	
New York:		
New York	1	

MEASLES.

See p. 474; also Current State summaries, p. 462, and Monthly summaries by States, p. 466.

PELLAGRA.

City.	Cases.	Deaths.
Georgia:		
Savannah		1
Illinois:		
Pekin		1
Louisiana:		
New Orleans	1	1
Texas:		
Houston		1
Waco	1	1

CITY REPORTS FOR WEEK ENDED FEBRUARY 17, 1923—Continued.

PNEUMONIA (ALL FORMS).

City.	Cases.	Deaths.
Alabama:		
Anniston	1	
Birmingham	7	5
Mobile		4
Tuscaloosa	1	
Arkansas:		
Little Rock	3	
California:		
Alameda		3
Bakersfield		2
Glendale		1
Long Beach	4	1
Los Angeles	61	24
Oakland	19	12
Pasadena	4	1
Riverside		2
Sacramento		1
San Bernardino		1
San Diego	11	8
San Francisco	29	9
Santa Ana		1
Santa Barbara		2
Santa Cruz		2
Colorado:		
Denver		26
Pueblo		3
Connecticut:		
Bridgeport	9	3
Bristol		3
Fairfield		1
Hartford		4
Meriden	1	
Milford	1	
New Haven		13
New London		2
District of Columbia:		
Washington		55
Georgia:		
Albany	1	
Atlanta	19	18
Macon	3	
Rome	2	
Savannah		4
Illinois:		
Alton	6	
Aurora	9	4
Centralia	1	
Champaign	4	
Chicago	577	158
Decatur	7	3
East St. Louis		9
Elgin		3
Evanston	5	
Forest Park	1	
Freeport	3	2
Galesburg	3	1
Jacksonville		2
Kewanee	13	3
Mattoon	2	
Oak Park	7	1
Pekin		2
Peoria		4
Quincy		2
Rockford		12
Rock Island		1
Springfield	18	4
Indiana:		
Anderson		2
Bloomington		2
Crawfordsville		2
East Chicago		4
Fort Wayne		14
Frankfort		1
Hammond		4
Huntington		3
Indianapolis		28
Kokomo		4
La Fayette		2
Logansport		4
Michigan City		2
Indiana—Continued.		
Mishawaka		4
Muncie		5
South Bend		3
Terre Haute		4
Iowa:		
Burlington	5	1
Council Bluffs		2
Muscatine		1
Kansas:		
Coffeyville	8	
Fort Scott	1	
Hutchinson	5	
Topeka	8	5
Wichita	10	5
Kentucky:		
Covington		6
Henderson	2	1
Lexington		5
Louisville	55	53
Louisiana:		
New Orleans		18
Maine:		
Auburn	2	1
Bath		3
Biddeford	7	4
Lewiston	7	5
Portland		15
Sanford	3	1
Maryland:		
Baltimore		62
Cumberland	12	5
Frederick		1
Massachusetts:		
Amesbury	1	
Arlington	5	2
Belmont		2
Beverly	5	2
Boston	74	63
Brockton	11	
Brookline	2	
Cambridge	9	6
Chelsea		6
Chicopee		3
Clinton		1
Danvers	4	
Easthampton	3	2
Everett		2
Fall River	2	5
Fitchburg		3
Gardner		3
Greenfield		2
Haverhill	7	2
Lawrence	3	1
Leominster	2	
Lowell		11
Lynn	11	1
Malden	7	2
Medford	5	
Melrose		3
Methuen		1
New Bedford		14
Newburyport		2
Newton	3	2
North Adams		3
Northampton		5
Northbridge		3
Pittsfield		3
Plymouth		2
Quincy	6	4
Salem		6
Somerville	7	2
Springfield	24	4
Taunton		5
Wakefield		1
Waltham		1
Watertown		1
West Springfield		3
Westfield		1
Weymouth		1
Worcester		13

CITY REPORTS FOR WEEK ENDED FEBRUARY 17, 1923—Continued.

PNEUMONIA (ALL FORMS)—Continued.

City.	Cases.	Deaths.
Michigan:		
Ann Arbor	10	2
Battle Creek	4	
Detroit	146	71
Flint		14
Grand Rapids	40	7
Hamtramck		3
Highland Park	10	5
Holland	2	
Jackson		4
Kalamazoo	13	6
Marquette	2	
Muskegon	4	3
Pontiac	4	2
Port Huron	3	1
Sault Ste. Marie	1	
Minnesota:		
Duluth	6	
Minneapolis		19
Rochester	4	1
St. Paul		14
Missouri:		
Kansas City	33	23
St. Joseph		2
Montana:		
Great Falls		1
Missoula	4	
Nebraska:		
Lincoln		6
Omaha		20
New Hampshire:		
Concord		1
Dover		1
New Jersey:		
Atlantic City		7
Bayonne	4	
Belleville	1	
Bloomfield	4	2
Clifton		2
East Orange	10	2
Elizabeth		9
Englewood	5	1
Garfield		2
Hackensack		3
Hoboken		10
Jersey City	20	
Kearny	7	4
Montclair	7	4
Morristown		2
Newark	127	35
Passaic		4
Perth Amboy		2
Plainfield	8	6
Trenton		14
Union	3	
West Hoboken		3
West New York	2	
West Orange	3	1
New Mexico:		
Albuquerque	3	
New York:		
Albany	51	
Amsterdam	1	
Auburn	4	2
Buffalo	75	33
Cohoes	2	1
Cortland	2	1
Elmira	14	5
Glens Falls	1	
Hornell	4	2
Hudson		2
Ithaca	1	
Lackawanna	4	3
Little Falls		1
Lockport		2
Middletown	2	1
Mount Vernon	13	5
New York	1,139	424
Niagara Falls	8	3
North Tonawanda		1
New York—Continued.		
Olean	4	2
Peekskill	2	
Poughkeepsie		16
Rochester	39	7
Rome	14	4
Saratoga Springs	4	1
Schenectady	13	5
Syracuse	20	12
Troy	12	6
Watertown	8	
White Plains	4	3
Yonkers		5
North Carolina:		
Raleigh		3
Rocky Mount		1
Winston-Salem		5
Ohio:		
Akron	17	
Ashtabula		1
Barberton		3
Bucyrus		1
Cambridge	2	1
Canton		4
Cincinnati		26
Cleveland	123	61
Cleveland Heights		5
Columbus		27
Coshocton	2	
Dayton	2	
East Clevelnad	8	2
East Youngstown		1
Findlay		2
Hamilton		2
Kenmore	2	
Lima		5
Lorain	2	
Mansfield	4	
Marion	4	
Middletown	2	1
Newark		5
Piqua	1	
Salem		1
Sandusky	2	1
Springfield		12
Tiffin	2	
Toledo		16
Zanesville		2
Oklahoma:		
Oklahoma		14
Oregon:		
Portland		8
Pennsylvania:		
Philadelphia	159	145
Rhode Island:		
Pawtucket		8
Providence		13
South Carolina:		
Charleston		6
Greenville		2
South Dakota:		
Sioux Falls		2
Tennessee:		
Memphis		20
Nashville		9
Texas:		
Beaumont		2
Corpus Christi		1
Corsicana		1
Dallas		5
El Paso		12
Fort Worth		6
Galveston		1
Houston		8
San Angelo		1
San Antonio		11
Waco	2	
Utah:		
Salt Lake City		3

CITY REPORTS FOR WEEK ENDED FEBRUARY 17, 1923—Continued.

PNEUMONIA (ALL FORMS)—Continued.

City.	Cases.	Deaths.	City.	Cases.	Deaths.
Vermont:			West Virginia—Continued.		
Burlington	2	1	Morgantown	2	
Rutland	1		Parkersburg		4
Virginia:			Wheeling		11
Alexandria	4	3	Wisconsin.		
Danville		1	Beloit	9	6
Lynchburg		1	Kenosha		2
Norfolk		6	Madison	6	1
Petersburg		2	Milwaukee		48
Richmond		10	Oshkosh		2
Roanoke	4	3	Racine		5
West Virginia:			Sheboygan		2
Charleston		6	Superior		4
Clarksburg		3	Wyoming:		
Huntington		13	Cheyenne		1

POLIOMYELITIS (INFANTILE PARALYSIS).

The column headed "Median for previous years" gives the median number of cases reported during the corresponding week 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 Feb. 17, 1923.		City.	Median for previous years.	Week ended Feb. 17, 1923.	
		Cases.	Deaths.			Cases.	Deaths.
Illinois:				New York:			
Chicago	0	2	1	Hudson	0	1	
Indiana:				Oregon:			
Muncie	0	1		Portland	0	1	
Massachusetts:				Pennsylvania:			
Fall River	0	1		Philadelphia	0	1	1
Michigan:				Texas:			
Detroit	0		1	Houston	0	1	
New Jersey:							
Plainfield	0	1					

RABIES IN ANIMALS.

City.	Cases.	City.	Cases.
California:		Tennessee:	
Los Angeles	9	Memphis	1
Pasadena	1	Texas:	
Georgia:		Fort Worth	1
Savannah	1		

RABIES IN MAN.

City.	Cases.	Deaths.
California:		
Los Angeles	1	1

SCARLET FEVER.

See p. 474; also Current State summaries, p. 462, and Monthly summaries by States, p. 466.

CITY REPORTS FOR WEEK ENDED FEBRUARY 17, 1923—Continued.

SMALLPOX.

The column headed "Median for previous years" gives the median number of cases reported during the corresponding week 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 Feb. 17, 1923.	
		Cases.	Deaths.
California:			
Los Angeles	3	3	.....
Oakland	0	3	.....
Colorado:			
Denver	17	2	1
Connecticut:			
Bridgeport	0	1	.....
Florida:			
St. Petersburg	.....	2	.....
Tampa	0	1	.....
Georgia:			
Atlanta	5	3	.....
Brunswick	0	1	.....
Idaho:			
Boise	1	1	.....
Illinois:			
Chicago	3	6	.....
Indiana:			
Fort Wayne	1	4	.....
Indianapolis	7	4	.....
Muncie	2	1	.....
Iowa:			
Des Moines	5	1	.....
Muscatine	0	1	.....
Maine:			
Biddeford	.....	1	.....
Michigan:			
Detroit	7	3	.....
Grand Rapids	1	5	.....
Jackson	0	3	.....
Pontiac	2	1	.....
Minnesota:			
Duluth	0	2	.....
Hibbing	0	1	.....
Minneapolis	18	6	.....
Rochester	3	1	.....
St. Paul	11	7	.....
Virginia	0	1	.....
Missouri:			
Joplin	0	1	.....
Nebraska:			
Omaha	6	1	.....
Nevada:			
Reno	0	1	.....
New York:			
Niagara Falls	0	1	.....
Watertown	0	1	.....
North Carolina:			
Winston-Salem	0	37	.....
North Dakota:			
Grand Forks	2	1	.....
Ohio:			
Bucyrus	0	1	.....
Columbus	0	2	.....
Dayton	0	1	.....
Sandusky	0	1	.....
Toledo	4	6	.....
Oklahoma:			
Oklahoma	6	1	.....
Tulsa	5	2	.....
Oregon:			
Portland	5	5	.....
South Carolina:			
Greenville	0	1	.....
South Dakota:			
Sioux Falls	2	1	.....
Tennessee:			
Knoxville	0	8	.....
Memphis	3	1	.....
Utah:			
Salt Lake City	3	.....	5
Virginia:			
Norfolk	0	1	.....
Roanoke	1	3	.....
Washington:			
Seattle	2	3	.....
Spokane	22	10	.....
Takoma	3	1	.....
Vancouver	2	1	.....
Wisconsin:			
Eau Claire	0	2	.....
Kenosha	0	1	.....
Superior	1	19	.....

TETANUS.

City.	Cases.	Deaths.
California:		
Los Angeles	.....	1
Riverside	.....	1
Missouri:		
St. Louis	1	.....
Pennsylvania:		
Philadelphia	.....	1
Texas:		
Fort Worth	1	1
San Antonio	.....	1

TUBERCULOSIS.

See p. 474; also Current State summaries, p. 462.

CITY REPORTS FOR WEEK ENDED FEBRUARY 17, 1923—Continued.

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 Feb. 17, 1923.	
		Cases.	Deaths.
Alabama:			
Birmingham	1	2	
California:			
Los Angeles	1	1	
Oakland	0		1
Sacramento	0	2	
Connecticut:			
Manchester	0	1	
District of Columbia:			
Washington	2	2	
Florida:			
Tampa	2	1	
Georgia:			
Albany	0	1	
Savannah	0	1	
Illinois:			
Alton	0	1	
Indiana:			
Hammond	0		1
Mishawaka	0	2	
Kentucky:			
Covington	0	5	1
Louisiana:			
New Orleans	1	2	
Massachusetts:			
Boston	2	2	
Cambridge	0		1
Michigan:			
Detroit	2	4	1
Flint	0	2	
Grand Rapids	0	1	
Minnesota:			
Minneapolis	0	3	1
Nebraska:			
Omaha	0	1	1
Nevada:			
Reno	0	1	
New York:			
Buffalo	0	1	
New York	6	7	2
Rochester	0	1	
North Carolina:			
Wilmington	0	2	
Ohio:			
Canton	0		1
Cincinnati	0	2	
Pennsylvania:			
Butler	0	1	
Erie	0	1	
McKeesport	0	1	
New Kensington	0	2	
Philadelphia	4	3	
Pittsburgh	2	1	
South Carolina:			
Greenville	0	1	
Texas:			
El Paso	0		1
Galveston	1	2	
Houston	1	1	1
Virginia:			
Richmond	0		1
West Virginia:			
Charleston	0	5	2
Clarksburg	0		1
Huntington	0		1
Wheeling	0	2	
Wisconsin:			
Appleton	0	1	
Milwaukee	0	1	

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS.

City.	Population Jan. 1, 1920.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Alabama:										
Anniston	17,734						2		1	
Birmingham	178,806	42	3		8		2		21	4
Mobile	60,777	20	1							
Tuscaloosa	11,996		2		1		4			
Arkansas:										
Fort Smith	28,870								1	
Hot Springs	11,695	3								
Little Rock	65,142		1		13		2		2	
North Little Rock	14,048				2					
California:										
Alameda	28,806	5	1				1		1	
Bakersfield	18,638	11	2	1	3		1			1
Glendale	13,536	16								1
Long Beach	55,593	12	4		8		1			1
Los Angeles	576,673	224	45	3	78		40		27	20
Oakland	216,261	66	8	1	18		8		1	1
Pasadena	45,354	17			4		4		1	1
Richmond	16,843	1					2			
Riverside	19,341	11								2
Sacramento	65,908	14	1		1		4		2	1
San Bernardino	18,721	7	1		2		1			1

CITY REPORTS FOR WEEK ENDED FEBRUARY 17, 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.
California—Continued.										
San Diego	74,683	31	5	.....	101	.....	13	1	4	3
San Francisco	506,676	157	24	1	2	.....	17	1	35	16
Santa Ana	15,485	14	.....	.....	.....	.....	.....	.....	.....	1
Santa Barbara	19,441	14	.....	.....	.....	.....	.....	.....	.....	3
Santa Cruz	10,917	6	.....	.....	.....	.....	.....	.....	.....	.....
Vallejo	21,107	4	.....	.....	.....	.....	.....	.....	.....	.....
Colorado:										
Denver	256,491	107	30	5	13	.....	23	.....	.....	15
Pueblo	43,050	15	.....	.....	.....	.....	2	.....	1	2
Trinidad	10,906	.....	.....	.....	1	.....	1	.....	.....	.....
Connecticut:										
Bridgeport	143,555	41	8	.....	84	2	12	.....	5	.....
Bristol	20,620	10	2	.....	.....	.....	2	.....	.....	.....
Fairfield (town)	11,475	4	1	.....	13	.....	1	.....	.....	.....
Hartford	138,036	.....	11	.....	1	.....	2	.....	10	.....
Manchester (town)	18,370	6	.....	.....	2	.....	1	.....	1	.....
Meriden (city)	29,867	.....	1	.....	.....	.....	.....	.....	.....	1
Milford (town)	10,193	1	.....	.....	.....	.....	.....	.....	.....	.....
New Haven	162,537	60	1	.....	52	.....	6	.....	18	1
New London	25,688	10	.....	.....	2	.....	1	.....	.....	.....
Orange (town)	16,614	.....	.....	.....	.....	.....	1	.....	.....	.....
Stonington (town)	10,236	1	.....	.....	11	.....	.....	.....	.....	.....
District of Columbia:										
Washington	437,571	213	8	.....	63	1	18	.....	34	10
Florida:										
St. Petersburg	14,237	7	.....	.....	1	.....	1	.....	1	.....
Tampa	51,608	16	3	.....	1	.....	.....	.....	4	2
Georgia:										
Albany	11,555	.....	1	.....	.....	.....	.....	.....	.....	.....
Atlanta	200,616	73	.....	.....	1	.....	4	.....	.....	3
Brunswick	14,413	1	.....	.....	.....	.....	.....	.....	.....	1
Macon	52,995	.....	2	.....	150	.....	.....	.....	.....	.....
Savannah	83,252	28	.....	.....	.....	.....	1	.....	3	5
Idaho:										
Boise	21,393	4	1	.....	.....	.....	.....	.....	.....	.....
Illinois:										
Alton	24,682	10	.....	.....	2	.....	.....	.....	2	1
Aurora	36,397	14	8	.....	2	.....	4	.....	.....	1
Centralia	12,491	6	.....	.....	1	.....	2	.....	.....	.....
Champaign	15,873	6	1	.....	13	.....	5	.....	.....	.....
Chicago	2,701,705	870	146	12	356	5	104	4	191	51
Cicero	44,995	11	2	1	1	.....	1	.....	3	1
Decatur	43,818	14	2	.....	.....	.....	1	.....	8	1
East St. Louis	66,767	22	2	.....	8	.....	.....	.....	1	.....
Elgin	27,454	11	.....	.....	.....	.....	1	.....	1	.....
Evanston	37,234	12	.....	.....	12	.....	4	.....	2	.....
Freeport	19,669	6	.....	.....	1	.....	2	.....	.....	.....
Galesburg	23,834	7	1	.....	2	.....	1	.....	.....	1
Jacksonville	15,713	10	2	.....	.....	.....	.....	.....	.....	1
Kewanee	16,026	8	.....	.....	.....	.....	2	.....	.....	.....
Mattoon	13,552	7	.....	.....	.....	.....	.....	.....	.....	.....
Oak Park	39,858	20	3	1	6	.....	4	.....	1	1
Pekin	12,086	3	.....	.....	.....	.....	.....	.....	.....	.....
Peoria	76,121	26	.....	.....	55	.....	6	1	1	2
Quincy	35,978	18	1	.....	.....	.....	2	.....	.....	.....
Rock Island	35,177	8	2	.....	.....	.....	1	.....	2	.....
Rockford	65,651	31	2	1	.....	.....	2	.....	.....	1
Springfield	59,183	27	3	1	92	.....	1	.....	2	.....
Indiana:										
Anderson	29,767	8	.....	.....	.....	.....	1	.....	.....	.....
Bloomington	11,595	5	.....	.....	.....	.....	1	.....	.....	.....
Crawfordsville	10,139	7	.....	.....	.....	.....	1	.....	.....	.....
East Chicago	35,967	18	1	.....	26	.....	.....	.....	.....	.....
Fort Wayne	86,549	32	1	.....	.....	.....	4	.....	.....	1
Frankfort	11,585	4	.....	.....	.....	.....	.....	.....	.....	.....
Hammond	36,004	10	2	.....	29	.....	2	.....	.....	.....
Huntington	14,000	8	.....	.....	.....	.....	.....	.....	.....	.....
Indianapolis	314,194	134	17	.....	10	.....	4	.....	13	12
Kokomo	30,067	11	.....	.....	.....	.....	.....	.....	.....	.....
La Fayette	22,486	12	3	.....	.....	.....	2	.....	.....	3
Logansport	21,626	5	.....	.....	22	.....	.....	.....	.....	.....
Michigan City	19,457	4	.....	.....	14	.....	1	.....	.....	.....
Mishawaka	15,195	11	.....	.....	7	.....	1	.....	.....	1

CITY REPORTS FOR WEEK ENDED FEBRUARY 17, 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.
Indiana—Continued.										
Muncie	36,524	10	3	1			1			2
South Bend	70,983	18	5	1	18		2		4	2
Terre Haute	66,083	17	5	1	23		2			
Iowa:										
Burlington	24,057	6	1				2			
Clinton	24,151		1				2			
Council Bluffs	36,162	14			1		2			1
Davenport	56,727		8				2			
Des Moines	126,468		6				44			
Dubuque	39,141				102		1			
Iowa City	11,267						1			
Mason City	20,065		2							
Muscatine	16,068	8	3		11		1			
Ottumwa	23,003		2							
Sioux City	71,227	1	3	1	1		12		2	
Kansas:										
Atchison	12,630		1				1			
Fort Scott	10,693	1	1							
Hutchinson	23,298				1		1			
Lawrence	12,456	7								1
Leavenworth	16,912		1							
Salina	15,085	3	2				1			
Topeka	50,022	19	1		3		4			
Wichita	72,217	34	5				4			
Kentucky:										
Covington	57,121	21	1				1			3
Henderson	12,169	2			3					
Lexington	41,534	21								
Louisville	234,891	119	7	1	13				11	2
Paducah	24,735				2					
Louisiana:										
New Orleans	387,219	174	14		3		7		21	21
Maine:										
Auburn	16,985	9	1		1		11			
Bath	14,731	12								1
Biddeford	18,008	6							1	
Lewiston	31,791	15					6		3	1
Portland	69,272	34	4		38					
Sanford (town)	10,691	2								
Maryland:										
Baltimore	733,826	316	36	2	75	1	38		23	26
Cumberland	29,837	25			49					2
Frederick	11,066	7	3				6		1	1
Massachusetts:										
Adams (town)	12,967	2			2					
Amesbury (town)	10,036	7								
Arlington (town)	18,665	7			10		1		1	
Attleboro	19,731	7								1
Belmont (town)	10,749	4			6		1			
Beverly	22,561	9	1		1					
Boston	748,060	335	62	2	142	4	85	2	31	17
Braintree (town)	10,580	4	1		8		4			2
Brockton	66,254		2		7		1			
Brookline	37,748	18	2	1	3		1		1	
Cambridge	109,694	31	4		44		6		4	4
Chelsea	43,184	17	2	1	8		5		2	1
Chicopee	36,214	12	1		2		3			
Clinton	12,979	3								
Danvers	11,108								1	
Dedham	10,792	1								1
Easthampton	11,261	3					1			1
Everett	40,120	11	2		20		1	1	1	
Fall River	120,485	36	5	2	47		8	1	6	5
Fitchburg	41,029	8	2				1		4	
Gardner	16,971	9	1							
Greenfield	15,462	6								
Haverhill	53,884	12	5	1	2		4		2	
Lawrence	94,270	30	2	1	2		2		4	1
Leominster	19,744	11					4		2	
Lowell	112,759	40	3		72	1	8		5	1
Lynn	99,148	30	7		98		6		8	
Malden	49,103	17	2		18		3		3	
Medford	39,038	9	1		12		7			

CITY REPORTS FOR WEEK ENDED FEBRUARY 17, 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.										
Melrose	18,204	7	1	.....	1	.....	4	.....	1	.....
Methuen	15,189	3	.....	.....	.....	.....	1	.....	.....	.....
New Bedford	121,217	32	7	.....	162	.....	2	.....	10	.....
Newburyport	15,618	13	.....	.....	4	.....	.....	.....	1	.....
Newton	46,054	11	1	.....	2	.....	15	.....	1	.....
North Adams	22,282	8	.....	.....	.....	.....	.....	.....	.....	.....
Northampton	21,951	13	.....	.....	.....	.....	6	.....	3	1
Northbridge	10,174	9	.....	.....	.....	.....	.....	.....	.....	.....
Peabody	19,552	3	3	.....	1	.....	.....	.....	1	.....
Pittsfield	41,763	11	3	1	.....	.....	7	.....	.....	.....
Plymouth	13,045	5	.....	.....	.....	.....	.....	.....	.....	.....
Quincy	47,876	19	2	.....	1	.....	22	.....	2	.....
Salem	42,529	25	.....	1	.....	.....	1	.....	2	1
Somerville	93,091	29	4	.....	13	.....	11	1	6	1
Southbridge	14,245	0	1	.....	.....	.....	.....	.....	.....	.....
Springfield	129,614	46	12	.....	.....	.....	13	1	5	3
Taunton	37,137	15	1	.....	50	2	10	.....	.....	2
Wakefield	13,025	2	.....	.....	.....	.....	4	.....	1	.....
Waltham	30,915	8	3	1	1	.....	5	.....	6	.....
Watertown	21,457	4	.....	.....	.....	.....	2	.....	.....	.....
Webster	13,258	4	.....	.....	.....	.....	1	.....	.....	.....
West Springfield	13,443	7	.....	1	.....	.....	.....	.....	.....	.....
Westfield	18,604	9	3	1	.....	.....	.....	.....	2	1
Weymouth	15,057	4	.....	.....	.....	.....	.....	.....	.....	.....
Winthrop	15,455	4	.....	.....	25	.....	1	.....	.....	.....
Woburn	16,574	3	.....	.....	.....	.....	.....	.....	.....	.....
Worcester	179,754	67	7	.....	.....	.....	13	.....	6	3
Michigan:										
Alpena	11,101	2	1	1	2	.....	2	1	.....	.....
Ann Arbor	19,516	14	1	.....	3	.....	2	.....	.....	.....
Battle Creek	36,164	1	.....	.....	.....	.....	7	1	.....	.....
Detroit	993,678	305	52	6	32	.....	147	2	83	18
Flint	91,599	45	9	4	8	.....	10	.....	1	1
Grand Rapids	137,634	63	4	.....	.....	.....	21	.....	5	2
Hamtramck	48,615	15	5	1	.....	.....	.....	.....	.....	2
Highland Park	46,499	20	3	.....	.....	.....	8	.....	1	1
Holland	12,183	1	.....	.....	.....	.....	6	1	.....	.....
Jackson	48,374	17	.....	.....	.....	.....	1	.....	.....	.....
Kalamazoo	48,487	26	3	.....	2	.....	1	.....	1	1
Marquette	12,718	1	.....	.....	.....	.....	2	.....	.....	.....
Muskegon	36,570	12	1	.....	.....	.....	.....	.....	.....	.....
Pontiac	34,273	11	.....	.....	2	.....	1	.....	.....	.....
Port Huron	25,944	11	2	.....	1	.....	1	.....	2	1
Sault Ste. Marie	12,096	4	.....	.....	.....	.....	.....	.....	.....	1
Minnesota:										
Duluth	98,917	26	3	1	136	.....	3	1	3	2
Faribault	11,089	4	.....	.....	.....	.....	6	.....	.....	1
Hibbing	15,089	5	.....	.....	4	.....	4	.....	.....	.....
Minneapolis	380,582	113	19	2	3	.....	42	1	40	10
Rochester	13,722	20	.....	.....	.....	.....	.....	.....	.....	1
St. Cloud	15,873	.....	2	.....	.....	.....	.....	.....	.....	.....
St. Paul	234,698	98	16	1	136	1	37	.....	17	6
Virginia	14,022	.....	2	.....	.....	.....	2	.....	.....	.....
Missouri:										
Cape Girardeau	10,252	6	.....	.....	.....	.....	.....	.....	.....	.....
Joplin	29,902	.....	1	.....	.....	.....	1	.....	.....	.....
Kansas City	324,410	122	8	1	8	.....	6	.....	9	8
St. Joseph	77,939	43	2	.....	1	.....	1	.....	.....	.....
St. Louis	772,897	286	30	2	203	.....	30	.....	28	11
Montana:										
Anaconda	11,668	1	.....	.....	.....	.....	.....	.....	.....	.....
Billings	15,100	4	1	.....	.....	.....	.....	.....	.....	.....
Great Falls	24,121	9	1	.....	.....	.....	.....	.....	.....	1
Helena	12,037	5	.....	.....	.....	.....	.....	.....	.....	.....
Missoula	12,668	6	.....	.....	.....	.....	2	.....	.....	.....
Nebraska:										
Lincoln	54,948	18	3	.....	1	.....	1	.....	.....	.....
Omaha	191,601	65	18	2	.....	.....	6	.....	.....	.....
Nevada:										
Reno	12,016	5	.....	.....	.....	.....	1	.....	.....	.....
New Hampshire:										
Berlin	16,104	5	.....	.....	.....	.....	.....	.....	.....	1
Concord	22,167	13	.....	.....	.....	.....	2	.....	.....	1
Dover	13,029	6	.....	.....	.....	.....	1	.....	.....	.....
Keene	11,210	2	1	.....	.....	.....	.....	.....	.....	.....

CITY REPORTS FOR WEEK ENDED FEBRUARY 17, 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	6			1		1			
Atlantic City	50,707	18	3	1	65				3	
Bayonne	76,754		2				1			
Belleville	15,660				1					
Bloomfield	22,019	4			16		9			
Clifton	26,470	8			17		2		1	1
East Orange	50,710	17			37		11		2	2
Elizabeth	95,783		10		71	1	15			
Englewood	11,627	8			21					
Garfield	19,381	9	1	1	2					
Hackensack	17,667	6	3		4		4			
Harrison	15,721				18		1		1	
Hoboken	68,166	27	2		2				1	1
Jersey City	298,103		8		9		17		6	
Kearny	26,724	12			1		2		1	
Long Branch	13,521	6								
Montclair	28,810	6	1		3		2		1	
Morristown	12,548	5	2		2		1		1	
Newark	414,524	180	13	1	135	1	23		10	8
Passaic	63,841	18	1		11		3		1	
Perth Amboy	41,707		3							1
Phillipsburg	16,923	4							1	
Plainfield	27,700	9								
Trenton	119,289	56	33	4			16	1	10	1
Union (town)	20,651		1		1					
West Hoboken	40,074	10							1	1
West New York	29,926	3	1	1					3	2
West Orange	15,573	5	1		17		5			1
New Mexico:										
Albuquerque	15,157	6	4		1		2		3	4
New York:										
Albany	113,344		1		4		2		7	
Amsterdam	33,524	10	1	1	1				5	
Auburn	36,192	13	1							
Buffalo	506,775	172	8		236	1	33	1	27	12
Cohoes	22,987	6	1						1	1
Cortland	13,294	4	1							
Elmira	45,393		6		2					
Geneva	14,648	5								
Glen Falls	16,638	4								
Hornell	15,025	3								
Hudson	11,745	11							1	2
Ithaca	17,004	12					1			
Lackawanna	17,918	7			4				1	
Little Falls	13,029	2								
Lockport	21,308	6					1			
Middletown	18,420				3					1
Mount Vernon	42,726	15	6		11		1			
New York	5,620,048	1,991	185	13	252	2	328	2	[1] 187	[1] 115
Newburgh	30,366	13					1		1	1
Niagara Falls	50,760	12	1		3		4		2	
North Tonawanda	15,482	7	1				1			
Olean	20,506	9			24		9			
Peekskill	15,868	6	1		1		4		1	
Poughkeepsie	35,000	23					3		1	1
Rochester	295,750	103	6	1	91	1	4		27	4
Rome	26,341	14					4			1
Saratoga Springs	13,181	5					2			
Schenectady	88,723	33	3		3	1	4		1	3
Syracuse	171,717	62	13	1	1		24		3	1
Troy	72,013	28	3	1			1		1	
Watertown	31,285	14	2		1					
White Plains	21,031	9			1		14		2	
Yonkers	100,176	29	1	1	13		12			1
North Carolina:										
Durham	21,719	5			13				1	1
Greensboro	15,861	3								
Raleigh	24,418	18			20		2			
Rocky Mount	12,742	7								
Salisbury	13,884	3								
Wilmington	33,372	5								
Winston-Salem	48,395	15								

[1] Pulmonary tuberculosis only.

CITY REPORTS FOR WEEK ENDED FEBRUARY 17, 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.
North Dakota:										
Fargo	21,961	0	2				3			
Grand Forks	14,010						1			
Ohio:										
Akron	208,435	31	3		8		6			
Ashtabula	22,082	9							1	
Barberton	18,811	11					8			
Bucyrus	10,425	4			9					
Cambridge	13,104	5			4		1			
Canton	87,091	17	6		4				1	2
Chillicothe	15,831	4	1				2		1	
Cincinnati	401,247	175	25	2	15		10	1	17	16
Cleveland	796,841	243	32	2	178		164	5	28	19
Cleveland Heights	15,236				11		10		1	
Columbus	237,031	122	5	1	53		10		12	6
Coshocton	10,847				9					
Dayton	152,559	58	4				9		3	
East Cleveland	27,292	6	2	1	8		6			
East Youngstown	11,237	1								
Findlay	17,021	10			30					
Fremont	12,468	3			4		1			
Hamilton	39,675	18			11	1				1
Kenmore	12,683						1		1	
Lima	41,326	14			1		2			2
Lorain	37,295		3		73		5		1	
Mansfield	27,824	6	1		59					
Marion	27,891		2		2					
Martins Ferry	11,634	2			4					
Middletown	23,594	6	1		1		2			
New Philadelphia	10,718						1			
Newark	26,718	18	1							
Niles	13,080	3	1		4					
Norwood	24,966	1	1				1			
Piqua	15,044	6	2							2
Salem	10,305	4	4							
Sandusky	22,897	6	1		19		2			
Springfield	60,840	40	4	1	39		4	1		2
Steubenville	28,508	21					2			
Tiffin	14,375	5	2						1	
Toledo	243,164	81	21	2	190		17		1	7
Zanesville	29,569	17	1		3					
Oklahoma:										
Oklahoma	91,295	33	3				1		2	1
Tulsa	72,075		2		29					
Oregon:										
Portland	258,288	70	4	1			7		8	5
Pennsylvania:										
Allentown	73,502		7		92		4		3	
Altoona	60,331		2		101		2			
Ambridge	12,730		2		8					
Beaver Falls	12,802				2					
Berwick	12,181		2							
Bethlehem	50,358		8		44				1	
Braddock	20,879				4		1		1	
Bradford	15,525				9					
Bristol	10,273		3							
Butler	23,778				13		1			
Carbondale	18,640		1							
Carlisle	10,916				1					
Carnegie	11,516		1		10		1			
Carrick	10,504				2					
Chambersburg	13,171		1		8		7			
Charleroi	11,516		2						2	
Chester	58,030				50		1			
Coatesville	14,515				2					
Columbia	10,836				51		1			
Connellsville	13,804				2					
Dickson	11,049				2					
Donora	14,131				20					
Dubois	13,681		5		2					
Duquesne	19,011				8				1	
Easton	33,813				29				1	
Erie	93,372		5		7		4		1	
Farrell	15,586				2		6			

CITY REPORTS FOR WEEK ENDED FEBRUARY 17, 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.										
Greensburg	15,033		2		11					
Harrisburg	75,917		3		254		12			
Hazleton	32,277		6				3		4	
Homestead	20,452				23				3	
Jeanette	10,627		2		12				1	
Johnstown	67,327		6				11		1	
Lancaster	53,150		5		187		4		2	
Lebanon	24,643				41					
McKees Rocks	16,713				6				1	
McKeesport	46,781				13					
Mahanoy City	15,599				3					
Meadville	14,568				1		1			
Monessen	18,179		3				1			
Mount Carmel	17,469		1							
Nanticoke	22,614		1		2					
New Castle	44,938		1		1		1			
New Kensington	11,987		2		2					
Norristown	32,319		3		18					
North Braddock	14,928				1					
Oil City	21,274				103		1			
Philadelphia	1,823,779	700	79	8	413	11	49	1	84	47
Phoenixville	10,484				23					
Pittsburgh	588,343		22		493		47		17	
Pittston	18,497				10					
Pottstown	17,431				87					
Pottsville	21,876				2				2	
Reading	107,784		3		99					
Scranton	137,783		2		18		1			
Shamokin	21,204				5		1			
Sharon	21,747		1		16		3			
Shenandoah	24,726		2		2					
Steelton	13,428		2		18					
Sunbury	15,721		1							
Swissvale	10,908		1		8					
Tamaqua	12,363		2		10					
Uniontown	15,692		2		36				1	
Washington	21,480						2			
West Chester	11,717		1		23		1			
Wilkes-Barre	73,833		2		11					
Wilkinsburg	24,403				40					
Williamsport	36,198		2							
Woodlawn	12,495		1		2					
York	47,512				35		5			
Rhode Island:										
Cranston	29,407	5			6		1			
Newport	30,255		7		16					
Pawtucket	64,248	19	1		6				1	3
Providence	237,595	107	12	2	201	10	6			3
South Carolina:										
Charleston	67,957	19	1				1			1
Columbia	37,524	13			1				1	
Greenville	23,127	3	1							
South Dakota:										
Sioux Falls	25,202	7	3				5			
Tennessee:										
Knoxville	77,818		2	1			1		1	1
Memphis	162,351	63	1		255	2	1		21	4
Nashville	118,342	40			38		3		5	4
Texas:										
Amarillo	15,494		3				1		2	1
Beamont	40,422	14								3
Corpus Christi	10,522	2								
Corsicana	11,356	5	1							
Dallas	158,976	39	4						1	1
El Paso	77,560	43			125	2	2			7
Fort Worth	106,482	22	2						3	2
Galveston	44,255	16	2							2
Houston	138,276	34	1				1			
San Angelo	10,050	3								
San Antonio	161,379	55	2							9
Waco	38,500	7	1		3					1
Utah:										
Salt Lake City	118,110	25	2		3		1		1	

CITY REPORTS FOR WEEK ENDED FEBRUARY 17, 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.
Vermont:										
Burlington	22,779	4					1			
Rutland	14,954	6								
Virginia:										
Alexandria	18,060	3							1	
Charlottesville	10,688	0								
Danville	21,539	11							1	1
Lynchburg	30,070	10			34				3	2
Norfolk	115,777		5		1		2		2	3
Petersburg	31,012	9	1				1			1
Richmond	171,667	71	4		1		5		13	7
Roanoke	50,842	13	1		7					
Washington:										
Aberdeen	15,337						1			
Everett	27,644						1			
Seattle	315,312		2		3		11		16	
Spokane	104,437		5		1		2			
Tacoma	96,965						9			
Vancouver	12,637						1			
Walla Walla	15,503						1			
West Virginia:										
Charleston	39,608	15								
Clarksburg	27,869	9			1		1			1
Fairmont	17,851		3		4		8			
Huntington	50,177	34	1		10					2
Morgantown	12,127		2		21		2			
Moundsville	10,669	2								
Parkersburg	20,050	14	1				1			1
Wheeling	56,208	28	1		100		1			
Wisconsin:										
Appleton	19,561	10	3				1			
Beloit	21,284	15			2		6			
Eau Claire	20,906		1							
Green Bay	31,017		2		5		1			
Janesville	18,293	10	1		27		2			
Kenosha	40,472	6	1		372					1
La Crosse	30,421				36		1		2	
Madison	38,378	11			13		5		3	
Manitowoc	17,563		1							
Marinette	13,610	1					2			
Milwaukee	457,147	159	19	1	250		208	4	10	4
Oshkosh	33,162	14					1		15	2
Racine	58,593	22	2		57		2		4	1
Sheboygan	30,955	9	3		7				6	
Stevens Point	11,371				1		2			
Superior	39,671	9			2					
Wausau	18,661		2		5					
West Allis	13,745				5		7			
Wyoming:										
Cheyenne	13,829	3					1			

FOREIGN AND INSULAR.

CUBA.

Communicable Diseases.

Communicable diseases have been notified in Cuba as follows:

Habana.

Disease.	Feb. 11-20, 1923.		Remaining under treatment Feb. 20, 1923.
	New cases.	Deaths.	
Chicken pox	9	.....	3
Diphtheria	3	.....	4
Leprosy	1	.....	11
Malaria	13	.....	[1] 13
Measles	1	.....	1
Scarlet fever	.....	.....	2
Typhoid fever	8	3	[2] 26

[1] From the interior, 10. [2] From the interior, 12.

Provinces.

Province.	Cases reported Jan. 1-10, 1923.							
	Chicken pox.	Diphtheria.	Malaria.	Measles.	Paratyphoid fever.	Scarlet fever.	Small pox.	Typhoid fever.
Camaguey	1	.....	46	.....	.....	.....	.....	1
Habana	7	6	37	1	.....	3	.....	24
Matanzas	1	.....	.....	.....	.....	.....	1	8
Oriente	26	2	84	.....	.....	.....	2	10
Pinar del Rio	.....	.....	3	.....	.....	.....	.....	3
Santa Clara	5	5	3	.....	3	.....	.....	10
Total	40	13	173	1	3	3	3	56

JAMAICA.

"Alastrim."

During the two weeks ended February 10, 1923, 100 new cases of "alastrim" were notified in the Island of Jamaica.

Quarantine Regulations—1923.

Under date of January 25, 1923, the quarantine board of Jamaica issued a revised set of regulations governing vessels arriving at Jamaican ports. The regulations pertain to the rat guarding of all vessels while in port, and to special rules applying to those vessels which have cleared from countries infected with plague, yellow fever, influenza, and smallpox.

Typhoid Fever—Kingston and Vicinity.

During the two weeks ended February 10, 1923, 9 cases of typhoid fever were notified in Kingston and 48 cases in the surounding country.

PANAMA CANAL.

Communicable Diseases—January, 1923.

Communicable diseases were notified for the Panama Canal during the month of January, 1923, as follows:

Disease.	Canal Zone.	Colon.	Panama.	Non-resident.	Total.
Chicken pox	7	5	7	.....	19
Diphtheria	4	2	12	3	21
Dysentery	.....	1	3	.....	4
Hookworm disease	8	11	29	19	67
Malaria	160	4	18	26	208
Measles	3	.....	3	.....	6
Mumps	.....	1	.....	.....	1
Pneumonia	1	5	10	.....	16
Scarlet fever	.....	.....	.....	1	1
Tuberculosis	4	6	24	6	40
Typhoid fever	.....	.....	.....	1	1
Whooping cough	2	.....	.....	.....	2

SWEDEN.

Certain Localities in Italy Declared Plague Infected.

Under date of January 15, 1923, the Royal Swedish Board of Trade declared the ports of Catania and Venice, and the Province of Naples, Italy, to be considered plague infected.

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

Reports Received During Week Ended March 9, 1923.[1]

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

CHOLERA.

Place.	Date.	Cases.	Deaths.	Remarks.
India:				
Calcutta	Jan. 14-20	22	12	Declared; epidemic. One death in port; not in connection with shipping.
Rangoon	Dec. 31-Jan. 6	1	.....	
Siam:				
Bangkok	Dec. 17-23	1	.....	

PLAGUE.

Ceylon:				
Colombo	Dec. 17-30	18	17	4 plague rodents.
Do	Dec. 31-Jan. 13	17	15	2 plague rodents.
China:				
Hongkong	Dec. 31-Jan. 6	1	.....	
Ecuador:				
Guayaquil	Jan. 16-31	1	.....	Rats examined: 4,800; found infected, 13.

[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 March 9, 1923—Continued.

PLAGUE—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
India				Nov. 26-Dec. 30, 1922: Cases, 12,232; deaths, 8,719. (Report for week ended Nov. 25, 1922, not received.) Dec. 31, 1922-Jan. 6, 1923: Cases, 4,001; deaths, 3,105.
Bombay	Dec. 24-30	3	1	
Madras Presidency	Jan. 14-20	436	296	
Rangoon	Dec. 24-30	6	5	
Do	Dec. 31-Jan. 6	5	5	
Java:				
East Java—				
Soerabaya	Dec. 17-23	2	2	
Toelong-Agoeng	Dec. 10-16	1	1	Not a sea port.
Siam:				
Bangkok	Dec. 17-23	1	1	
Syria:				
Beirut	Nov. 13-30	2	2	

SMALLPOX.

Arabia:				
Aden	Jan. 21-27		1	
Brazil:				
Rio de Janeiro	Dec. 31-Jan. 27	28	8	
Canada:				
Ontario—				
Hamilton	Feb. 18-24	2		
Ceylon:				
Colombo	Dec. 17-24	1	1	Outside city.
Chile:				
Valparaiso	Dec. 3-30		102	
Do	Dec. 31-Jan. 27		66	
China:				
Amoy	Jan. 21-27		1	
Chungking	Dec. 24-30			Present
Foochow	Jan. 7-13			Do.
Hongkong	Dec. 31-Jan. 6	2	1	
Manchuria—				
Harbin	Jan. 8-14	5		
Shanghai	Jan. 29-Feb. 4	1		Foreign.
Colombia:				
Buenaventura	Jan. 25-Feb. 9	40		Estimated, 50 cases present. Type, mild. Among colored population.
Cuba:				
Province—				
Matanzas	Jan. 1-10	1		
Oriente	do	2		
Ecuador:				
Guayaquil	Jan. 16-31	4		
Greece:				
Saloniki	Jan. 7-14	3		
India:				
Bombay	Dec. 24-30	4	2	
Calcutta	Jan. 14-20	7	5	
Karachi	do	6	2	
Madras	do	23	5	
Rangoon	Dec. 24-30	5	1	
Japan:				
Kobe	Jan. 27-Feb. 2		1	
Yokohama	Jan. 22-28	1		
Mexico:				
Mexico City	Jan. 14-20	12		Including municipalities in Federal district.
Portugal:				
Lisbon	Jan. 15-27	28	4	
Spain:				
Valencia	Jan. 21-27	2		
Syria:				
Beirut	Dec. 11-20	1		
Damascus	Dec. 21-31	15		
Switzerland:				
Zurich	Jan. 14-20	5		
Tunis:				
Tunis	Jan. 22-28		1	

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

Reports Received During Week Ended March 9, 1923—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Turkey:				
Constantinople	Jan. 21-27	102	29	
Union of South Africa:				
Cape Province	Dec. 31-Jan. 6			Outbreaks.
Transvaal	do			Do.
Yugoslavia:				
Belgrade	Dec. 25-31	1		

TYPHUS FEVER.

Chile:				
Talcahuano	Jan. 7-13	2	1	
Valparaiso	Dec. 3-30		9	
Do	Dec. 31-Jan. 27		13	
China:				
Manchuria—				
Harbin	Jan. 8-14	1		
Greece:				
Patras	Nov. 19-25		1	
Do	Jan. 1-7	3	1	
Saloniki	Jan. 7-14	3	1	Refugees.
Hungary:				
Budapest	Jan. 14-20	3		
Mexico:				
Mexico City	do	14		Including municipalities in Federal district.
Syria:				
Beirut	Oct. 1-22	1		
Turkey:				
Constantinople	Jan. 21-27	3	1	
Union of South Africa:				
Cape Province	Dec. 31-Jan. 6			Outbreaks.

Reports Received from December 30, 1922, to March 2, 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. 18, 1922: Cases, 7,890; deaths, 5,316.
Bombay	Oct. 27-Dec. 23	2	1	
Calcutta	Nov. 12-Dec. 30	102	60	
Do	Dec. 31-Jan. 13	29	21	
Madras	Nov. 19-Dec. 16	4	2	
Rangoon	Nov. 12-Dec. 23	17	10	
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-Dec. 16	3	1	

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

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

Reports Received from December 30, 1922, to March 2, 1923—Continued.

PLAGUE.

Place.	Date.	Cases.	Deaths.	Remarks.
Azores:				
Fayal Island—				
Castelo Branco	Dec. 2-31		3	Vicinity of Horta. Dec. 30, 1922: Several cases.
Pico Island—				
Lages	Nov. 27-Dec. 15		8	1 case present Dec. 15, 1922.
St. Michaels Island				Nov. 12-Dec. 30, 1922: Cases, 109; deaths, 35. At localities 3-9 miles from Ponta Delgada.
Ponta Delgada	Nov. 25-Dec. 9	3		
Brazil:				
Bahia	Oct. 29-Dec. 30	5	5	
Porto Alegre	Nov. 19-25	1		
British East Africa:				
Kenya Colony—				
Tanganyika Territory	Oct. 15-Dec. 16	12	7	
Ceylon:				
Colombo	Nov. 12-Dec. 16	28	21	Plague rodents, 12.
China:				
Hongkong	Nov. 5-Dec. 23	14	12	
Ecuador:				
Guayaquil	Nov. 1-Dec. 31	9	3	Rats examined, 16,609; found infected, 72.
Do	Jan. 1-15	3	1	Rats examined, 4,500; found infected, 13.
Egypt				Jan. 1-Dec. 28, 1922: Cases, 485; deaths, 228. Jan. 1, 1922-Jan. 4, 1923: Cases, 487; deaths, 228. Jan. 1-11, 1923: Cases, 1; deaths, 1.
City—				
Alexandria	Nov. 19-25	2		
Do	Jan. 8-10	1	1	
Port Said	Nov. 19-27	4	2	
Suez	Nov. 18-Dec. 5	3	4	
Province—				
Assiout	Nov. 19-Dec. 29	4	1	Septicemic: 1 case, 1 death.
Dakahlieh	Dec. 3	1	1	Pneumonic.
Minieh	Nov. 18-27	2	1	
India				Oct. 1-Nov. 18, 1922: Cases, 12,775; deaths, 10,084.
Bombay	Oct. 27-Dec. 23	38	31	
Karachi	Dec. 10-16	1	1	
Do	Dec. 31-Jan. 13	3	2	
Madras Presidency	Nov. 19-Dec. 30	2,269	1,448	
Do	Dec. 31-Jan. 6	261	131	
Madras	Nov. 19-25	1	1	
Rangoon	Nov. 12-Dec. 23	46	44	
Japan:				
Osaka				July 1-Nov. 30, 1922: Cases, 70.
Java				Oct. 1-Nov. 30, 1922: Cases, 900; deaths, 763.
East Java—				
Soerabaya	Oct. 22-Dec. 16	12	12	
Soerakarta—				
Klaten	Nov. 4			Present in epidemic form.
Toeloeng-Agoeng	Oct. 29-Nov. 11	17	17	Not a sea port.
Madagascar				Jan. 1-Dec. 10, 1922: Cases, 143.
Province—				
Moramanga				To Nov. 12, 1922: Cases, 24; deaths, 21. Cases reported to Oct. 30, pneumonic.
Amparafara region	Sept. 18-Nov. 5	21		Bubonic, 18; septicemic, 3 (doubtful, 2).
Moramanga	Dec. 6-9	3		Bubonic.
Tamatave	Feb. 10-Sept. 12	10		Do.
Miarinarivo				Dec. 14, 1922-Jan. 1, 1923: 1 case (European.)
Tananarivo				Jan. 1-Dec. 10, 1922: Cases, 73 (bubonic, 37; pneumonic, 8; septicemic, 28).
Ambohimangakeley	Nov. 19-Dec. 9	9		Bubonic, 3; pneumonic, 3; septicemic, 3.
Anketrina	Mar. 27-May 9	11		Bubonic, 4; pneumonic, 2; septicemic, 5 (3 doubtful).
Fenoarivo region	Oct. 7-Nov. 28	16		Bubonic, 3; pneumonic, 8; septicemic, 5.
Tananarivo	Oct. 23-Dec. 10		5	1 septicemic.
Do	Dec. 14-Jan. 1	11		
Mesopotamia:				
Bagdad	Oct. 1-Nov. 30	16		
Palestine:				
Jaffa	Nov. 27-Dec. 4	1		

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

Reports Received from December 30, 1922, to March 2, 1923—Continued.

PLAGUE—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Peru				Nov. 1-Dec. 15, 1922: Cases, 120; deaths, 51.
Localities—				
Canete	Nov. 16-Dec. 15	22	9	
Chepen	Nov. 1-15			Present.
Chiclayo (city and country).	Nov. 16-Dec. 15	17	7	
Eten	do	4		
Guadaloupe	Nov. 1-Dec. 15	15	6	
Huacho	Nov. 16-Dec. 15	4	1	
Huaral	Nov. 16-30	1		
Huarmey	Dec. 1-15	1	1	
Jayanca	Nov. 16-Dec. 15	4	2	
Lambayeque	Nov. 16-30	5	3	
Lima (city)	Nov. 1-Dec. 15	8	6	
Lima (country)	do	9	1	
Lurin	Dec. 1-15	1		
Magdalena del Mar	Nov. 16-30	1		
Mala	Dec. 1-15	1		
Mosche	Nov. 16-30	2	1	
Piura	do	8	5	
Pueblo Nuevo	Dec. 1-15	4	2	
San Pedro	Nov. 1-Dec. 15	6	3	
Sullana	Nov. 16-30	3	3	
Trujillo	Nov. 1-Dec. 15	1	1	
Tuman	Nov. 16-30	3		
Portugal:				
Lisbon	Nov. 10-29	4	2	
Oporto	Jan. 21-27		1	
Portuguese West Africa:				
Angola—				
Loanda	Oct. 1-Dec. 2		44	Fatal cases among white population.
Siam:				
Bangkok	Nov. 12-Dec. 16	4	4	
Spain:				
Barcelona	Nov. 15-Dec. 18	1		Sept. 24-Nov. 14, 1922: Cases, 23; deaths, 9.
Straits Settlements:				
Singapore	Dec. 17-23	2	2	
Syria:				
Beirut	Nov. 6-12	2	1	
Turkey:				
Constantinople	Nov. 22-28	2		
Union of South Africa:				
Transvaal—				
Klipfontein	Dec. 24-30			Outbreak.
On vessels:				
S. S. Helcion	Dec. 1	1		At Thursday Island Quarantine, Australia, from Singapore, Straits Settlements. In Chinese fireman.
S. S. ——	Dec. 30			At Port of London, plague-infected rats and cats found in grain cargo on vessel from South America.

SMALLPOX.

Algeria:			
Algiers	Dec. 1-10	1	
Arabia:			
Aden	Nov. 19-Dec. 23	7	3
Do	Jan 7-13	1	
Brazil:			
Bahia	Nov. 5-11	1	
Rio de Janeiro	Nov. 25-Dec. 30	40	15
Sao Paulo	Oct. 16-22	1	1
British East Africa:			
Kenya Colony—			
Tanganyika Territory	Oct. 8-Dec. 15	179	9
Uganda	Sept. 1-30	1	1
Canada:			
Manitoba—			
Winnipeg	Dec. 10-30	14	
Do	Jan. 21-27	1	

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

Reports Received from December 30, 1922, to March 2, 1923—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Canada—Continued.				
New Brunswick—				
Northumberland County	Jan. 21-27	7		
Ontario				Dec. 1-31, 1922: Cases, 51; deaths, 1. Jan. 1-30, 1923; Cases, 43.
Hamilton	Dec. 31-Feb. 17	5		
Niagara Falls	Dec. 3-30	10		
Do	Dec. 31-Jan. 12	12		
Ottawa	Dec. 10-23	6		
Do	Jan. 7-20	10		
Toronto	Dec. 10-30	2		
Do	Feb. 4-10	1		
Quebec—				
Quebec	Jan. 14-20	3		
Saskatchewan—				
Regina	Dec. 3-23	2		
Ceylon:				
Colombo	Nov. 12-Dec. 9	8	3	
Chile:				
Concepcion	Oct. 30-Dec. 25		7	
Valparaiso	Oct. 2-Dec. 26	4	54	In hospital, 83 cases.
Do	Jan. 9-15		9	
China:				
Amoy	Nov. 5-Dec. 23		3	Nov. 26-Dec. 16, 1922: Present.
Do	Jan. 7-13		1	
Antung	Nov. 13-Dec. 10	2		
Canton	Oct. 1-Nov. 30			Prevalent.
Chungking	Nov. 5-Dec. 16			Present.
Do	Dec. 31-Jan. 6			Do.
Foochow	Nov. 12-Dec. 30			Do.
Do	Dec. 31-Jan. 6			Do.
Hankow	Dec. 31-Jan. 20	4	1	
Hongkong	Nov. 5-11		1	
Manchuria—				
Harbin	Nov. 20-Dec. 31	13		
Mukden	Nov. 19-Dec. 16			Do.
Do	Jan. 7-13			Do.
Nanking	Nov. 5-Dec. 23			Do.
Do	Jan. 7-20			Do.
Shanghai	Jan. 15-21	1		Foreign.
Chosen (Korea):				
Chemulpo	Oct. 1-Dec. 31	135	84	
Fusan	Nov. 1-Dec. 31	4		
Gensan	Dec. 1-31	6	2	
Seoul	Oct. 1-Dec. 31	19	1	
Colombia:				
Buenaventura	Feb. 2	50		
Cuba:				
Province—				
Camaguey	Nov. 11-Dec. 31	20		
Oriente	Nov. 21-Dec. 31	22		
Santa Clara	Dec. 21-31	1		
Czechoslovakia				Oct. 1-31, 1922: Cases, 3.
Province—				
Bohemia	Oct. 1-31	1		
Moravia	....do	1		
Slovakia	Oct. 1-Nov. 30	2		
Dominican Republic:				
Puerto Plata	Dec. 14-30	2		
Santo Domingo	Dec. 3-16			Present.
San Pedro de Macoris	Jan. 13-19	2		
Ecuador:				
Guayaquil	Dec. 1-31	10		
Do	Jan. 1-15	5		
Egypt:				
Port Said	Jan. 21-27	1		
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. 23	3		
Nottingham	Nov. 19-Dec. 13	4		
Do	Jan. 7-27	5		

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

Reports Received from December 30, 1922, to March 2, 1923—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Greece:				
Saloniki	Nov. 6-Dec. 31	6	5	
Zante	Jan. 17			Epidemic.
India				Nov. 5-18, 1922: Cases, 1,390; deaths, 276.
Bombay	Nov. 5-Dec. 23	14	4	
Calcutta	Nov. 12-Dec. 30	46	23	
Do	Dec. 31-Jan. 13	27	13	
Karachi	Nov. 26-Dec. 30	6		
Do	Dec. 31-Jan. 13	4	4	
Madras	Nov. 12-Dec. 30	71	23	
Do	Dec. 31-Jan. 13	29	12	
Rangoon	Nov. 5-Dec. 23	22	5	
Japan:				
Kobe	Jan. 13-25	2	1	
Java:				
East Java—				
Soerabaya	Nov. 5-11	4		
West Java—				
Batavia	Nov. 11-Dec. 22	25	1	City and Province.
Mesopotamia:				
Bagdad	Oct. 1-Nov. 30	568	361	
Mexico:—				
Chihuahua	Dec. 4-17		4	
Do	Jan. 1-28	19	11	
Guadalajara	Dec. 1-31	4		
Mexico City	Nov. 12-Dec. 23	43		Including municipalities in Federal District.
Do	Dec. 31-Jan. 6	21		Do.
Nogales	Dec. 10-19		1	
Do	Dec. 31-Feb. 10		2	
Saltillo	Jan. 28-Feb. 3		1	
San Luis Potosi	Jan. 14-20		1	
Sonora, State				Nov. 1-30, 1922: Present in northern section.
Empalme	Nov. 1-30	4	1	
Torreon	Dec. 1-31		1	
Palestine				Jan. 23-29, 1923: One case in northern district.
Peru:				
Callao	Nov. 1-15	2		
Lima (city)	Dec. 1-15	3	1	
Lima (country)	Nov. 1-15	2	1	
Poland				Oct. 1-Dec. 2, 1922: Cases, 103; deaths, 24.
Portugal:				
Lisbon	Nov. 19-Dec. 30	143	34	
Do	Dec. 31-Jan. 6	29	37	Dec. 25-31, 1922: Deaths, 12.
Oporto	Oct. 15-Dec. 30	24	12	
Do	Dec. 31-Jan. 27	8	7	Jan. 5-20, 1923: Cases, 22; deaths, 6.
Portuguese West Africa:				
Angola—				
Loanda	Oct. 27-Nov. 11		10	
Russia:				
Province—				
Esthonia	Oct. 1-Nov. 30	42		
Lettonia	do	6		
Ukraine				Jan.-Sept., 1922: Cases, 8,744.
Spain:				
Corunna	Nov. 26-Dec. 2		1	
Huelva	Nov. 24-Dec. 31		4	
Madrid	Dec. 1-31		1	
Seville	Nov. 27-Dec. 31		32	
Do	Jan. 1-28		8	
Valencia	Nov. 26-Dec. 23	3		
Do	Dec. 31-Feb. 3	4	1	
Switzerland:				
Berne	Nov. 19-Dec. 30	85		
Do	Dec. 31-Jan. 27	77		
Zurich	Nov. 19-Dec. 30	19		
Do	Jan. 21-27	9		
Syria:				
Aleppo	Nov. 19-Dec. 23	38	20	Dec. 3-30, 1922: Present.
Do	Dec. 31-Jan. 27	16	5	
Damascus	Nov. 1-30	82	16	
Tunis:				
Tunis	Dec. 1-22	2	1	

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

Reports Received from December 30, 1922, to March 2, 1923—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Turkey:				
Constantinople	Nov. 19–Dec. 16	122	34	
Do	Dec. 31–Jan. 20	213	56	
Union of South Africa				Oct. 1–Nov. 30, 1922: Cases—Colored, 29; white, 4.
Cape Province				Oct. 1–Nov. 30, 1922: Cases—Colored, 21; white, 4.
Do	Oct. 29–Dec. 30			Outbreaks.
Natal	Dec. 3–30			Do.
Orange Free State	Dec. 10–16			Do.
Southern Rhodesia	Nov. 9–15	3		
Transvaal				Oct. 1–31, 1922: Cases, 8.
Do	Oct. 29–Nov. 4			Outbreaks.
Johannesburg	Nov. 1–30		1	
Yugoslavia				Aug. 1–31, 1922: Cases, 30; deaths, 12.
Serbia				Aug. 1–31, 1922: Cases, 26.
Belgrade	Nov. 12–Dec. 23	9	4	
On vessel:				
S. S. Huntress	Nov. 11	1		At Fremantle, Australia, from Cape Town, South Africa.
S. S. Junin	Jan. 13	1		At Antofagasta, Chile. Vessel proceeded to Arica, Chile, with patient on board.
S. S. ———	Dec. 17–23	1		At Liverpool.

TYPHUS FEVER.

Algeria:				
Algiers	Nov. 11–Dec. 31	2	1	
Oran	Jan. 11–20	1	1	
Brazil:				
Pernambuco	Dec. 3–9	2	2	
Porto Alegre	Nov. 19–Dec. 16	3		
Chile:				
Antofagasta	Nov. 12–Dec. 30	24	5	Nov. 11–Dec. 5, 1922: Cases, 10; deaths, 2.
Do	Dec. 31–Jan. 6	2	1	
Concepcion	Oct. 17–Dec. 18		9	
Do	Dec. 26–Jan. 15		7	
Iquique	Jan. 14–20		1	
Talcahuano	Nov. 12–Dec. 23	10	6	
China:				
Antung	Nov. 13–Dec. 10	7		
Manchuria—				
Harbin	Nov. 20–26	7		
Do	Jan. 1–7	1		
Cuba:				
Matanzas	Dec. 25–31	1	1	
Czechoslovakia:				
City—				
Prague	Nov. 19–25	1		
Province—				
Bohemia	Nov. 1–30	1		
Ruthenia	Oct. 1–31	1		
Slovakia	Nov. 1–30	2		
Danzig (Free City)	Jan. 7–13	1		
Egypt:				
Alexandria	Nov. 19–Dec. 31	2	1	
Do	Dec. 22–28	1		
Cairo	Oct. 1–Dec. 2	13	7	
Germany:				
Berlin	Nov. 26–Dec. 2		1	
Coblenz	Dec. 10–16	1		
Dresden	....do	1		
Great Britain:				
Glasgow	Jan. 7–Feb. 3	4		
Greece:				
Leucadia	Jan. 17			Present.
Prevesa	....do			Do.
Saloniki	Dec. 18–24	3		Among refugees.
Zante	Jan. 17			Present.
Ireland:				
Belmullet	June 15–Dec. 14	20		In county Mayo.
Mexico:				
Mexico City	Nov. 12–Dec. 23	78		Including municipalities in Federal District.
Do	Dec. 24–Jan. 7	19		Do.
San Luis Potosi	Jan. 28–Feb. 10		2	

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

Reports Received from December 30, 1922, to March 2, 1923—Continued.

TYPHUS FEVER—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Palestine				Dec. 5–25, 1922: Cases, 3; in northern section.
Jaffa	Dec. 12–18	2		
Do	Jan. 16–22	2		
Jerusalem	Dec. 26–Jan. 1	1		
Persia:				
Teheran	Sept. 24–Oct. 24		1	
Poland				Oct. 1–Dec. 2, 1922: Cases, 1,415 deaths, 101; Recurrent typhus: Cases, 1,583; deaths, 45.
Portugal:				
Oporto	Oct. 15–Dec. 2	1	1	
Rumania:				
Bucharest				To Jan. 31, 1923: Cases, 95; deaths, 13.
Chisinau	Nov. 1–30	5		
Russia				July 30–Sept. 23; 1922: cases, 23,803.
Esthonia				Oct. 1–Nov. 30, 1922: 1 Case.
Libau	Dec. 24–30	1		Recurrent typhus: Cases, 7.
Lettonia	Oct. 1–Nov. 30	45		Recurrent typhus: Cases, 9.
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. 27		3	
Do	Jan. 11–17		1	
Madrid	Dec. 1–31		1	
Syria:				
Aleppo	Dec. 10–16	1	1	
Do	Jan. 7–27	17	5	
Turkey:				
Constantinople	Nov. 27–Dec. 2	3		
Do	Dec. 31–Jan. 20	14	2	
Union of South Africa				Oct. 1–Nov. 30, 1922: Colored—cases, 1,986; deaths, 184; white—cases, 7; deaths, 2.
Cape Province				Oct. 1–Nov. 30, 1922: Colored—cases, 1,799; deaths, 146; white—cases, 3; deaths, 1.
Do	Oct. 29–Dec. 16			Outbreaks.
Natal				Oct. 1–Nov. 30, 1922: Colored—cases, 107; deaths, 27; white—cases, 2.
Do	Dec. 3–9			Outbreaks.
Orange Free State				Oct. 1–Nov. 30, 1922: Colored—cases, 58; deaths, 6; white—cases, 2; deaths, 1.
Do	Nov. 12–Dec. 30			Outbreaks.
Transvaal				Oct. 1–Nov. 30, 1922: Colored—cases, 22: deaths, 5.
Do	Oct. 29–Nov. 25			Outbreaks.
Johannesburg	Nov. 1–30	3	6	
Venezuela:				
Maracaibo	Jan. 21–27		1	
Yugoslavia:				
Bosnia-Herzegovina	Aug. 1–31	1		
Serbia				Aug. 1–31, 1922: Recurrent typhus fever, cases, 4.

YELLOW FEVER.

Brazil:				
Bahia	Dec. 31–Jan. 6	1	1	
Mexico:				
Ciudad Victoria	Dec. 17–23	1		
West Africa:				
Gold Coast—				
Saltpond				Reported present Dec. 21, 1922.
Nigeria—				
Warrai				Do.

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