PUBLIC HEALTH REPORTS

VOL. 40 JULY 10, 1925 No. 28

THE BIO-ASSAY OF THYROID

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I have recently discussed the standardization of thyroid [1] and shown that all of the available evidence, both experimental and clinical, leads to the conclusion that the therapeutic value of properly selected and prepared preparations of this drug can be ascertained by a determination of their iodine content. With approximately normal glands the physiological action and therapeutic value is closely parallel to the iodine percentage. Reliance can not, at least at present, be placed upon chemical analysis for the detection of adulterations of thyroid or of gross carelessness in its preparation. Hence there is need of a biological method for determining the relative strength of thyroid preparations.

At a conference on biological standardization held at Edinburgh in July, 1923, under the auspices of the Health Committee of the League of Nations, Professor Straub and I were requested to consider the various methods which had been proposed for the biological assay of thyroid, with especial reference to the acetonitril method [2] (the increased resistance to acetonitril of white mice to which thyroid had been administered). I have recently published [3] observations showing the close parallelism between the results obtained by this method and those obtained clinically in cases of myxedema and cretinism.

Straub [4] has recently described certain modifications in the method of performing the acetonitril test which makes it better suited as a routine test. The modifications consist in administering the thyroid in a single dose to mice by the stomach tube and the injection of the nitril intravenously. I have repeated these experiments and found the method satisfactory, but there are certain minor modifications which I think could be introduced to advantage.

Thus I believe that the doses both of the standard and of the preparations to be tested could advantageously be based upon their iodine content. Straub proposed that the standard should be a preparation of thyroid which, when administered to mice in the dose of 0.2 c. c. of a 5 per cent suspension, increases the resistance of the

[1] Hunt: Archives Int. Med., vol. 35, p. 671, 1925 (June 15).

[2] Hunt: Jour. Biol. Chem., 1, p. 1, 1905; Am. Jour. Physiol., 73, 257, 1923; Hunt & Seidell, Hygienic Laboratory Bulletin No. 47, United States Public Health Service, 1908.

[3] Cited in reference 1.

[4] Straub, W.: Deut. med. Wochensch., 51, p. 4, 1925.

animal to acetonitril by at least 100 per cent. I would suggest that the standard be a preparation of thyroid of known origin and containing 0.2 (±0.02) per cent of iodine. I find that 10 mgs. of such a preparation (i. e., 0.2 c. c. of a 5 per cent suspension and containing 0.02 mg. iodine) usually gives about the optimum degree of protection to the nitril, i. e., an increased resistance which is neither minimal nor maximal and therefore suitable for comparisons with preparations both weaker and stronger. Since, however, the dose which gives the optimum degree of resistance varies with different lots of mice (according to season, diet, etc.), I would suggest that the optimum dose of the standard preparation be first determined upon the special lot of mice to be used in the test. For this purpose it usually suffices to give one group of the mice 5 mgs. and another group 10 mgs. of the standard. I would suggest that the doses of the thyroid preparations to be tested be based upon their iodine content so that the mice should receive the thyroid in equi-iodine amounts. If the preparations are normal, unadulterated thyroid, the relative strength (and so the correct dosage) is given at once by the relative amounts of thyroid administered. If, however, an amount of iodine administered in the sample under investigation affords a lesser degree of protection than the standard, the suspicion would arise that part of the iodine is not present in thyroid combination. If, on the other hand, the standard dose of iodine is contained in an amount of thyroid less than that of the standard, the conclusion would be that at least a part of the iodine is present in thyroid which is stronger than the standard.

The following summary of an experiment illustrates how the method may be used to detect adulterated or factitious thyroid on the one hand and overstrength thyroid on the other.

The mice used in this series had received for a few days a diet of dog bread to which had been added 1 per cent of cod-liver oil. The experiments were performed during a period of very warm weather in June, and the resistance to acetonitril, both of the controls and of the thyroid-fed mice, was low. Five mgs. of the thyroid gave about the optimum degree of resistance as is shown by the following:

TABLE 1

May 31—9.30 a. m., the mice were removed from food.
12.30 p. m., thyroid administration by stomach tube and the mice returned to the previous diet
June 1—12 to 12.20 p. m., acetonitril intravenously.

Standard thyroid	Per cent of iodine in thyroid	Dose of thyroid in mgs.	Iodine in dose of thyroid in mgs.	Maximum tolerated dose of acetonitril mg. per gm. mouse
Controls				0.36
658	0.216	5	0.0108	0.7
658	0.216	10	0.0216	0.9

Thus 5 mgs. of the standard thyroid (containing 0.0108 mg. iodine) gave an almost maximum degree of protection, and the doses of the "unknowns" were based upon this. The experiments were performed the following day in the manner described above. The results were as follows:

TABLE 2

Preparation	Per cent of iodine in preparation	Dose of preparation in mgs.	Mg. iodine in dose of preparation given	Maximum tolerated dose acetonitril in mg. per gm. mouse
Controls (no thyroid)				0.36
Standard thyroid	0.216	5	0.0108	0.7
A-3	0.216	5	0.0108	0.33
B-4	0.216	5	0.0108	0.54
B-5	0.216	10	0.0216	0.7
C-7	0.432	2.5	0.0108	0.51
D-8	0.418	2.574	0.0108	0.85

From the above results it would be concluded—

(1) That A–3 was probably not thyroid at all, although it contained protein and 0.216 per cent iodine but it afforded no protection against the nitril when administered in doses containing as much iodine as the standard thyroid. As a matter of fact A–3 was thymus to which had been added a sufficient amount of potassium iodide to bring the iodine content up to that of the standard thyroid.

(2) That not all of the iodine in B–4 was in thyroid combination; for, although the iodine percentage was the same as that of the standard thyroid, the administration of an amount (5 mgs.) equal to that of the standard thyroid and containing the same amount of iodine (0.0108 mg.) caused a much lower degree of protection than did the standard thyroid. When, however, the preparation was administered (B–5) in twice the dose of the standard (10 mgs. containing 0.0216 mg. iodine), the protection was the same as that given by the standard. From this it would be concluded that half of the iodine in B–5 was in thyroid combination. As a matter of fact B–5 was obtained by adding to a "weak" thyroid (one containing 0.108 per cent iodine) sufficient potassium iodide to bring the total iodine percentage up to that of the standard (viz, 0.216).

(3) C–7 contained a high percentage of iodine (0.432), and a small dose (2.5 mgs.) had an undoubted thyroid effect. But since the dose administered (2.5 mgs.) contained as much iodine (0.0108 mg.) as the standard, but gave only about half as much protection as the standard, it is evident that not all of the iodine is in thyroid combination. Since, however, the dose administered (2.5 mgs.) was only half that of the standard (5 mgs.), the conclusion seems inevitable that the thyroid present is as active as the standard, and that

iodine had been added so that the preparation would simulate a thyroid having a higher percentage of iodine. As a matter of fact, C–7 was the standard to which sufficient potassium iodide had been added to bring the total percentage of iodine up to 0.432. By chemical analysis C–7 would be confused with a preparation like D–8, which contained approximately the same percentage of iodine (0.418). The latter, however, when fed in a comparable dose (2.574 mgs., containing 0.0108 mg. iodine), had a much greater effect; in fact, 2.574 mgs. of D–8, containing 0.0108 mg. iodine, was as active as 5 mgs. of the standard (also containing 0.0108 mg. iodine). From this it would seem that D–8 was unadulterated thyroid containing all of the iodine in thyroid combination, and that it was about twice as active as the standard.

In the following experiment three thyroid preparations, with very different percentages of iodine, were tested in the manner described above:

TABLE 3

Preparation	Per cent of iodine in preparation	Dose of preparation in mgs.	Iodine in dose of preparation in mgs.	Maximum tolerated dose of acetonitril in mgs. per gm. mouse
Controls				0.55
658 (beef thyroid)	0.216	10.0	0.0216	1.40
486 (sheep thyroid)	0.042	51.5	0.0216	1.40
501 (hog thyroid)	0.531	4.06	0.0216	1.40
658	0.216	5.0	0.0108	0.90
486	0.042	25.75	0.0108	0.90
501	0.531	2.03	0.0108	0.95
486	0.042	10.00	0.0042	0.60

Thus, when these preparations were administered in equi-iodine doses the degree of protection was the same, although the amount of thyroid administered varied from 4.06 mgs. to 51.5 mgs. in one case, and from 2.03 to 25.75 in another; 4.06 and 2.03 mgs. of No. 501 was more effective than 25.75 and 10 mgs. of No. 486.

A considerable number of experiments were performed with much less satisfactory results, but I believe that the cause of this lay in the use of mice of different weights (and presumably of different ages). The figures quoted above are those based upon experiments on mice weighing from 14.25 to 14.9 gms.; mice weighing 15 gms. and more died from 1.2 mgs. of the nitril, and those weighing 12 gms. survived 2.3 mgs. Another factor is probably involved: all of the mice received the same dose of thyroid irrespective of their body weight; the smaller mice therefore received more thyroid per gm. body weight than did the heavier mice. If it is necessary to use mice of different weights, it would doubtless be better to base the dose of thyroid (as well as that of the nitril) upon the body weight.

But I do not believe that this would be altogether satisfactory, for in the controls in the above experiment, the lighter the mice the greater the resistance to the nitril; thus, mice weighing from 14.10 to 14.8 gms. survived 0.55 mg. of the nitril per gm. body weight, but died from 0.6 mg., whereas mice weighing from 15.06 to 16.80 gms. died from 0.5 mg. and less, and those weighing 13.80 gms. or less, tolerated doses of 0.7 mg. or more.

It may be of interest to compare this modification of the aceto-nitril method with the one I have usually used. In the latter method the thyroid was given to mice in their food for about five days, when the nitril was injected, usually subcutaneously. Thus, almost a week was necessary for a test, whereas by the newer method a test can be completed within 24 hours. I am inclined to think, however, that perhaps more accurate comparisons can be obtained by the older method. When the thyroid was given in a single dose by the stomach tube, the maximum protection obtained with any dose was only 200 to 400 per cent increase in maximum tolerated dose of controls whereas in the older method (in which the resistance was built up by the cumulative effects of small doses of thyroid administered daily) the resistance was easily increased by 500 or 600, or much more, even up to 2,500 per cent. Thus, in the above-cited experiment the maximum tolerated dose was increased only from 0.55 to 1.4 mg. nitril per gm. mouse by the administration of a single dose of thyroid No. 501; in an experiment cited in an earlier paper the same thyroid when fed in doses of 0.565 mg. daily for five days increased the tolerated dose of the nitril from 0.55 to 2.6 mgs. This greater range is obviously an advantage in making more accurate comparisons of the activity of different preparations. Moreover, variations in the weights of the mice seemed to have less effect upon the results when the thyroid was fed for several days.

Where the "cakes" method is used it is very easy to determine fairly accurately the amount of food (and so the amount of thyroid) consumed daily. Animals showing abnormalities in their food consumption can thus be eliminated. The mice ate most of the food early in the night and the tests were made upon the different groups of mice at the same time, when the condition of the animals' nutrition was apparently very uniform.

In the course of such experiments I frequently compared the results of the subcutaneous and intravenous methods of administering the nitril. The results were about the same, but I got the impression that in these experiments (where the resistance was very high, the tolerated dose having been raised, for example, from 0.35 to 4.5 mgs. per gm.) the subcutaneous method was preferable. I thought that this might perhaps be explained as follows: Acetonitril has two distinct actions—a narcotic action similar to that of alcohol

and presumably due to the action of the molecule as a whole, and another action (the one of chief interest in this connection) due to the changes which the poison undergoes in the body. When the nitril was injected intravenously, it seemed that the former action might develop more abruptly and be of relatively more importance than when the drug was injected subcutaneously.

I also did a number of experiments in which the thyroid was fed at a single dose. The mice were removed from food at 1 p. m.; the thyroid was mixed with 2 gms. of powdered dog bread and made into cakes which were fed to the mice at 5 p. m. The mice ate practically every trace of these cakes during the night; if any did not feed, they were excluded from the test. The mice were then placed upon the usual food until in the afternoon, when the nitril was injected (intravenously or subcutaneously). The results were fairly satisfactory, but seemed to be less uniform than when the thyroid was administered by the stomach tube.

SUGGESTIONS

It is suggested—

(1) That the assay of thyroid be based primarily upon the iodine content. (The U. S. P. standard of 0.2 per cent has been found feasible and satisfactory in the United States.[5])

(2) That simple chemical tests be included for the detection of non-thyroid iodine.

(3) That in cases where a physiological test is desirable, the acetonitril test as modified by Straub is recommended, but that the dosage be based upon the iodine content of the preparation to be examined.

(4) That the standard be a preparation of thyroid of known origin containing 0.2 per cent iodine.

(5) That physicians be urged to use thyroid of known iodine content and that they be requested to collect further data on the relation between the iodine content of different samples of thyroid and their effect upon the basal metabolism in cases of hypothyroidism.

STANDARDIZATION OF POLLEN EXTRACTS BY THE COMPLEMENT-FIXATION TEST [1]

By CHAS. ARMSTRONG, Surgeon, and W. T. HARRISON, Surgeon, United States Public Health Service.

As a result of the lack of uniformity in the methods of preparation of any given pollen extract used in the treatment of hay fever, there are in use at the present time many preparations prepared in different ways and differing in potency and keeping qualities.

[1] Read before The Society for the Study of Asthma and Allied Conditions, New York, Nov. 22, 1924.
[5] Hunt and Seidell: Amer. Jour. Pharmacy, 83, 407, 1911.

It is thus apparent that some method by which these various products may be compared or standardized is highly desirable. The writers took up the subject of the standardization of pollen extracts, and this report represents the status of the work at the present time, in so far as complement fixation is concerned.

This work has been carried on entirely with ragweed pollen extracts, the pollen of both giant and short ragweed being used. Complement fixation, which had previously been demonstrated for pollen extracts by Clock, in 1918 (1), would seem *a priori* to offer certain advantages as a method of standardization. It is not only more delicate, for instance, than the nitrogen determination, but it has the additional advantage of being highly specific.

The procedure in determining the strength of an extract by the complement-fixation method is as follows:

The antiserum used in the test is prepared by injecting rabbits intraperitoneally with increasing amounts of ragweed pollen extract, 5 to 50,000 Noon units (2), on alternate days for a period of about three weeks. The animals are bled on the seventh day following the last injection. The serum is collected from the clot, inactivated at 56° C. for 30 minutes, and an equal volume of pure glycerine added. The sera are tested individually for potency, and those showing a good titer are pooled.[2]

In the titration of an extract a constant amount of pooled antiserum— 0.1 cubic centimeter of a 1 in 9 dilution in 85 per cent saline— is added to each of a series of 11 tubes. Antigen (pollen extract) is next added in decreasing amounts 100, 90, 80, etc., to 10 and 5 Noon units. Two units of guinea pig complement, titrated in the presence of an average dose of antigen, 50 units, are next added and fixation is permitted to continue for 18 hours at an ice-box temperature of 5° to 8° C., after which, sheep cells sensitized with two units of amboceptor are added as an indicator and the rack is incubated at 37.5° C. for 1 hour, when the test is read. As an example of the antigenic unit let us suppose that the tube containing 20 Noon units of extract has complete fixation, while that containing 10 units shows partial hemolysis. The antigenic unit is, therefore, somewhere between 10 and 20 Noon units. A second titration covering this range, i. e., using 20, 18, 16, etc., to 10 units, gives a more accurate result; and the lowest amount of extract with which there is complete fixation is the antigenic unit. With a potent extract and antiserum the test gives clear-cut results which can be duplicated, and is quite delicate, the antigenic unit being often as low as 5 to 10 Noon units.

The test is quite specific, it being possible to distinguish giant and short ragweed pollen extracts from each other as noted in a previous

[2] In a previous communication (3) the writers have presented evidence which seems to indicate that different rabbits when immunized may produce their antibodies against different antigenic fractions of the pollen extract; hence it is felt that the test serum should be pooled from several potent sera.

communication (3). Giant and short ragweed pollen extracts and their anti-sera give cross-fixation, but the extracts are regularly more potent in complement-fixing power when tested with their homologous sera. A number of extracts made from pollen other than ragweed failed to give fixation when tested with anti-ragweed serum.

Standard extract.—It is desirable to have an extract whose complement-fixing properties are high and stable and which might therefore serve as a standard. Many commercial extracts, and several prepared by ourselves in various ways, were tested for antigenic properties and keeping qualities, and one suggested by Bernton was finally selected as a standard, which represents a slight modification of Clock's glycerinated extract. The extract is prepared by extracting the dry pollen granules with a mixture of pure glycerin 2 parts and Coca's fluid 1 part. (Coca's fluid is made by dissolving 5 grams of sodium chloride and 2.7 grams of sodium bicarbonate in 1 liter of distilled water.) The extraction is permitted to continue for 8 days at room temperature.

This extract was found to have maintained its potency without apparent deterioration in complement-fixing power at the end of 144 days at room temperature, and after 12 months at ice-box temperature. The antigenic unit of an unknown extract must be determined in relation to that of the standard extract titrated in the same test.

For the past two seasons Harrison and Bernton have used, in clinical work, extracts prepared as described above, which were standardized by the complement fixation test. Prophylactic treatment was usually begun with one-tenth to one-fifth of an antigenic unit, depending upon the apparent sensitiveness of the patient as judged from the cutaneous test and from the clinical history. Succeeding dosage was determined by the reaction to the previous injection.

The results of standardization by the complement-fixation method with this stable extract have been satisfactory, and the method might be a practicable one for those who use extracts prepared by some method giving a relatively stable antigenic extract and who determine the antigenic strength of the extract soon after its preparation; however, before any method of standardization can be recommended for general use, it must be shown—

First, that the standard unit is really measuring the essential, potent, and valuable portion of the extract; or

Second, that if the method is measuring some non-essential attribute of the extract, it must be shown that this attribute varies directly or in some regular manner with the essential or potent fraction.

The complement-fixing property of ragweed pollen extract seems to fulfill neither of these requirements. For instance, the standard extract which we have described may, by the action of heat, be made to lose entirely its power of combining with complement in the presence of antiserum with which it was originally active; yet this heated extract is still capable of calling forth antibodies in rabbits, which antibodies are specific for the heated extract. By heat, therefore, we have been able so to alter a ragweed extract that it is as distinct from the original, unheated product, as far as we can judge from its complement-fixing properties, as timothy extract is from ragweed extract. Yet, when the heated and unheated extracts are tested on the skin of a highly sensitive person, they are indistinguishable. Likewise, the heated and unheated extracts are both active in producing local and general reactions when given subcutaneously in treatment. Moreover, a guinea pig sensitized with the unheated extract can be shocked with the heated extract, and vice versa

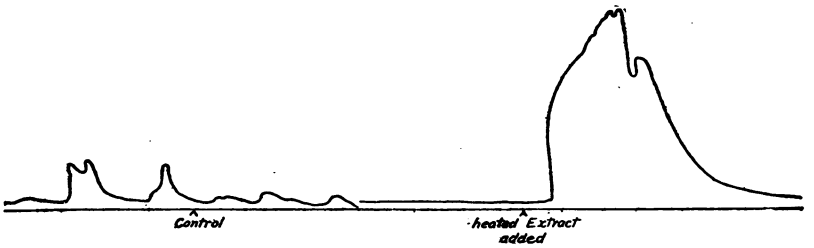

FIG. 1.—(Pig 401-CA) Tracing made by uterus of guinea pig sensitized with unheated giant ragweed pollen extract. Shocked with same extract heated to 100° C. for 30 minutes.

(protocols 1 and 2). The same thing is shown when the sensitized uterus is employed (Figs. 1 and 2). Figure 3 shows the kymograph tracing made by the uterus of a guinea pig sensitized with giant extract unheated and shocked with a commercial extract X, which is devoid of antigenic power in that it has uniformly failed to call forth complement-fixing antibodies in rabbits and gives no fixation with known potent sera. Moreover, an extract which has its complement-fixing receptors completely saturated by an excess of antiserum is still active in causing skin reactions in the sensitive subject.

Finally, in the small parallel series of cases treated prophylactically, one with an actively antigenic unheated extract and the other series with the same extract in which the complement-binding property had been altered by heating to 100° C. for 30 minutes, the clinical results were equally favorable in both, and no difference in the local or general response was noted. Various clinicians, moreover, have reported favorable results in treatment with commercial extracts which have uniformly failed in our hands to call forth the production of complement-binding antibodies in rabbits or to bind complement in the presence of known potent antiserum. We therefore feel that the

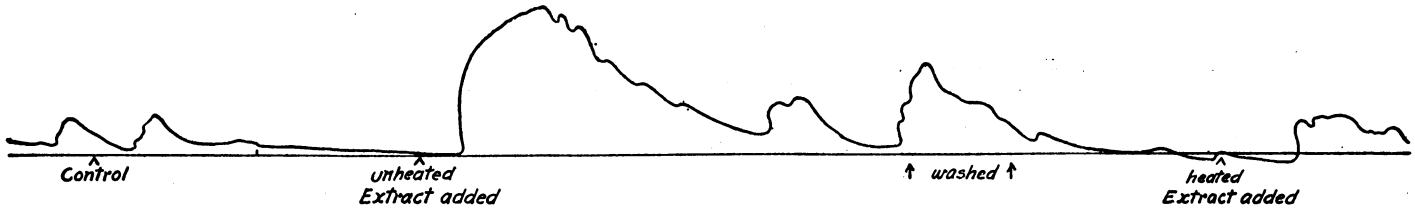

FIG. 2.—(Guinea pig No. 401-CA) Tracing of uterus of pig sensitized with unheated giant ragweed pollen extract. Shocked with same unheated extract. Rendered insensitive to extract heated to 100° C. for 30 minutes.

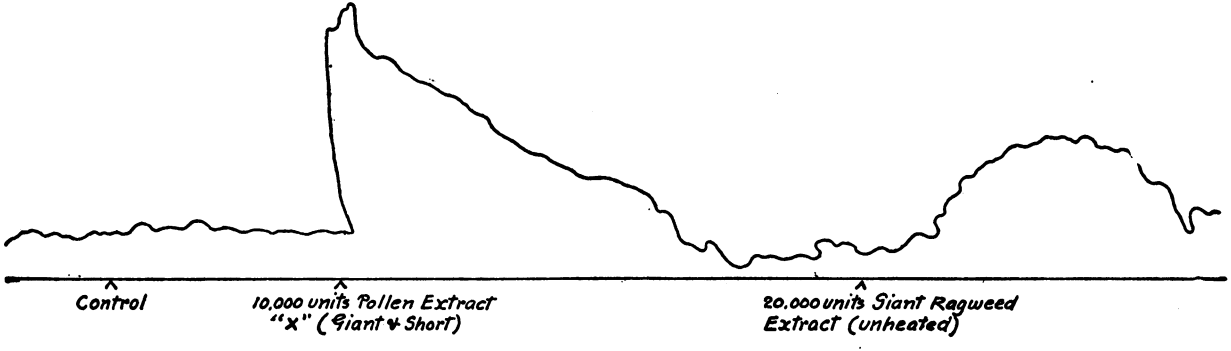

FIG. 3.—(Guinea pig No. 414-A) Tracing of uterus of pig sensitized with unheated giant ragweed pollen extract. Shocked with commercial extract X (an extract devoid of complement-fixing power), and rendered insensitive to the unheated giant extract.

complement-fixing property of an extract is not an essential part of the extract in so far as treatment or desensitization is concerned.[1]

We have not found an active antigenic extract which was not at the same time highly potent by skin test, etc.; but we have found extracts to grow weaker in antigenic power until the function of binding complement was lost in the range of our test, and yet without corresponding loss in its power to produce shock, skin reactions, etc.

It is therefore apparent that the complement-fixing power of an extract can not serve as a measure of potency of extracts to be used in treatment, and it would seem apparent that the field of complement fixation as a means of standardization is limited, being confined to extracts of stable antigenic nature. Even here caution is necessary, and the unit should be determined soon after the extract is prepared; for if from some unrecognized cause the labile complement-fixing property should decrease, but leave the stable shocking property of the extract relatively unaltered, overdosage of the patient might result. The method would seem to be of some value in determining the keeping qualities of extracts, since extracts relatively stable in complement-fixing properties have been found to be markedly stable as regards their shocking or desensitizing power. By the use of a stable extract it becomes possible to prepare enough material for the season's use in one lot. The antigenic unit may be determined soon after the extraction is completed, and the danger of possible errors resulting from the unequal rate of deterioration in complement-fixing and shocking properties through aging may be avoided. The antigenic unit for extracts prepared by the same method seems to be strikingly uniform, provided it be measured before deterioration has had time to take place.

SUMMARY

In summary it may be said that—

1. The complement-fixing property of ragweed pollen extracts is due to a labile fraction, is one of the first properties of the extract to deteriorate, and its rate of deterioration bears no definite relation to the rate of deterioration of the portion of the extract which causes shock.

2. The complement-fixing property of ragweed pollen extract is a nonessential attribute in so far as the value of the extract for treatment is concerned.

3. Complement fixation as a means of standardization of ragweed pollen extracts should be applied only to extracts of stable antigenic nature, which, however, should be tested soon after extraction is completed.

[1] We realize the necessity for caution in applying to the naturally hypersensitive human being, the results obtained by the use of experimental animals.

4. Complement fixation for standardization of ragweed pollen extracts which are not stable in antigenic properties is fraught with danger, because overdosage may result; for some extracts which are relatively unstable as regards their complement-fixing properties may lose the latter, while their ability to cause shock is relatively unaltered.

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(3) Armstrong and Harrison: Pub. Health Rep., 1924, **39**, 2422–2423. (Reprint 925.)

PROTOCOLS

Protocol 1.—A 300-gram guinea pig was sensitized by injecting intraperitoneally 10,000 Noon units of unheated giant ragweed pollen extract on June 2, 6, and 24, 1924, respectively. On January 26 and 28, 1925, the guinea pig received 50,000 and 200,000 Noon units, respectively, of unheated giant extract.

On February 19, 1925, an intravenous injection of 0.5 cubic centimeter of 1:10 extract of giant ragweed heated to 100° C. for 30 minutes was given. Typical anaphylactic symptoms developed in 30 seconds and death resulted in 6 minutes. Autopsy findings were typical.

Protocol 2.—A 250-gram guinea pig received intraperitoneally 230,000 Noon units of giant extract heated to 100° C. for 30 minutes, 10,000 units being given every second day for 23 injections. The last treatment was on August 1, 1923. On December 28 this pig was given 0.5 cubic centimeter of giant unheated 1:10 extract. Typical symptoms of anaphylaxis developed in 30 seconds and death occurred in 4½ minutes. Autopsy findings were typical.

NOTES ON THE CLARIFICATION OF COLORED WATERS

By Lewis B. Miller, Chemist, Hygienic Laboratory, United States Public Health Service

Previous papers from this laboratory dealing with the alum process of water purification have been concerned almost exclusively with the nature of and conditions for "alum floc" formation. Little has been said on the several functions of this floc. With a somewhat better understanding of what may be termed the primary aspects of the subject, we now turn to studies of what the "alum floc" is supposed to do. This paper reports some notes on color removal.

Since the publication of Saville's (1917) work, the "color" taken up by waters originating in swamps or peaty soils has been regarded

as held in a colloidal state. While the nature of these coloring matters is not definitely known, they appear to belong to that group known as humic acids.

In the present work a number of samples of water containing "color" of the humic acid type from several sources have been studied in some detail by three different methods of experimentation; namely, (1) by dialysis, (2) by cataphoresis, and (3) by the study of the effect of various chemical reagents upon the stability of the "color" in solution. These methods of experimentation were designed to determine first of all whether the "color" was present in the condition of true solution or of collodial dispersion. This is important, since the type of reaction exhibited would be quite different in the two cases. The condition in solution being determined, a more detailed study of the effect of chemical reagents upon the "color" stability should yield information concerning the mechanism of "color" removal. Such information has a practical as well as a theoretical value in suggesting possible lines of improvement and in assisting in standardizing the methods for the commercial clarification of colored waters.

Since the results from the study of any one sample were found, in a limited degree, to be typical of the results obtained with the several samples studied, the experimental results obtained with one of them will be described in detail. This will be followed by a discussion of the similarities and differences between the various samples. It will be shown later that severe limitations are imposed upon conclusions drawn from a study of any one "color." However, for purposes of orientation, a more or less reproducible material called "synthetic humus No. 1" has been used. For this I am indebted to Mr. P. R. Dawson, of the United States Department of Agriculture.

This sample was prepared by the condensation of sugar by an acid, followed by dispersion in alkali and dialysis to remove excess electrolytes. The strongly colored sample was diluted with distilled water until it contained about 500 parts per million of color. The pH value of this diluted sample determined colorimetrically was 5.6.

Cataphoresis experiments showed that under all conditions in which the coloring matter was stable—that is, not coagulated—it bore a negative charge. (There is one exception to this statement which will be discussed later.) In these experiments the "color" behaved as a typical negatively charged colloid.

Upon dialysis in a collodion bag the coloring matter failed to pass through the membrane although electrolytes dialyzed through readily. This indicates that the "color" has colloid dimensions.

The following set of experiments will suggest one type of phenomenon which would have to be dealt with were we to imagine this "synthetic humus" to occur in a natural water.

Fifty-c. c. samples of the solution were placed in cylinders; to successive samples were added increasing quantities of standardized reagent. The samples were shaken and allowed to stand for 24 hours. The smallest quantity of reagent which will just produce complete clarification was noted and the pH of the final mixture determined colorimetrically. The results are shown in Table 1. Concentrations are expressed in two ways, namely, in equivalents per liter and in parts per million of the reagent in the final mixture.

TABLE 1.—*Synthetic humus No. 1*

Reagent	Concentration (equivalents)	Parts per million of reagent	pH	Observations
HCl	0.04	1,440	1.55	
$HC_2H_3O_2$	.8	48,000	2.30	No clarification.
H_2SO_4	.04	1,960	1.55	
$AlCl_3$	.0002	8.8	5.20	
Alum $KAl(SO_4)_2 \cdot 12H_2O$	.0002	31.6	5.00	
$FeCl_3$	.0004	21.6	3.9	
$CaCl_2$	.016	880	5.6	
$CuSO_4$	.002	159	5.3	
NaOH				Increased stability.
$Ca(HCO_3)_2$	.005	405	6.8	No clarification.
KCl	.8	59,200	5.7	Partial clarification.

Since the cataphoresis and dialysis experiments suggest that the "color" is present as a negatively charged colloid, let us first observe what relation the coagulation of the "color" bears to the concentrations of the several cations recorded in Table 1. If we compare the coagulating power (the reciprocal of the concentration) of the several cations we find the following:

Ion	Coagulating power
K^+	Less than 1.2
H^+	25.0
Ca^{++}	63.0
Cu^{++}	252.0
Al^{+++}	5,000.0
Fe^{+++}	2,500.0

The coagulating power of the cations evidently increases with valence and qualitatively follows Schulze's rule. As is usually the case, the coagulating power of the hydrogen ion approaches closely to that of the divalent ions. In these experiments the coloring material behaves as a negatively charged colloid of the suspensoid type. That such is the case is further proved by the experimental fact that acetic acid, because of its low dissociation, is unable to produce a sufficient concentration of cation to effect coagulation.

That the coagulation is produced by the positive ion is further indicated by the following experiment: A 0.01 normal $FeCl_3$ solution was prepared and allowed to stand for several weeks. During this time it became opalescent, due to slow hydrolysis of the $FeCl_3$. By this process the concentration of ferric ion is, of course, reduced. The coagulating power of this solution as compared to a freshly prepared ferric chloride solution in which hydrolysis had occurred to a lesser extent was as follows:

Substance	Coagulating power
$FeCl_3$ (after standing)	1,660
$FeCl_3$ (freshly prepared)	2,500

The coagulating effect of the anions is qualitatively additive. For example: If to a series of 50 c. c. samples of the "color" solution are added half the quantity of HCl necessary to cause coagulation, the quantities of $CaCl_2$ and alum necessary to produce coagulation are as follows (compare with Table 1):

TABLE 2

Reagent	Concentration (equivalents)	Parts per million of reagent	pH
$CaCl_2$	0.0001	5.5	1.9
Alum	.00002	3.2	1.8

That the sign of the charge on the "color" was always negative under the conditions of experimentation just described (except when coagulation of the "color" occurred) was determined by cataphoresis experiments.

As with most negatively charged colloids, the addition of hydroxyl ion tends to stabilize the colloid, rendering it much more difficult to effect clarification. This is true of the "humic acids." By addition of sodium hydroxide, for example, to the colored water, a point is soon reached where calcium chloride will no longer effect clarification. Acid and alum both effect clarification in the presence of alkali because of their ability to destroy the alkali by chemical reaction. In both cases, however, addition of alkali increases the quantity of reagent which must be added in order to secure clarification.

In the instance of alum, however, the case is not as simple as was just indicated. With a relatively pure (well dialyzed) "humic-acid" solution, clarification depends upon the coagulating power of the aluminium ion. With small quantities of alkali present, the addition

of alum first destroys the alkali, after which the excess aluminium ion effects coagulation. With increasing quantities of alkali plus alum, however, another factor gradually appears, namely, the positively charged colloidal "alum floc." It is not until alkali plus alum is added in relatively large amounts (far greater than the amounts ever used in water purification) that the coagulating effect becomes clearly due to the colloidal "alum floc." The following experiment indicates this effect: Fifty c. c. samples of the colored waters were taken as before. To each sample was added sodium hydroxide until the solution was 0.002 N (contained 80 parts per million of NaOH). To successive samples was added potassium alum in increasing quantities. The sign of the charge was determined by cataphoresis. The results are given in Table 3.

TABLE 3.—*Humic-acid solution 0.002 N with respect to NaOH, treated with alum*

Experiment No.	Normality of solution with respect to Al^{+++}	pH	Sign of charge on particles	Observations
1	0.1000	4.4	None	Complete clarification.
2	.0600	4.5	do	Do.
3	.0200	4.5	do	Do.
4	.0140	4.5	do	Do.
5	.0100	4.5	do	Do.
6	.0080	4.6	do	Do.
7	.0060	4.6	do	Do.
8	.0040	4.6	do	Do.
9	.0034	4.6	do	Do.
10	.0030	4.6	do	Do.
11	.0028	4.6	do	Do.
12	.0026	4.7	do	Do.
13	.0024	4.8	do	Do.
14	.0022	5.0	do	Do.
15	.0020	6.8	do	Do.
16	.0018	8.4	Negative	No clarification.
20	.0010	9.4	do	Do.
24	.0001	9.8	do	Do.

With alum alone, or with only small concentrations of alkali present, clarification is favored by a low pH. With stronger mixtures of alkali plus alum, however, clarification begins near neutrality and when the quantitative amount of alum necessary to react with NaOH is added. It is at this point rather than at higher alum concentrations that clarification proceeds most rapidly.

The mechanism of the above reaction will perhaps be more clearly seen if for potassium alum is substituted aluminium chloride (be it noted that this essentially consists only in a substitution of the monovalent chloride ion in place of the divalent sulfate ion.) The results are given in Table 4.

TABLE 4.—*Humic acid solution 0.002 N with respect to NaOH treated with aluminium chloride*

Experiment No.	Normality of solution, with respect to Al^{+++}	pH	Sign of charge on particles	Observations
1	0.1000	4.4	None	Complete clarification. Slow reaction.
2	.0600	4.5	do	Do.
3	.0200	4.5	do	Do.
4	.0140	4.5	do	Do.
5	.0100	4.6	Positive	No clarification.
6	.0080	4.6	do	Do.
7	.0060	4.6	do	Do.
8	.0040	4.6	do	Do.
9	.0034	4.6	do	Do.
10	.0030	4.7	do	Do.
11	.0028	4.7	do	Do.
12	.0026	4.7	do	Do.
13	.0024	4.9	do	Do.
14	.0022	5.2	do	Do.
15	.0020	6.9	None	Complete clarification. Very rapid reaction.
16	.0018	8.3	Negative	No clarification.
20	.0010	9.5	do	Do.
24	.0001	10.0	do	Do.

The explanation of the results observed in Table 4 may be as follows: In experiments 1 to 4 coagulation results because of the coagulating power of the trivalent aluminium ion upon the negatively charged humic acid colloid. Aluminium hydroxide would probably not be formed, being soluble in the excess aluminium chloride. That the coloring material is precipitated by the aluminium ion and not by colloidal alumina is further indicated by the slow rate of reaction which is typical of the coagulation of these "colors" by cations. In experiments 5 to 14 the effect of the colloidal alumina makes its appearance. Due probably to the presence of an excess of the positively charged colloidal alumina (as compared to the colloidal humic acid) and to low pH, a condition of stability results in which the combination of the two colloidal substances bears a positive charge. (It may be stated parenthetically that this is the only condition observed under which the colloidal matter in these samples assumed a positive charge. That this same condition did not occur with alum (see Table 3) is due to the coagulating effect of the divalent sulfate anion upon the positively charged colloid which tended to form.) In experiment 15 mutual precipitation of the positively charged and negatively charged colloids occurred at a pH of 6.9. In experiment 16 and following decreasing concentrations of the positively charged colloid, together with increasing pH, produced a stable combination bearing a negative charge.

When experiments such as those described upon synthetic humus No. 1 were applied to several "color" samples of the humic acid type from different sources it was found that the results just described

were fairly typical. Dialysis and cataphoresis experiments suggested that the "color" was present as a negatively charged colloid. Treatment by several chemical reagents indicated the same thing. This is in complete agreement with the conclusions of Saville (1917). Treatment by chemical reagents likewise showed that clarification was produced by the coagulating action of the cations. The relative effect of cations followed Schulze's rule.

In the sample "synthetic humus No. 1" we have what may be described in a relative sense as a "pure material." Most of the electrolytes ordinarily present in natural waters are absent. The excess electrolytes added in the preparation of the sample are almost entirely removed by prolonged dialysis. Consequently the results obtained may be looked upon as the effect of the reagents added upon the "color," unaffected or nearly so by contaminating electrolyte. The more highly purified a sample is (that is, the more completely are contaminating electrolytes removed by dialysis), the more closely will it approach to the more or less typical example cited above in its reaction to chemical reagents. There is, however, some variation between samples from different sources. In Table 5 are given data upon some of the samples studied in this laboratory which will serve to indicate the magnitude of the differences referred to. With the exception of the sample of Cape Fear River water and of soil extract No. 1, all of these are of the "purified" type. In Table 5 are given the pH of the original sample and the degree of color it contains, the lowest concentrations of two reagents which will cause clarification, and the pH at which clarification occurs in each case.

TABLE 5

Description of sample[1]	Color	pH of original sample	Concentration (equivalents) of HCl necessary to produce clarification	pH	Concentration (equivalents) of alum necessary to produce clarification	pH
	Parts per million					
Synthetic humus No. 1	500	5.6	0.04	1.55	0.0002	5.2
Synthetic humus No. 2	500	5.9	.02	1.80	.0004	4.1
Synthetic humus No. 3	500	5.7	.008	2.10	.0002	4.3
Cape Fear River water	100	6.3			.0002	5.4
Tea extract No. 1	500	5.0	.006	2.2	.0028	5.2
Tea extract No. 2	500	6.2	.02	1.8	.0002	5.3
Soil extract No. 1	500	8.2	.01	2.6	.002	6.8
Soil extract No. 2	500	6.8	.008	3.6	.0006	5.4

[1] The three samples of synthetic humus were furnished by Mr. P. R. Dawson, Department of Agriculture, and the sample of Cape Fear River water was furnished by Mr. George D. Norcom, sanitary engineer, Wilmington, N. C. The soil extracts were from soil of glacial origin from Butler County, Iowa, furnished by Mr. B. L. Miller.

The experiments described in this paper suggest a conclusion which, if found by future work to be of wide application to colored waters, will be of considerable significance in the commercial clarifi-

cation of these waters by alum. In the clarification of the colored waters studied it is the strong coagulating power of the trivalent aluminium ion acting upon the negatively charged colloidal "color" which is of importance. It causes the formation of what may be called a "color floc." "Alum floc," which is of so much importance in other aspects of clarification, plays an unimportant rôle. In fact, the formation of "alum floc" by its removal of aluminium ion from solution in the form of an insoluble compound would be distinctly antagonistic to the formation of the "color floc." All conditions, therefore, such as proper hydrogen ion concentration, which would otherwise tend to retain the aluminium in solution in the form of aluminium ion, will tend to promote coagulation of these "colors."

This leads us at once to the fundamental question of the proper range of hydrogen ion concentration for best results. It has been shown (see Clark and Theriault, 1923; Miller, 1923; Baylis, 1923; and Hatfield, 1924) that from the acid side the precipitation of alum first approaches completion near a pH value of 5.4. Above this approximate value precipitation and removal of aluminium ion from solution is practically complete. Below this value aluminium ion as such is retained in solution. It is above this pH value, therefore, that best clarification of turbid water results, because of the clarifying action of "alum floc."

In the literature of the last few years upon this subject abundant evidence exists confirming this conclusion. Similarly it is below the pH value of 5.4, where aluminium ion exists as such, and there clarification of highly colored waters of the type under discussion should occur. Definite information upon this point from commercial sources is almost entirely lacking with the exception of the results of Norcom (1924) on Cape Fear River water. These point to the same conclusion. Information, however, is entirely too meager to consider this point as universally established.

While a low pH value seems to favor formation of the "color floc" by alum, this fact may prove to be one of the difficulties of the method when applied to water purification. In the coagulation of the coloring matter a part of the aluminium ion will probably be removed from solution by adsorption or combination with the color material. Since the pH of the water must be raised subsequent to the coagulation because of its corrosive action at low pH values, it is highly probable that flocculation of the remaining alum will occur at this point. Norcom (private communication) states that he has observed this to occur especially during the winter months. He has avoided the difficulty by connecting his sedimentation basins in series, treating the water with alum at a low pH value in the first basin and increasing the pH in the second basin by addition of alkali.

In the work upon colored waters at this laboratory, color samples of the humic acid type from several sources have been studied. As we have emphasized in the preceding paragraphs, in the treatment of these "colors" by alum it is the aluminium ion which is the important factor in their clarification. However, there may be and most probably are other modifications and types of colored waters in the clarification of which other factors are of greater importance. To such colored waters the principles advanced in this paper will obviously not apply. Where colored waters similar to those here studied are found in nature the phenomena observed in their treatment will approach the phenomena recorded in this study. In such cases the principles laid down in this paper will undoubtedly prove of value.

It will be observed that the differences between the properties of the several samples described in Table 5, while quite definite, are not great. When, however, these samples are made more nearly to simulate natural waters by the introduction of electrolyte "impurities," the variation between the samples are somewhat more pronounced. This is especially true when the "impurities" added are of an acidic, basic, or buffering nature. Similarly when a few of the common electrolyte components of natural waters are added in varying quantities, proportions, and combinations to the same "color" sample, the differences which exist from the standpoint of a filter plant operator would appear to be quite pronounced. Considering the probable differences in the coloring matter itself in different natural waters and the infinity of possible variations among the other components of the waters, it became evident early in this work that no detailed procedure could be advanced for treatment of colored waters in waterworks practice from a laboratory study of them. An investigation with such an object in view must be conducted in the field over a long period of time and under a wide variety of conditions. Therefore, although the results from the samples studied were promising, no attempt was made to carry out a laboratory study upon small samples of natural waters collected from different places. It is believed, however, that the work already accomplished will furnish a scientific foundation upon which a productive field investigation may be based.

Acknowledgments.—I wish to express my appreciation to Mr. P. R. Dawson, Mr. George D. Norcom, and Mr. B. L. Miller for furnishing the samples of coloring matter used in this investigation. I wish also to express my appreciation to Prof. William Mansfield Clark, chief of the division of chemistry, Hygienic Laboratory, for much kindly advice and many favors during the course of this investigation.

SUMMARY

1. Several samples of water containing material of the "humic acid" type have been studied by three different methods.

2. In every case investigated the "color" has proved to be present as negatively charged colloid.

3. The coagulation and removal of the "color" (formation of the "color floc") by electrolytes was shown to be effected by the cation. The relative effect of different cations followed Schulze's rule of valence.

4. With respect to the clarification of colored waters by alum, it was suggested that the clarification was due to aluminium ion and that "alum floc," which is effective in the clarification of turbid waters, had an unimportant rôle in the removal of "colors" of this type. The conditions most favorable for color removal by alum were discussed. Possible limitations in the application of the principle were pointed out.

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DEATHS DURING WEEK ENDED JUNE 27, 1925

Summary of information received by telegraph from industrial insurance companies for week ended June 27, 1925, and corresponding week of 1924. (From the Weekly Health Index, June 30, 1925, issued by the Bureau of the Census, Department of Commerce)

	Week ended June 27, 1925	Corresponding week, 1924
Policies in force	60, 370, 192	56, 466, 115
Number of death claims	11, 123	10, 090
Death claims per 1,000 policies in force, annual rate	9. 6	9. 3

Deaths from all causes in certain large cities of the United States during the week ended June 27, 1925, infant mortality, annual death rate, and comparison with corresponding week of 1924. (From the Weekly Health Index, June 30, 1925, issued by the Bureau of the Census, Department of Commerce)

City	Week ended June 27, 1925		Annual death rate per 1,000 corresponding week, 1924	Deaths under 1 year		Infant mortality rate week ended June 27, 1925 [2]
	Total deaths	Death rate [1]		Week ended June 27, 1925	Corresponding week, 1924	
Total (64 cities)	5,725	10. 8	[3] 11. 5	698	[3] 757	[4] 57
Albany [5]	25	16. 9	16. 3	2	3	44
Atlanta	85			12	15	
Baltimore [5]	167	10. 9	14. 1	25	22	75
Birmingham	78	19. 8	20. 8	12	13	
Boston	159	10. 6	13. 5	29	27	77
Bridgeport	21			1	6	16
Buffalo	140	13. 2	11. 6	9	24	36
Cambridge	21	9. 7	13. 5	4	2	69
Camden	33	13. 4	11. 6	4	6	64
Chicago [5]	504	8. 8	9. 1	66	92	58
Cincinnati	93	11. 8	13. 9	11	10	65
Cleveland	156	8. 7	9. 3	18	24	45
Columbus	65	12. 1	13. 2	8	4	73
Dallas	48	12. 9	12. 8	6	11	
Dayton	33	9. 9	8. 3	4	1	63
Denver	78	14. 5	14. 7	4	6	
Des Moines	32	11. 2	7. 9	4	5	69
Detroit	207			27	30	46
Duluth	23	10. 9	10. 1	0	2	0
Erie	20			7	1	136
Fall River [5]	21	9. 0	13. 4	4	10	58
Flint	17	6. 8	9. 2	5	7	79
Fort Worth	34	11. 6	8. 8	7	4	
Grand Rapids	33	11. 3	5. 6	5	4	79
Houston	54	17. 1	12. 7	7	3	
Indianapolis	72	10. 5	12. 3	6	2	43
Jersey City	55	9. 1	11. 0	10	7	71
Kansas City, Kans	24	10. 1	13. 3	2	2	42
Kansas City, Mo	84	11. 9	10. 0	10	8	
Los Angeles	208			28	32	77
Louisville	73	14. 7	13. 1	2	3	17
Lowell	27	12. 1	13. 1	4	3	70
Lynn	12	6. 0	10. 6	1	3	27
Memphis	77	23. 0	21. 5	19	12	
Milwaukee	90	9. 4	8. 2	7	14	33
Minneapolis	73	8. 9	8. 4	10	6	53
Nashville [5]	59	22. 6	23. 7	5	4	
New Bedford	20	7. 7	9. 8	6	2	100
New Haven	34	9. 9	9. 8	4	3	52
New Orleans	146	18. 4	19. 5	18	13	
New York	1,127	9. 6	11. 3	139	161	56
Bronx Borough	138	8. 0	9. 3	17	14	58
Brooklyn Borough	372	8. 7	10. 1	40	46	41
Manhattan Borough	487	11. 2	13. 5	68	86	71
Queens Borough	90	8. 2	10. 7	12	14	56
Richmond Borough	40	15. 6	11. 6	2	1	36

[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 1924. Cities left blank are not in the registration area for births.
[3] Data for 63 cities.
[4] Data for 60 cities.
[5] Deaths for week ended Friday, June 26, 1925.

Deaths from all causes in certain large cities of the United States during the week ended June 27, 1925, infant mortality, annual death rate, and comparison with corresponding week of 1924. (From the Weekly Health Index, June 30, 1925, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended June 27, 1925		Annual death rate per 1,000 corresponding week, 1924	Deaths under 1 year		Infant mortality rate week ended June 27, 1925
	Total deaths	Death rate		Week ended June 27, 1925	Corresponding week, 1924	
Newark, N. J	77	8.9	10.1	6	13	27
Norfolk	37			6	3	111
Oakland	58	11.9	8.9	3	5	35
Oklahoma City	26			5	4	
Omaha	31	7.6	9.8	3	5	31
Paterson	29	10.7	10.0	7	3	118
Philadelphia	408	10.7	11.3	45	45	57
Pittsburgh	135	11.1	13.3	20	21	66
Portland, Oreg	71	13.1	11.4	8	4	80
Providence	52	11.1	13.7	6	12	48
Richmond	50	14.0	19.3	12	13	143
Rochester	61	9.6	10.7	7	9	56
St. Louis	170	10.8	11.4	10	17	
St. Paul	56	11.9	9.8	5	3	42
San Antonio	66	17.4	13.3	23	18	
San Diego	33	17.1		4		94
San Francisco	147	13.7	10.4	5	7	29
Schenectady	18	9.2	8.3	2	4	56
Seattle	57			2	4	19
Somerville	22	11.2	9.3	2	3	54
Spokane	28	13.4	13.5	2	2	45
Springfield, Mass	28	9.6	10.5	6	7	89
Syracuse	26	9.8	10.5	4	4	50
Tacoma	16	8.0	11.6	1	1	23
Toledo	49	8.9	13.0	5	6	45
Trenton	46	18.2	15.3	4	4	66
Utica	23	11.2		3		64
Washington, D. C	100	10.5	13.4	15	18	84
Waterbury	15			4	5	86
Wilmington, Del	20	8.5	8.7	4	0	91
Worcester	53	13.9	9.9	5	7	58
Yonkers	16	7.5	10.5	0	2	0
Youngstown	39	12.7	7.1	4	1	49

PREVALENCE OF DISEASE

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

UNITED STATES

CURRENT WEEKLY STATE REPORTS

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

Reports for Week Ended July 4, 1925

ALABAMA	Cases
Chicken pox	8
Diphtheria	6
Dysentery	15
Influenza	2
Malaria	83
Measles	2
Mumps	5
Ophthalmia neonatorum	1
Pellagra	26
Pneumonia	11
Poliomyelitis	2
Scarlet fever	16
Smallpox	24
Tuberculosis	41
Typhoid fever	91
Whooping cough	16

ARIZONA	
Chicken pox	2
Measles	4
Scarlet fever	3
Tuberculosis	6
Typhoid fever	2
Whooping cough	8

ARKANSAS	
Cerebrospinal meningitis	1
Diphtheria	1
Influenza	2
Malaria	112
Measles	10
Mumps	4
Paratyphoid fever	3
Pellagra	37
Poliomyelitis	1
Scarlet fever	1
Trachoma	1
Tuberculosis	14
Typhoid fever	42
Whooping cough	8

CALIFORNIA	Cases
Diphtheria	72
Influenza	13
Lethargic encephalitis:	
Berkeley	1
Los Angeles County	2
San Francisco	2
Measles	34
Poliomyelitis:	
Berkeley	3
Los Angeles	4
Los Angeles County	3
Sacramento	5
San Francisco	1
San Diego	2
Stanislaus County	1
Scarlet fever	59
Smallpox:	
Los Angeles	15
Oakland	16
Scattering	27
Typhoid fever	14

COLORADO (Exclusive of Denver)	
Botulism	5
Chicken pox	5
Diphtheria	8
Influenza	1
Measles	5
Mumps	13
Pneumonia	2
Scarlet fever	9
Tuberculosis	92
Typhoid fever	9
Whooping cough	15

CONNECTICUT	
Chicken pox	16
Conjunctivitis (infectious)	1
Diphtheria	13
German measles	7

CONNECTICUT—continued	Cases
Influenza	4
Lethargic encephalitis	1
Malaria	4
Measles	141
Mumps	6
Pneumonia (broncho)	7
Pneumonia (lobar)	4
Scarlet fever	18
Tuberculosis (all forms)	21
Typhoid fever	1
Whooping cough	81

DELAWARE

Measles	9
Mumps	2
Smallpox	1
Tuberculosis	2

FLORIDA

Cerebrospinal meningitis	1
Diphtheria	9
Malaria	9
Measles	1
Mumps	6
Pneumonia	1
Smallpox	4
Tuberculosis	9
Typhoid fever	12

GEORGIA

Cerebrospinal meningitis	1
Chicken pox	6
Conjunctivitis (infectious)	2
Dengue	1
Diphtheria	5
Dysentery	41
Hookworm disease	8
Influenza	7
Malaria	82
Measles	1
Mumps	16
Paratyphoid fever	2
Pellagra	10
Pneumonia	18
Poliomyelitis	2
Septic sore throat	6
Tuberculosis	17
Typhoid fever	118
Whooping cough	31

ILLINOIS

Cerebrospinal meningitis:	
Cook County	1
Will County	1
Winnebago County	1
Diphtheria:	
Cook County	44
Scattering	26
Influenza	34
Measles	360
Pneumonia	183
Poliomyelitis:	
Bureau County	1
Macoupin County	2
Scarlet fever:	
Cook County	73
Scattering	40

[1] Week ended Friday.

ILLINOIS—continued	Cases
Smallpox:	
McLean County	11
Scattering	7
Tuberculosis	314
Typhoid fever	38
Whooping cough	231

INDIANA

Chicken pox	9
Diphtheria	11
Measles	41
Mumps	4
Pneumonia	1
Scarlet fever	40
Smallpox	43
Tuberculosis	62
Typhoid fever	13
Whooping cough	51

IOWA

Diphtheria	6
Scarlet fever	2
Smallpox	13

KANSAS

Cerebrospinal meningitis	1
Chicken pox	13
Diphtheria	5
Dysentery (bacillary)	5
Influenza	1
Measles	3
Mumps	36
Pneumonia	10
Poliomyelitis	2
Scarlet fever	16
Smallpox	4
Tetanus	1
Tuberculosis	32
Typhoid fever	12
Whooping cough	100

LOUISIANA

Cerebrospinal meningitis	1
Diphtheria	4
Lethargic encephalitis	2
Malaria	12
Pneumonia	11
Poliomyelitis	2
Scarlet fever	4
Smallpox	8
Tuberculosis	21
Typhoid fever	63

MAINE

Cerebrospinal meningitis	1
Chicken pox	16
Diphtheria	9
Measles	5
Mumps	79
Pneumonia	6
Poliomyelitis	1
Scarlet fever	8
Tuberculosis	9
Vincent's angina	3

MARYLAND[1]

Chicken pox	31
Diarrhea	7

MARYLAND—continued	Cases
Diphtheria	9
Dysentery	2
German measles	3
Influenza	1
Malaria	1
Measles	84
Mumps	31
Ophthalmia neonatorum	1
Paratyphoid fever	1
Pneumonia (broncho)	15
Pneumonia (lobar)	1
Scarlet fever	23
Tuberculosis	85
Typhoid fever	10
Whooping cough	110

MASSACHUSETTS	
Cerebrospinal meningitis	3
Chicken pox	69
Diphtheria	79
German measles	83
Influenza	4
Lethargic encephalitis	1
Measles	322
Mumps	20
Ophthalmia neonatorum	15
Pellagra	1
Pneumonia (lobar)	31
Poliomyelitis	1
Scarlet fever	82
Septic sore throat	5
Tetanus	2
Trachoma	2
Tuberculosis (pulmonary)	97
Tuberculosis (other forms)	18
Typhoid fever	6
Whooping cough	113

MICHIGAN	
Diphtheria	60
Measles	211
Pneumonia	53
Scarlet fever	140
Smallpox	17
Tuberculosis	357
Typhoid fever	6
Whooping cough	132

MINNESOTA	
Chicken pox	88
Diphtheria	49
Influenza	1
Measles	7
Pneumonia	2
Poliomyelitis	9
Scarlet fever	93
Smallpox	2
Tuberculosis	77
Typhoid fever	1
Whooping cough	31

MISSISSIPPI	
Diphtheria	1
Smallpox	2
Typhoid fever	31

MISSOURI (Exclusive of Kansas City)	Cases
Chicken pox	17
Diphtheria	41
Influenza	1
Malaria	3
Measles	17
Mumps	27
Pneumonia	4
Scarlet fever	39
Smallpox	17
Trachoma	2
Tuberculosis	50
Typhoid fever	19
Whooping cough	47

MONTANA	
Chicken pox	6
Diphtheria	6
Lethargic encephalitis	1
Measles	2
Mumps	3
Pneumonia	3
Scarlet fever	10
Tuberculosis	6
Typhoid fever	2
Whooping cough	8

NEW JERSEY	
Chicken pox	103
Diphtheria	56
Influenza	1
Malaria	1
Measles	214
Paratyphoid fever	1
Pneumonia	55
Poliomyelitis	5
Scarlet fever	87
Smallpox	6
Trachoma	1
Typhoid fever	5
Whooping cough	117

NEW MEXICO	
Chicken pox	5
Diphtheria	9
Measles	6
Mumps	2
Pneumonia	2
Rabies in animals	13
Scarlet fever	3
Tuberculosis	22
Typhoid fever	5
Whooping cough	7

NEW YORK (Exclusive of New York City)	
Cerebrospinal meningitis	1
Diphtheria	35
Influenza	1
Lethargic encephalitis	5
Measles	307
Paratyphoid fever	1
Pneumonia	91
Poliomyelitis	4
Scarlet fever	65
Septic sore throat	17
Typhoid fever	20
Whooping cough	198

NORTH CAROLINA	Cases
Chicken pox	18
Diphtheria	13
German measles	3
Measles	2
Poliomyelitis	1
Scarlet fever	4
Smallpox	17
Typhoid fever	51
Whooping cough	119

OKLAHOMA (Exclusive of Oklahoma City and Tulsa)	
Cerebrospinal meningitis—Garfield	1
Chicken pox	4
Diphtheria	3
Influenza	33
Malaria	66
Mumps	6
Pellagra	13
Pneumonia	4
Poliomyelitis:	
Canadian	1
Cleveland	1
Garvin	1
Scarlet fever	6
Smallpox:	
Delaware	15
Scattering	5
Typhoid fever:	
Lincoln	9
McCurtain	19
Tillman	10
Washington	32
Scattering	65
Whooping cough	42

OREGON	
Cerebrospinal meningitis	2
Chicken pox	9
Diphtheria	11
Influenza	2
Measles	8
Mumps	1
Pneumonia	[1] 7
Scarlet fever	3
Smallpox	7
Tuberculosis	[1] 4
Typhoid fever	2
Whooping cough	6

SOUTH DAKOTA	
Chicken pox	1
Diphtheria	5
Scarlet fever	12
Smallpox	1
Tuberculosis	1
Typhoid fever	3
Whooping cough	5

TEXAS	
Cerebrospinal meningitis	1
Chicken pox	8
Dengue	1
Diphtheria	25
Dysentery	7
Influenza	6
Measles	10
Mumps	13
Ophthalmia neonatorum	1
Paratyphoid fever	11
Pellagra	10
Poliomyelitis	4
Scarlet fever	14
Smallpox	7
Trachoma	2
Tuberculosis	32
Typhoid fever	30
Whooping cough	30

VERMONT	
Chicken pox	2
Measles	44
Mumps	18
Scarlet fever	4
Typhoid fever	1
Whooping cough	2

VIRGINIA	
Poliomyelitis—Fairfax County	1
Smallpox	2

WASHINGTON	
Chicken pox	47
Diphtheria	25
German measles	4
Measles	17
Mumps	18
Scarlet fever	22
Smallpox	30
Tuberculosis	7
Typhoid fever	5
Whooping cough	78

WEST VIRGINIA	
Diphtheria	1
Scarlet fever	4
Smallpox	9
Typhoid fever	8

WISCONSIN	
Milwaukee:	
Chicken pox	19
Diphtheria	10
German measles	12
Measles	90
Mumps	11
Pneumonia	10
Scarlet fever	7
Smallpox	3
Tuberculosis	12
Whooping cough	25
Scattering:	
Cerebrospinal meningitis	1
Chicken pox	63
Diphtheria	30
German measles	17
Influenza	19
Lethargic encephalitis	2
Measles	96
Mumps	33

[1] Deaths.

WISCONSIN—continued	Cases
Scattering—Continued	
Pneumonia	5
Poliomyelitis	1
Scarlet fever	58
Smallpox	11
Tuberculosis	53
Whooping cough	49

WYOMING	Cases
Chicken pox	3
Impetigo contagiosa	2
Mumps	3
Pneumonia	1
Scarlet fever	8
Tuberculosis	1
Whooping cough	1

Report for Week Ended June 20, 1925

DISTRICT OF COLUMBIA

	Cases		Cases
Chicken pox	4	Scarlet fever	10
Diphtheria	9	Tuberculosis	27
Measles	25	Typhoid fever	1
Pneumonia	2	Whooping cough	8

Reports for Week Ended June 27, 1925

DISTRICT OF COLUMBIA

	Cases		Cases
Chicken pox	2	Scarlet fever	9
Diphtheria	5	Smallpox	1
Lethargic encephalitis	1	Tuberculosis	25
Measles	28	Typhoid fever	4
Pneumonia	14	Whooping cough	13

NEBRASKA

Chicken pox	6	Smallpox	5
Diphtheria	9	Tetanus	1
Measles	1	Typhoid fever	1
Mumps	8	Whooping cough	14
Scarlet fever	4		

NORTH DAKOTA

Chicken pox	6	Pneumonia	3
Diphtheria	1	Poliomyelitis	1
German measles	1	Scarlet fever	16
Measles	2	Whooping cough	19
Mumps	6		

SUMMARY OF MONTHLY REPORTS FROM STATES

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

State	Cerebrospinal meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
April, 1925										
New Mexico	1	9	172	0	74	0	1	32	2	7
May, 1925										
Idaho	0	5	----	----	----	0	0	12	----	4
Montana	1	21	21	----	66	----	----	171	17	13
Mississippi	1	47	1,130	5,975	547	1,431	4	11	102	319
New Mexico	0	12	2	2	42	0	0	28	6	3
Virginia	7	82	1,083	87	1,248	20	4	72	45	148
Washington	9	87	----	----	25	0	1	121	192	8

POLIOMYELITIS IN SOUTH CAROLINA

Under date of June 30, 1925, the State Health Officer of South Carolina reported that 48 cases of poliomyelitis had been notified in that State this summer. The cases occurred in the following counties:

Aiken	1	Richland	10
Chester	1	Spartanburg	6
Chesterfield	4	Sumter	3
Darlington	1	Union	11
Greenville	1	Williamsburg	2
Kershaw	1	York	5
Lexington	2		

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

Diphtheria.—For the week ended June 20, 1925, 34 States reported 946 cases of diphtheria. For the week ended June 21, 1924, the same States reported 1,403 cases of diphtheria. One hundred and one cities, located in all parts of the country, and having an aggregate population of more than 28,260,000, reported 647 cases of diphtheria for the week ended June 20, 1925. Last year, for the corresponding week, they reported 857 cases. The estimated expectancy for these cities was 823 cases. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Measles.—Thirty-one States reported 4,193 cases of measles for the week ended June 20, 1925, and 5,807 cases of this disease for the week ended June 21, 1924. One hundred and one cities reported 2,403 cases of measles for the week this year, and 2,275 cases last year.

Scarlet fever.—Scarlet fever was reported for the week as follows: 34 States—this year, 1,584 cases; last year, 1,972 cases; 101 cities—this year, 909; last year, 954; estimated expectancy, 624 cases.

Smallpox.—For the week ended June 20, 1925, 34 States reported 591 cases of smallpox. Last year, for the corresponding week, they reported 885 cases. One hundred and one cities reported smallpox for the week as follows: 1925, 185 cases; 1924, 317 cases; estimated expectancy, 87 cases. Five deaths from smallpox were reported by these cities, 4 deaths in Milwaukee, Wis., where the diseases is now decreasing, and one death in Superior, Wis.

Typhoid fever.—Five hundred and thirty cases of typhoid fever were reported for the week ended June 20, 1925, by 33 States. For the corresponding week of 1924 the same States reported 370 cases. One hundred and one cities reported 121 cases of typhoid fever for the week this year, and 128 cases for the corresponding week last year. The estimated expectancy for these cities was 91 cases.

Influenza and pneumonia.—Deaths from influenza and pneumonia (combined) were reported for the week by 101 cities as follows: 1925, 465 deaths; 1924, 537 deaths.

City reports for week ended June 20, 1925

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

If reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1915 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviations from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Population July 1, 1923, estimated	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
			Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND									
Maine:									
Portland	73,129	2	2	0	0	0	0	5	1
New Hampshire:									
Concord	22,408	0	0	0	0	0	4	0	0
Manchester	81,383	0	1	0	0	0	0	0	3
Vermont:									
Barre	[1] 10,008	0	0	0	0	0	1	0	0
Burlington	23,613	0	0	0	0	0	0	3	0
Massachusetts:									
Boston	770,400	----	52	20	2	0	136	----	11
Fall River	120,912	0	3	2	0	0	8	0	0
Springfield	144,227	0	2	3	0	0	0	0	1
Worcester	191,927	6	4	3	0	0	25	0	1
Rhode Island:									
Pawtucket	68,799	0	1	0	0	1	0	0	1
Providence	242,378	0	8	4	0	0	4	0	4
Connecticut:									
Bridgeport	[1] 143,555	5	4	2	0	0	6	0	2
Hartford	[1] 138,036	3	5	3	0	0	5	2	2
New Haven	172,967	1	3	2	0	0	66	1	2
MIDDLE ATLANTIC									
New York:									
Buffalo	536,718	2	12	6	0	0	137	3	15
New York	5,927,625	297	240	207	3	3	231	41	105
Rochester	317,867	6	6	5	0	0	110	4	0
Syracuse	184,511	15	6	4	0	0	6	7	3
New Jersey:									
Camden	124,157	8	4	5	0	0	29	0	2
Newark	438,699	62	13	10	0	0	83	4	8
Trenton	127,390	2	4	2	0	0	1	0	1
Pennsylvania:									
Philadelphia	1,922,788	93	55	82	----	1	245	23	30
Pittsburgh	613,442	27	18	6	----	3	193	5	18
Reading	110,917	4	2	2	0	0	41	5	2
Scranton	140,636	1	3	3	0	0	1	0	3
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	406,312	----	7	----	----	----	----	----	----
Cleveland	888,519	111	21	15	----	0	29	5	11
Columbus	261,082	6	2	2	0	0	3	0	2
Indiana:									
Fort Wayne	93,573	4	2	0	0	0	8	0	1
Indianapolis	342,718	28	5	2	0	0	27	2	5
South Bend	76,709	1	1	1	0	0	1	0	0
Terre Haute	68,939	3	1	1	----	0	12	0	2

[1] Population Jan. 1, 1920.

City reports for week ended June 20, 1925—Continued

Division, State, and city	Population July 1, 1923, estimated	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
			Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued									
Illinois:									
Chicago	2,886,121	86	89	61	5	3	412	14	49
Cicero	55,968	5	1	2	0	0	13	0	0
Springfield	61,833	5	0	1	0	0	18	6	0
Michigan:									
Detroit	995,668	79	43	20	7	2	25	11	28
Flint	117,968	4	3	0	0	0	33	1	0
Grand Rapids	145,947	5	2	1	-------	1	70	1	1
Wisconsin:									
Madison	42,519	3	0	0	0	0	3	5	0
Milwaukee	484,595	38	11	11	2	2	142	47	6
Racine	64,393	3	1	3	1	1	1	6	0
Superior	[1] 39,671	-------	0	2	0	0	0	-------	0
WEST NORTH CENTRAL									
Minnesota:									
Duluth	106,289	7	1	1	-------	0	2	0	0
Minneapolis	409,125	77	11	18	-------	2	16	1	1
St. Paul	241,891	23	13	8	0	0	8	10	3
Iowa:									
Davenport	61,262	0	1	0	0	-------	0	0	-------
Des Moines	140,923	0	1	4	0	-------	1	0	-------
Sioux City	79,662	8	1	2	0	-------	1	1	1
Waterloo	39,667	3	1	0	0	-------	1	2	-------
Missouri:									
Kansas City	351,819	3	5	1	0	0	2	16	4
St. Joseph	78,232	0	1	0	0	0	0	1	3
St. Louis	803,853	16	31	29	1	1	11	9	-------
North Dakota:									
Fargo	24,841	0	1	0	0	0	0	4	0
Grand Forks	14,547	1	0	1	0	-------	0	0	-------
South Dakota:									
Aberdeen	15,829	1	1	0	0	-------	0	0	-------
Sioux Falls	29,206	0	0	0	0	0	0	0	0
Nebraska:									
Lincoln	58,761	2	1	0	-------	0	0	0	0
Omaha	204,382	4	2	3	0	0	1	2	1
Kansas:									
Topeka	52,555	9	1	0	0	0	0	24	1
Wichita	79,261	2	1	1	0	0	0	0	1
SOUTH ATLANTIC									
Delaware:									
Wilmington	117,728	1	1	2	0	0	11	0	1
Maryland:									
Baltimore	773,580	66	14	6	1	1	52	48	22
Cumberland	32,361	2	0	0	0	0	0	1	0
Frederick	11,301	0	0	0	0	0	0	0	0
District of Columbia:									
Washington	[1] 437,571	4	7	9	0	0	25	-------	2
Virginia:									
Lynchburg	30,277	2	0	1	0	0	1	2	0
Norfolk	159,089	1	0	0	0	0	0	8	0
Richmond	181,044	8	1	1	0	0	24	4	0
Roanoke	55,502	0	0	1	0	1	12	0	0
West Virginia:									
Charleston	45,597	1	1	0	0	-------	25	0	0
Huntington	57,918	0	0	0	0	-------	0	0	-------
Wheeling	[1] 56,208	2	1	0	-------	0	17	1	3
North Carolina:									
Raleigh	29,171	5	0	0	0	0	3	0	0
Wilmington	35,719	2	0	0	0	0	0	0	1
Winston-Salem	56,230	3	0	0	0	0	2	2	1
South Carolina:									
Charleston	71,245	0	1	0	0	0	0	0	2
Columbia	39,688	1	1	0	0	0	0	2	0
Greenville	25,789	0	0	0	0	0	0	0	0

[1] Population Jan. 1, 1920.

City reports for week ended June 20, 1925—Continued

Division, State and city	Population July 1, 1923, estimated	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
			Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
SOUTH ATLANTIC—contd.									
Georgia:									
Atlanta	222,963	5	1	0	10	0	0	3	3
Brunswick	15,937	0	0	0	0	0	0	1	0
Savannah	89,448	1	0	2	1	1	0	0	2
Florida:									
St. Petersburg	24,403	----	0	----	----	----	----	----	----
Tampa	56,050	0	0	3	0	0	0	1	2
EAST SOUTH CENTRAL									
Kentucky:									
Covington	57,877	0	1	1	----	0	0	0	2
Louisville	257,671	0	3	0	0	0	4	0	2
Tennessee:									
Memphis	170,067	8	1	0	0	2	2	0	9
Nashville	121,128	0	0	0	----	3	12	0	2
Alabama:									
Birmingham	195,901	4	1	0	0	1	1	1	3
Mobile	63,858	0	0	0	0	0	0	0	0
Montgomery	45,383	1	0	0	0	0	1	1	0
WEST SOUTH CENTRAL									
Arkansas:									
Fort Smith	30,635	0	1	1	0	----	0	4	----
Little Rock	70,916	2	0	1	0	0	0	0	1
Louisiana:									
New Orleans	404,575	0	5	5	2	2	2	0	9
Shreveport	54,590	0	----	0	0	0	0	1	0
Oklahoma:									
Oklahoma	101,150	0	1	0	0	0	0	0	1
Tulsa	102,018	0	1	0	0	0	0	0	0
Texas:									
Dallas	177,274	5	2	3	0	0	0	0	1
Galveston	46,877	0	0	0	0	0	0	0	0
Houston	154,970	----	2	2	0	0	0	----	3
San Antonio	184,727	0	1	4	----	0	2	1	4
MOUNTAIN									
Montana:									
Billings	16,927	0	0	0	0	0	5	15	0
Great Falls	27,787	0	1	1	0	0	0	1	0
Helena	[1] 12,037	0	0	0	0	0	0	0	0
Missoula	[1] 12,668	0	0	0	1	0	0	0	1
Idaho:									
Boise	22,806	0	0	0	0	0	0	0	0
Colorado:									
Denver	272,031	9	11	11	0	0	2	15	12
Pueblo	43,519	2	2	2	0	0	1	0	1
New Mexico:									
Albuquerque	16,648	0	1	0	0	0	0	0	1
Arizona:									
Phoenix	33,899	0	----	1	0	0	0	0	1
Utah:									
Salt Lake City	126,241	48	2	6	0	0	0	26	1
Nevada:									
Reno	12,429	0	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Seattle	[1] 315,685	24	5	2	0	----	3	25	----
Spokane	104,573	9	2	4	0	----	0	0	----
Tacoma	101,731	7	1	4	0	0	0	3	2
California:									
Los Angeles	666,853	36	37	13	6	1	21	18	11
Sacramento	69,950	3	1	5	----	0	1	1	0
San Francisco	539,038	11	21	11	2	0	4	39	3

[1] Population Jan. 1, 1920.

City reports for week ended June 20, 1925—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	1	2	0	0	0	0	0	0	0	0	19
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	10
Manchester	0	2	0	0	0	1	0	0	0	0	18
Vermont:											
Barre	1	0	0	0	0	0	0	0	0	1	0
Burlington	0	0	0	0	0	0	0	0	0	0	4
Massachusetts:											
Boston	33	25	0	0	0	19	2	4	0	----	179
Fall River	2	4	0	0	0	2	2	0	0	0	21
Springfield	4	6	0	0	0	4	0	1	0	18	25
Worcester	4	9	0	0	0	5	0	1	0	3	39
Rhode Island:											
Pawtucket	1	1	0	0	0	1	0	0	0	0	13
Providence	6	1	0	0	0	3	1	1	1	1	64
Connecticut:											
Bridgeport	4	8	0	0	0	3	1	0	0	0	24
Hartford	3	0	0	0	0	5	0	0	0	4	37
New Haven	2	1	0	0	0	1	1	1	0	35	33
MIDDLE ATLANTIC											
New York:											
Buffalo	16	21	1	0	0	9	0	0	1	21	142
New York	127	113	0	0	0	[1] 86	14	23	3	110	1,237
Rochester	7	13	0	0	0	1	0	1	0	14	49
Syracuse	6	1	0	0	0	1	0	1	0	0	41
New Jersey:											
Camden	1	2	0	0	0	3	1	0	0	4	30
Newark	14	11	0	0	0	12	1	0	0	38	93
Trenton	1	3	0	1	0	0	0	1	0	3	42
Pennsylvania:											
Philadelphia	50	77	0	0	0	41	5	1	1	70	435
Pittsburg	16	39	1	0	0	7	2	1	0	13	148
Reading	1	6	0	0	0	0	0	0	0	1	28
Scranton	1	0	0	0	0	2	0	0	0	6	----
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	6	----	2	----	----	----	1	----	----	----	----
Cleveland	15	15	1	3	0	20	2	0	0	60	153
Columbus	4	4	1	14	0	6	1	2	0	5	59
Indiana:											
Fort Wayne	1	2	1	1	0	0	0	2	0	0	20
Indianapolis	8	4	5	8	0	9	1	0	1	34	96
South Bend	2	6	0	1	0	0	1	0	0	1	10
Terre Haute	1	2	0	2	0	1	0	0	0	0	21
Illinois:											
Chicago	54	122	2	5	0	38	3	0	1	87	563
Cicero	0	2	0	0	0	1	0	0	0	1	12
Springfield	1	3	1	0	0	3	1	0	0	0	21
Michigan:											
Detroit	47	84	9	0	0	21	2	3	0	80	265
Flint	3	7	1	7	0	0	0	0	0	10	14
Grand Rapids	3	18	1	0	0	0	0	0	0	0	36
Wisconsin:											
Madison	1	2	1	0	0	0	0	0	0	9	7
Milwaukee	20	13	2	12	4	8	0	1	0	42	110
Racine	2	0	1	4	0	0	0	0	0	1	8
Superior	1	5	2	0	1	0	0	0	0	----	10
WEST NORTH CENTRAL											
Minnesota:											
Duluth	2	10	3	0	0	0	0	0	0	1	14
Minneapolis	18	57	9	0	0	4	1	0	0	1	96
St. Paul	11	21	3	2	0	5	0	0	0	30	51

[1] Pulmonary tuberculosis only.

City reports for week ended June 20, 1925—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST NORTH CENTRAL—continued											
Iowa:											
Davenport	1	0	3	0	----	----	0	0	----	1	----
Des Moines	4	1	4	0	----	----	0	0	----	0	----
Sioux City	2	0	1	2	----	----	0	0	----	----	1
Waterloo	3	0	0	1	----	----	0	0	----	5	----
Missouri:											
Kansas City	4	11	4	1	0	7	1	1	0	22	79
St. Joseph	1	0	0	0	0	0	0	0	0	3	22
St. Louis	17	56	1	5	0	10	2	3	1	12	197
North Dakota:											
Fargo	0	0	0	0	0	0	0	0	0	8	5
Grand Forks	0	1	1	0	----	----	0	0	----	0	----
South Dakota:											
Aberdeen	1	0	0	0	----	----	0	0	----	6	----
Sioux Falls	0	0	1	0	0	0	0	0	0	0	8
Nebraska:											
Lincoln	1	1	0	0	0	0	0	0	0	9	13
Omaha	3	1	2	18	0	4	1	0	0	2	39
Kansas:											
Topeka	1	1	1	0	0	0	0	0	0	8	8
Wichita	1	0	3	0	0	0	0	2	0	16	30
SOUTH ATLANTIC											
Delaware:											
Wilmington	2	2	0	1	0	2	0	0	0	0	2
Maryland:											
Baltimore	16	7	0	0	0	14	3	3	0	93	192
Cumberland	1	0	0	0	0	1	0	0	0	0	10
Frederick	0	0	0	0	0	0	0	0	0	0	1
District of Columbia:											
Washington	9	10	0	0	0	8	3	1	0	8	141
Virginia:											
Lynchburg	0	1	0	0	0	1	0	0	0	6	7
Norfolk	1	1	0	0	0	2	0	0	0	4	----
Richmond	1	3	0	0	0	3	1	1	0	4	47
Roanoke	1	0	0	0	0	1	1	2	0	0	26
West Virginia:											
Charleston	1	0	0	0	0	0	1	1	1	0	17
Huntington	0	2	0	4	----	----	0	0	----	0	----
Wheeling	1	2	0	0	0	0	0	0	0	1	16
North Carolina:											
Raleigh	0	2	0	2	0	0	0	0	0	4	13
Wilmington	0	0	0	0	0	0	0	0	0	9	19
Winston-Salem	1	0	1	9	0	2	1	1	0	26	27
South Carolina:											
Charleston	0	0	0	0	0	3	1	0	1	0	29
Columbia	0	0	0	0	0	0	1	4	0	2	----
Greenville	0	0	0	0	0	2	0	1	0	7	5
Georgia:											
Atlanta	3	1	7	3	0	3	2	8	1	18	58
Brunswick	0	0	0	0	0	1	0	0	0	0	4
Savannah	0	1	1	0	0	2	2	2	0	1	22
Florida:											
St. Petersburg	0	----	0	----	----	----	0	----	----	----	----
Tampa	0	0	0	0	0	1	0	0	0	0	18
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	0	0	1	0	1	0	0	0	0	7
Louisville	2	10	1	0	0	5	2	0	0	12	76
Tennessee:											
Memphis	2	1	1	2	0	6	1	11	0	7	82
Nashville	1	3	0	8	0	4	3	1	0	0	35
Alabama											
Birmingham	1	13	1	24	0	3	4	0	0	6	53
Mobile	0	0	1	0	0	2	0	1	0	1	21
Montgomery	0	1	0	0	0	0	0	1	0	0	7

City reports for week ended June 20, 1925—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	0	0	0	-------	-------	0	2	-------	4	--------
Little Rock	0	0	0	0	0	0	2	13	0	0	--------
Louisiana:											
New Orleans	1	6	2	0	0	16	4	6	1	23	156
Shreveport	-------	0	-------	0	0	0	1	1	1	0	24
Oklahoma:											
Oklahoma	1	1	5	0	0	2	0	6	1	0	14
Tulsa	0	1	2	0	0	0	0	1	0	0	--------
Texas:											
Dallas	1	2	1	2	0	5	1	3	2	25	68
Galveston	0	0	0	0	0	0	1	0	0	0	13
Houston	0	0	1	2	0	4	1	1	0	-------	59
San Antonio	0	0	0	0	0	3	0	2	0	0	77
MOUNTAIN											
Montana:											
Billings	0	2	0	0	0	0	0	0	0	1	5
Great Falls	1	7	1	2	0	0	1	0	0	0	8
Helena	0	0	0	0	0	1	0	0	0	0	9
Missoula	0	1	0	0	0	0	1	0	0	1	7
Idaho:											
Boise	1	0	0	0	0	0	0	0	0	0	7
Colorado:											
Denver	8	3	0	0	0	7	1	0	0	16	75
Pueblo	1	0	0	0	0	1	0	0	0	10	6
New Mexico:											
Albuquerque	1	0	0	0	0	2	0	0	0	0	6
Arizona:											
Phoenix	-------	2	-------	0	0	13	-------	1	0	1	28
Utah:											
Salt Lake City	2	2	1	0	0	0	1	4	0	12	26
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	1
PACIFIC											
Washington:											
Seattle	7	5	3	5	-------	-------	1	0	-------	36	--------
Spokane	4	1	3	4	-------	-------	0	1	-------	10	--------
Tacoma	2	1	2	7	0	1	0	0	0	11	24
California:											
Los Angeles	11	19	1	34	0	19	3	1	0	50	210
Sacramento	1	0	0	1	0	5	0	0	0	3	29
San Francisco	12	14	0	2	0	14	1	0	0	25	121

City reports for week ended June 20, 1925—Continued

Division, State, and city	Cerebrospinal meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Rhode Island:									
Pawtucket	0	1	0	0	0	0	0	0	0
Providence	0	0	0	0	0	0	0	1	0
MIDDLE ATLANTIC									
New York:									
Buffalo	0	0	1	0	0	0	0	0	0
New York	2	2	2	1	0	0	1	1	0
Syracuse	0	0	0	0	0	0	0	1	0
New Jersey:									
Newark	0	0	0	0	0	0	0	1	0
EAST NORTH CENTRAL									
Ohio:									
Cleveland	0	0	0	0	0	0	0	1	0
Columbus	0	0	0	1	0	0	0	0	0
Illinois:									
Chicago	2	1	1	0	0	0	1	1	0
Wisconsin:									
Milwaukee	0	0	1	0	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	0	1	0	0	0	0	0	1	0
Virginia:									
Richmond	0	0	0	0	1	0	0	0	0
South Carolina:									
Charleston	0	0	0	0	0	3	0	0	0
Columbia	1	0	0	0	0	0	0	0	0
Georgia:									
Savannah	0	0	0	0	0	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	0	0	0	0	1	1	0	0	0
Alabama:									
Birmingham	0	0	0	0	0	0	0	3	0
Mobile	0	0	0	0	2	1	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Fort Smith	0	0	0	0	3	0	0	0	0
Little Rock	0	0	0	0	1	1	0	0	0
Louisiana:									
Shreveport	0	0	0	0	0	1	-------	0	0
Texas:									
Dallas	0	0	0	0	0	0	0	1	1
Galveston	0	0	0	1	0	0	0	0	0
Houston	0	0	0	0	0	3	0	0	0
San Antonio	0	0	0	0	0	0	0	1	1
MOUNTAIN									
Arizona:									
Phoenix	0	0	0	0	0	0	-------	0	1
PACIFIC									
Washington:									
Tacoma	1	0	0	0	0	0	0	0	0
California:									
Los Angeles	0	0	0	0	0	0	0	4	0
Sacramento	0	0	1	1	0	0	0	0	0
San Francisco	1	0	0	0	0	0	0	2	0

The following table give the rates per hundred thousand population for 105 cities for the 10-week period ended June 20, 1925. The population figures used in computing the rates were estimated as of July 1, 1923, as this is the latest date for which estimates are available. The 105 cities reporting cases had an estimated aggregate

population of nearly 29,000,000, and the 97 cities reporting deaths had more than 28,000,000 population. The number of cities included in each group and the aggregate populations are shown in a separate table below.

Summary of weekly reports from cities, April 12 to June 20, 1925—Annual rates per 100,000 population [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Apr. 18	Apr. 25	May 2	May 9	May 16	May 23	May 30	June 6	June 13	June 20
105 cities	160	162	158	[2] 157	[3] 164	153	[4] 149	[5] 157	[6] 120	[7] 120
New England	129	144	127	109	154	127	114	129	94	97
Middle Atlantic	228	218	213	212	238	203	211	244	156	166
East North Central	110	113	110	113	110	108	106	99	[6] 95	[6] 96
West North Central	168	187	201	278	211	251	197	189	145	133
South Atlantic	102	108	104	104	85	87	[4] 77	[5] 93	57	[5] 51
East South Central	46	40	40	11	34	40	11	11	11	6
West South Central	74	79	70	65	56	42	65	42	70	74
Mountain	239	267	115	105	153	134	143	76	181	191
Pacific	168	165	206	[2] 123	[3] 138	165	168	145	165	113

MEASLES CASE RATES

105 cities	589	645	581	[2] 627	[3] 624	601	[4] 593	[5] 618	[6] 589	[7] 440
New England	917	1,217	1,004	984	1,188	1,051	867	872	892	634
Middle Atlantic	815	782	734	797	768	617	704	774	727	544
East North Central	742	901	761	890	854	954	913	893	[6] 893	[6] 627
West North Central	91	102	79	112	79	236	145	114	135	87
South Atlantic	256	295	305	240	329	327	[4] 256	[5] 416	297	[8] 353
East South Central	97	189	200	343	166	337	217	132	212	114
West South Central	65	37	28	32	14	23	14	23	14	19
Mountain	267	219	534	181	57	181	248	38	95	76
Pacific	154	203	162	[2] 95	[3] 178	131	165	165	87	84

SCARLET FEVER CASE RATES

105 cities	342	360	309	[2] 323	[3] 352	307	[4] 278	[5] 266	[6] 177	[7] 167
New England	350	407	430	415	358	350	211	266	179	142
Middle Atlantic	343	336	323	319	331	265	271	263	156	145
East North Central	403	433	324	366	399	413	346	317	[6] 216	[6] 227
West North Central	651	692	518	618	728	556	531	481	325	328
South Atlantic	167	175	132	106	165	146	[4] 122	[5] 132	61	[8] 62
East South Central	229	257	263	263	326	246	183	126	160	160
West South Central	60	121	111	88	74	23	65	88	46	37
Mountain	315	401	334	277	353	324	410	334	277	143
Pacific	145	148	125	[2] 151	[3] 197	162	139	151	162	116

SMALLPOX CASE RATES

105 cities	48	62	50	[2] 46	[3] 46	60	[4] 48	[5] 46	[6] 37	[7] 36
New England	0	2	0	2	0	0	0	0	0	0
Middle Atlantic	18	12	8	6	7	2	2	4	2	1
East North Central	27	39	30	44	56	70	58	65	[6] 43	[6] 45
West North Central	85	89	75	60	79	68	70	95	52	60
South Atlantic	53	79	63	45	37	65	[4] 10	[5] 39	22	[8] 31
East South Central	395	457	435	377	189	440	423	114	297	200
West South Central	14	42	32	28	37	130	56	32	5	19
Mountain	10	29	10	48	29	29	57	38	29	19
Pacific	162	264	206	[2] 176	[3] 191	186	168	191	148	154

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1923.
[2] Spokane, Wash., not included. Report not received at time of going to press.
[3] Tacoma, Wash., not included.
[4] Charleston, W. Va., not included.
[5] Wilmington, N. C., not included.
[6] Cincinnati, Ohio, not included.
[7] Cincinnati, Ohio, and St. Petersburg, Fla., not included.
[8] St. Petersburg, Fla., not included.

Summary of weekly reports from cities, April 12 to June 20, 1925—Annual rates per 100,000 population—Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	Apr. 18	Apr. 25	May 2	May 9	May 16	May 23	May 30	June 6	June 13	June 20
105 cities	12	16	18	[2]14	[3]13	19	[4]16	[5]25	[6]28	[7]22
New England	7	17	10	5	12	25	17	30	25	20
Middle Atlantic	11	14	22	13	10	19	9	26	17	14
East North Central	4	7	4	9	6	5	7	10	[6]9	[6]4
West North Central	2	6	12	2	0	4	10	8	25	12
South Atlantic	12	14	28	28	26	39	[4]41	[5]41	65	[8]49
East South Central	34	80	46	46	63	74	51	40	120	80
West South Central	56	51	51	46	79	65	74	88	116	130
Mountain	38	29	0	0	0	19	10	76	48	38
Pacific	12	23	17	[2]9	[3]3	6	9	9	15	6

INFLUENZA DEATH RATES

105 cities	27	30	22	15	14	14	[4]12	[5]11	[6]7	[7]60
New England	27	30	20	10	7	5	7	2	5	2
Middle Atlantic	24	17	14	10	12	11	9	11	6	4
East North Central	24	33	23	16	11	12	14	10	[6]5	[6]7
West North Central	50	48	31	11	11	18	18	4	9	7
South Atlantic	12	43	26	24	10	6	[4]12	[5]6	4	[8]6
East South Central	80	86	51	51	80	86	40	54	17	34
West South Central	36	25	31	15	20	24	31	5	20	10
Mountain	38	76	48	19	57	19	0	29	10	0
Pacific	29	12	12	16	12	25	8	12	4	4

PNEUMONIA DEATH RATES

105 cities	192	203	167	151	127	128	[4]117	[5]128	[6]105	[7]817
New England	206	186	149	161	134	119	114	72	117	62
Middle Atlantic	204	223	206	185	143	144	146	168	130	93
East North Central	190	211	148	130	125	125	119	114	[6]91	[6]83
West North Central	171	136	72	77	58	79	59	57	59	33
South Atlantic	232	191	195	156	136	134	[4]157	[5]146	122	[8]78
East South Central	206	286	194	160	166	137	172	126	63	103
West South Central	173	158	127	138	112	84	76	66	87	92
Mountain	210	219	124	124	162	172	76	95	105	143
Pacific	98	147	127	123	78	135	82	131	49	65

[2] Spokane, Wash., not included. Report not received at time of going to press.
[3] Tacoma, Wash., not included.
[4] Charleston, W. Va., not included.
[5] Wilmington, N. C., not included.
[6] Cincinnati, Ohio, not included.
[7] Cincinnati, Ohio, and St. Petersburg, Fla., not included.
[8] St. Petersburg, Fla., not included.

Number of cities included in summary of weekly reports and aggregate population of cities in each group, estimated as of July 1, 1923

Group of cities	Number of cities reporting cases	Number of cities reporting deaths	Aggregate population of cities reporting cases	Aggregate population of cities reporting deaths
Total	105	97	28,898,350	28,140,934
New England	12	12	2,098,746	2,098,746
Middle Atlantic	10	10	10,304,114	10,304,114
East North Central	17	17	7,082,535	7,082,535
West North Central	14	11	2,515,330	2,381,454
South Atlantic	22	22	2,566,901	2,566,901
East South Central	7	7	911,885	911,885
West South Central	8	6	1,124,564	1,023,013
Mountain	9	9	546,445	546,445
Pacific	6	3	1,797,880	1,275,841

FOREIGN AND INSULAR

THE FAR EAST

Wireless health news message.—The following data for the week ended June 13, 1925, were sent by wireless from the Far Eastern Bureau of the Health Section of the League of Nations, located at Singapore, to the headquarters at Geneva, Switzerland.

Port	Plague		Cholera		Smallpox	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Calcutta	0	0	-------	11	18	17
Bombay	-------	4	0	0	14	8
Madras	0	0	-------	1	31	13
Rangoon	-------	11	-------	1	10	0
Karachi	0	0	0	0	2	0
Negapatam	0	0	0	0	0	0
Singapore	0	0	0	0	0	0
Port Swettenham	0	0	0	0	0	0
Penang	0	0	0	0	0	0
Batavia	0	0	0	0	0	0
Soerabaya	0	0	0	0	0	0
Samarang	0	0	0	0	0	0
Belawan Deli	0	0	0	0	0	0
Macassar	0	0	0	0	0	0
Sandakan (North Borneo)	0	0	0	0	0	0
Sarawak	0	0	0	0	1	0
Bangkok	2	1	0	0	2	4
Saigon and Cholon	0	0	2	1	0	0
Hongkong	0	0	0	0	3	0
Shanghai	0	0	0	0	0	0
Manila	0	0	0	0	0	0
Colombo	4	4	0	0	0	0
Nagasaki	0	0	0	0	0	0
Yokohama	0	0	0	0	0	0
Shimonoseki	0	0	0	0	0	0
Kobe	0	0	0	0	0	0
Adelaide	0	0	0	0	0	0
Fremantle	0	0	0	0	0	0
Melbourne	0	0	0	0	0	0
Sydney	0	0	0	0	0	0

ECUADOR

Communicable diseases—Quito, April, 1925.[1]—During the month of April, 1925, cases of communicable diseases were notified at Quito, Ecuador, as follows: Diphtheria, 97 (from country districts, 7); measles, 127 (country districts, 28); typhoid fever, 30 (country districts, 3); tuberculosis (pulmonary), 9 (country districts, 2); whooping cough, 23 (country districts, 3).

[1] For mortality from communicable diseases, Quito, see Public Health Reports, June 19, 1925, p. 1338.

FINLAND

Communicable diseases—May 1–15, 1925.—During the period May 1 to 15, 1925, communicable diseases were notified in Finland as follows: Diphtheria, 51; paratyphus fever, 5; poliomyelitis (infantile paralysis), 1; scarlet fever, 86; typhoid fever, 27.

JAMAICA

Smallpox (reported as alastrim)—April 26–May 30, 1925.—During the five-week period ended May 30, 1925, 75 cases of smallpox (reported as alastrim), were notified in the Island of Jamaica, exclusive of Kingston, and 6 additional cases in Kingston.

Chicken pox—Typhoid fever.—During the same period chicken pox and typhoid fever were reported as follows: Island, exclusive of Kingston, 16 cases; in Kingston, 12 cases; typhoid fever—island, 48 cases; Kingston, 12 cases. Population of island, 858,118; Kingston, 62,707.

LATVIA

Communicable disesaes—April, 1925.—During the month of April, 1925, communicable diseases were reported in Latvia as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	4	Paratyphoid fever	1
Chicken pox	2	Scarlet fever	296
Diphtheria	50	Typhoid fever	64
Influenza	11	Typhus fever	12
Measles	466	Whooping cough	91
Mumps	163		

Population, estimated, 2,000,000.

MADAGASCAR

Plague—April 1–15, 1925.—During the period April 1 to 15, 1925, 82 cases of plague with 61 deaths were reported in the Island of Madagascar. Of these, 52 cases with 35 deaths were bubonic, 17 cases with 13 deaths pneumonic, and 13 cases with 13 deaths septicemic. For distribution according to Province, see page 1502.

Plague at Tamatave (port).—Bubonic. Two cases of bubonic plague were reported at the port of Tamatave. This is the first occurrence of plague reported at that port since the last two-week period of the month of December, 1924, when one case with one death was notified.

MALTA

Communicable diseases—May 16–31, 1925.—During the period May 16 to 31, 1925, communicable diseases were reported in the Island of Malta as follows: Chicken pox, 4 cases; Malta (undulant) fever, 36; pneumonia, 6 (including 4 cases of broncho-pneumonia); smallpox, 1 case; tuberculosis, 9 cases; typhoid fever, 5. Population (civilian), 223,088.

NEW ZEALAND

Poliomyelitis (infantile paralysis)—Summary of epidemic prevalence—December, 1924–April, 1925.—Information received under date of May 20, 1925, shows a total of 1,257 cases of poliomyelitis (infantile paralysis) with 166 deaths, in the Dominion of New Zealand, reported during the period December, 1924, to April, 1925.[1] The distribution according to districts was as follows: Auckland—cases, 310; deaths, 61; Canterbury-Westland—cases, 277; deaths, 27; Otogo-Southland—cases, 66; deaths, 8; Wellington—cases, 604; deaths, 70.

SYRIA

Lethargic encephalitis—Beirut—Damascus—May 11–20, 1925.—During the 10-day period ended May 20, 1925, one case of lethargic encephalitis was reported in Beirut and one case in Damascus, Syria.

UNION OF SOUTH AFRICA

Influenza—Cape Town—April 19–May 1, 1925.—During the two weeks ended May 1, 1925, 30 cases of influenza with seven deaths were reported at Cape Town, Union of South Africa. Population, 201,440.

Typhus fever—Durban—February 1–April 15, 1925.—During the period February 1 to April 15, 1925, 13 cases of typhus fever were reported at Durban, Natal, Union of South Africa. The discovery of the infection was the result of routine examinations for typhus of all blood samples sent to the Government laboratory for the Widal test for enteric fever. No case was found among the native or Asiatic population, with which classes the same routine examinations were made as with the European population. The type of the disease was stated to be mild, with no fatalities.

CHOLERA, PLAGUE, SMALLPOX, AND TYPHUS FEVER

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

Reports Received During Week Ended July 10, 1925 [2]

CHOLERA

Place	Date	Cases	Deaths	Remarks
Ceylon:				
Colombo	May 10–16	2	2	One port case, one town, untraced.
India				Apr. 26–May 2, 1925: Cases, 5,421; deaths, 3,120.
Rangoon	May 10–16	4	4	

[1] Public Health Reports, May 22, 1925, p. 1076, May 29, 1925, p. 1119, and June 19, 1925, p. 1339.
[2] From medical officers of the Public Health Service, American consuls, and other sources.

CHOLERA, PLAGUE, SMALLPOX, AND TYPHUS FEVER—Continued

Reports Received During Week Ended July 10, 1925—Continued

PLAGUE

Place	Date	Cases	Deaths	Remarks
India				Apr. 26–May 2, 1925: Cases, 3,858; deaths, 3,359.
Rangoon	May 10–16	8	7	
Java:				
Pasoeroean Residency	Mar. 7			Epidemic in one locality.
Madagascar				Apr. 1–15, 1925: Cases, 82; deaths, 61 (bubonic, 52 cases, 35 deaths; pneumonic, 17 cases, 13 deaths; septicemic, 13 cases, 13 deaths).
Province—				
Itasy	Apr. 1–15	1	1	
Town—				
Tamatave (port)	do	2		
Straits Settlements:				
Singapore	May 10–16	1	1	

SMALLPOX

Canada:				
Ontario—				
Galt	June 14–20	2		
China:				
Amoy	May 17–23		2	Prevalent in surrounding country.
Canton	do			Present.
Chungking	do			Very prevalent.
Foochow	May 9–23			Present.
Hongkong	May 3–9	2	3	
Manchuria—				
Dairen	May 4–17	28	3	
Nanking	May 24–30			Do.
Shanghai	May 3–23	4	2	
Swatow	May 17–23			Stated to be endemic.
Tientsin	May 9–16			Two cases reported by British municipality.
Egypt:				
Alexandria	May 21–27	1	1	
Cairo	Mar. 19–25	1		
Great Britain:				
Birmingham	June 7–13	1		
Newcastle-on-Tyne	do	2		
India				Apr. 26–May 2, 1925: Cases, 6,675; deaths, 1,719.
Karachi	May 24–30	1		
Madras	do	14	6	
Rangoon	May 10–16	35	24	
Indo-China:				
Saigon	May 11–17	3	2	Including 100 square kilometers of surrounding country.
Jamaica				Apr. 26–May 30, 1925: Cases, 75 (reported as alastrim).
Kingston	Apr. 26–May 30	6		
Japan:				
Kobe	May 24–30	1		
Yokohama	May 25–31	1		
Java:				
Rembang Residency	Apr. 23			Epidemic at Kawedanan.
Soerabaya	Apr. 23–29	31	2	
Mexico:				
Guadalajara	June 16–22		3	
Poland				Mar. 15–21, 1925: Cases, 7.
Portugal:				
Lisbon	May 18–June 13	10	6	
Spain:				
Malaga	June 7–13		4	
Union of South Africa:				
Transvaal	May 3–9			Outbreaks.

TYPHUS FEVER

Egypt:				
Cairo	Mar. 26–Apr. 1	1	1	
Latvia				April, 1925: Cases, 12.
Palestine:				
Majdal	May 26–June 1	1		
Ramleh	May 19–25	1		

CHOLERA, PLAGUE, SMALLPOX, AND TYPHUS FEVER—Continued

Reports Received During Week Ended July 10, 1925—Continued

TYPHUS FEVER—Continued

Place	Date	Cases	Deaths	Remarks
Poland				Mar. 8–21, 1925: Cases, 391; deaths, 27.
Spain:				
Valencia	June 7–13		1	
Union of South Africa:				
Cape Province	May 3–9			Outbreaks.
Natal	do			Do.
Durban	Feb. 1–Apr. 15	13		European.
Orange Free State	do			Outbreaks.
Transvall	do			Do.
Yugoslavia:				
Zagreb	May 8–21	7	1	

Reports Received from June 27 to July 3, 1925 [1]

CHOLERA

Place	Date	Cases	Deaths	Remarks
Algeria:				
Algiers	May 11–20	1		
Ceylon				Jan. 25–Apr. 4, 1925: Cases, 10; deaths, 10.
India:				
Calcutta	May 3–9	58	49	
Rangoon	do	8	5	
Indo-China:				
Saigon	May 4–10	1	1	
Siam:				
Bangkok	Apr. 26–May 2	2	1	
Turkey:				
Constantinople	May 16–22	1		

PLAGUE

Brazil:				
Bahia	May 3–16	4	3	
British East Africa:				
Uganda	Feb. 1–28	28	28	
Ceylon:				
Colombia	May 10–16		1	
India:				
Bombay	Apr. 26–May 9	15	16	
Karachi	May 18–23	3	3	
Rangoon	May 3–9	27	24	
Indo-China:				
Cochin-China—				
Saigon	Apr. 20–23	1	1	Including 100 square kilometers of surrounding country.
Madagascar:				
Tananarive Province	Apr. 1–15	79	60	Bubonic: Cases, 50; deaths, 35; pneumonic, cases, 17; deaths, 13; septicemic, cases, 12; deaths, 12.
Nigeria	Dec., 1924	17	13	
Do	Jan., 1925	10	6	
Siam:				
Bangkok	Apr. 26–May 9	5	5	
Straits Settlements:				
Singapore	May 3–9	6	6	

[1] From medical officers the Public Health Service, American consuls and other sources. For reports received from Dec. 27, 1924, to June 26, 1925, see Public Health Reports for June 26, 1925. The tables of epidemic diseases are terminated semiannually and new tables begun.

CHOLERA, PLAGUE, SMALLPOX, AND TYPHUS FEVER—Continued

Reports Received from June 27 to July 3, 1925—Continued

SMALLPOX

Place	Date	Cases	Deaths	Remarks
Algeria:				
Algiers	May 11-20	7		
Brazil:				
Pernambuco	Apr. 26-May 2	21	2	
Rio de Janeiro	May 9-16	1		
British East Africa:				
Kenya—				
Mombasa	Apr. 19-May 2	12	3	
Tanganyika Territory	Apr. 5-18	19	3	
Uganda	Feb. 1-28	2		
British South Africa:				
Northern Rhodesia	Apr. 28-May 4	3		
Canada:				
British Columbia—				
Vancouver	June 1-14	5		
Saskatchewan—				
Regina	May 24-30	3		
China:				
Antung	May 11-17	1		
Canton	May 10-16			Present.
Chungking	May 3-9			Do.
Hongkong	Apr. 19-May 2	7	6	
Manchuria—				
Dairen	Apr. 13-May 3	54	6	
Harbin	May 13-19	1		
Nanking	May 9-23			Do.
France:				
Paris	May 21-31	1		February-March, 1925: Cases, 48.
Gold Coast				January-February, 1925: Cases, 114; deaths, 17.
Great Britain:				
England and Wales				May 24-June 6, 1925: Cases, 187.
New Castle-on-Tyne	May 31-June 6	2		
Greece				January-February, 1925: Cases, 43; deaths, 6.
India:				
Bombay	Apr. 26-May 9	48	42	
Calcutta	May 3-9	109	100	
Karachi	May 18-23	1	1	Feb. 15-21, 1925: Cases, 2; deaths, 2.
Madras	do	40	16	
Rangoon	May 3-9	63	24	
Indo-China:				
Cochin-China—				
Saigon	Apr. 20-May 10	7	4	Including 100 square kilometers of surrounding country.
Irak				Jan. 11-Apr. 4, 1925: Cases, 87; deaths, 42.
Bagdad	Apr. 26-May 2	3		
Jamaica				Apr. 26-May 30, 1925: Cases, 75. Exclusive of Kingston.
Java:				
East Java—				
Soerabaya	Apr. 16-22	33	4	
West Java—				
Batavia	May 2-8	1		Province.
Tegal	Mar. 29-Apr. 4	2		
Mexico:				
Guadalajara	June 2-15		2	
Mexico City	May 24-30	1		Including municipalities in Federal District.
Tampico	June 1-10		1	
Morocco:				
Tangier	May 17-June 5			Present among natives.
Nigeria				December, 1924: Cases, 40; deaths, 16.
Do				January-February, 1925: Cases, 421; deaths, 11.
Poland				Mar. 1-7, 1925: Cases, 3.
Portugal:				
Lisbon	Apr. 26-May 30	33		
Russia				December, 1924: Cases, 880.
Do				January, 1925: Cases, 383.
Siam:				
Bangkok	Apr. 26-May 9	4	2	
Spain:				
Malaga	May 24-June 6		8	
Valencia	May 31-June 6	1		
Syria:				
Beirut	Apr. 21-30	1		

CHOLERA, PLAGUE, SMALLPOX, AND TYPHUS FEVER—Continued

Reports Received from June 27 to July 3, 1925—Continued

SMALLPOX—Continued

Place	Date	Cases	Deaths	Remarks
Tripoli				Jan. 3–Feb. 20, 1925: Cases, 6.
Tunis:				
Tunis	May 6–20	8	19	
Turkey:				
Constantinople	May 16–22	2		
Uruguay				December, 1924: Cases, 8.

TYPHUS FEVER

Algeria:				
Algiers	May 11–20	6	2	In vicinity stated to be 12 cases. Isolated.
Bulgaria				November–December, 1924: 1 case.
Do				January–March, 1925: Cases, 36; deaths, 2.
Chile:				
Valparaiso	May 10–16		1	
Egypt:				
Alexandria	May 7–13	2		
Port Said	May 14–20	1	1	
Greece				January–February, 1925: Cases, 40; deaths, 4.
Athens	May 1–31		2	
Mexico:				
Mexico City	May 24–30	11		Including municipalities in Federal District.
Morocco				January, 1925: Cases, 63.
Peru:				
Arequipa	Apr. 1–30		2	
Poland				Mar. 1–7, 1925: Cases, 201; deaths, 9.
Russia				December, 1924: Cases, 4,227.
Do				January, 1925: Cases, 3,828.
Turkey:				
Constantinople	May 11–20	6	2	
Union of South Africa:				
Cape Province				Apr. 19–25, 1925: Outbreaks.
Natal—				
Durban	May 3–9	1		
Orange Free State				Do.