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## A Further Study of Butter, Fresh Beef, and Yeast as Pellagra Preventives, with Consideration of the Relation of Factor P–P of Pellagra (and Black Tongue of Dogs) to Vitamin B

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A pellagra-preventive feeding experiment begun in 1914 by Goldberger, Waring, and Willets and carried on for a period of three years resulted in demonstrating the complete preventability of pellagra by diet alone (1). This experiment was of such a character, however, that it did not in itself reveal just what food or foods were to be credited with the preventive action. It could be considered as suggesting, at most, that the fresh meat and milk of the diet were concerned in bringing about the protective effect. The probability that both meat and milk contained the factor or factors which operated to prevent the development of the disease gained strength from the results of a study of the relation of diet to pellagra incidence among households of certain South Carolina cotton-mill villages carried out during 1916 by Goldberger, Wheeler, and Sydenstricker (2). In that study it was found not only that pellagra occurred less frequently or not at all in households having a daily minimum average supply of approximately a pint of milk or 30 grams of fresh meat per adult unit, but also that an increasing supply of each of these foods independently of the other was definitely associated with a decreasing pellagra incidence.

The soundness of the inference drawn from these studies, together with the inference from such epidemiological observations as the well-known rarity of the disease in nursing infants, that milk when a generous element in the diet operates to prevent pellagra was, in 1922, demonstrated by Goldberger and Tanner (3) by direct test. In that test it was found that a daily supplement of approximately 1200 grams (40 fluid ounces) of fresh buttermilk prevented the development of recognizable evidence of the disease in all of a group of 25 insane patients during a period of observation of one year when, in the absence of the buttermilk or other equivalent preventive, upward of 40 or 50 per cent of the group would, judging by previous experience, have developed the disease within a period of three to seven or eight

months. A test of dry skim milk (a Merrel-Soule product) carried out by the same workers (4) during the period July, 1923–September, 1924, resulted in showing that when taken in a daily quantity (105 grams) approximately equivalent (on the basis of protein content) to that of the fresh buttermilk, the dry skim milk was not fully adequate as a pellagra-preventive, and thus distinctly inferior to fresh buttermilk, since of some 22 pellagrins taking the dry skim milk, four developed either definite or very suggestive evidence of a recurrence of the dermal lesions of pellagra. The inferior potency of dried skim milk was recently further impressed on us by observing the occurrence of two recurrent attacks in a patient on a liquid diet containing 125 grams of such milk. [1]

**Butter**

The evidence that milk had preventive action in pellagra naturally suggested an inquiry as to whether butter had similar properties. In a previous communication (3) mention was made of the very disappointing results of such an inquiry. The butter to which this had reference was from the general supply of the Georgia State Sanitarium and was produced in batches of a few pounds each by farmers in the general vicinity of this institution in central Georgia and sold by them to the Sanitarium. The study was made at a season when the cows yielding the butter were and had for some time been largely pasture fed. Although tried repeatedly and in increasing quantities (in several instances the patients were known to have consumed an average of approximately 135 to 145 grams daily during a period of from three to upward of five months), this butter practically invariably failed to prevent recurrence of the disease.

The favorable results in the treatment and prevention of the Chittenden-Underhill (5) pellagralike disease of dogs (black tongue (6)), reported by Underhill and Mendel (7), with butter from a Northern locality suggested, in view of the possibility, if not probability, that this canine disease may be the analogue of human pellagra, the

[1] As this observation has a number of interesting bearings, mention of the more significant details may here be made:

A white, insane, female pellagrin, 35 years old and weighing 47 kilos, came under observation May 14, 1924, with mild dermal pellagra. The dermal lesions persisting, though with remissions, and the patient being so poor an eater as to make tube feeding from time to time necessary, she was changed on July 19, 1924, from the general ward diet to the following liquid diet: Dry skim milk (Merrel-Soule), 125 grams; cod liver oil, 28 grams; cottonseed oil, 70 grams; sucrose, 200 grams; tomato juice (from canned tomatoes), 170 grams; table salt, 5 grams in water. The dermal condition now cleared up, but a stomatitis gradually developed, and on September 29, 1924, that is, about two months after beginning this milk diet, the distinctive dermatitis reappeared. On October 10 she began taking a supplement of "Yeast Vitamine-Harris Powder," 25 grams daily. Eight days later this was reduced to 10 grams. Gradually the dermatitis and stomatitis cleared up. On January 15, 1925, the patient appearing in excellent condition, the "yeast vitamine" supplement was discontinued. She continued seemingly in good condition, taking all the milk ration until April 29, 1925, when lesions that proved to be those of a pellagrous dermatitis began to appear on her hands. Thus this patient had a relapse of her attack of pellagra at the end of a period of about two months, during which she daily consumed 125 grams of dry skim milk (representing about 44 grams of milk proteins), and a recurrence of the disease at the end of a further period of about seven months of this diet, or about three and a half months after discontinuing the supplement of a commercial yeast concentrate.

desirability of trying butter from a similar locality in the human disease. And this all the more as it seemed possible that butter from a northern dairying locality, presumably affording superior pasture at certain seasons, might be more potent in the factor preventing black tongue (and, possibly, pellagra) than that from the nondairying region of central Georgia. Accordingly, a supply of such butter laid down in Vermont early in July, 1924, was secured.[2] It was kept in cold storage at New Haven, Conn., until the fall of the year (October), after which time express shipments in quantities as needed were made to us at the Georgia State Sanitarium, where the study was carried out. At the Sanitarium it was kept in the Sanitarium refrigerator room and issued daily in the required amounts. The approximate composition of the butter-supplemented diet is shown in Table 1.

The results of trials in pellagra prevention made with this butter were no more favorable than those made with butter locally produced. Recurrence of the disease was observed in some patients (weighing between 40 and 50 kilos) in spite of a daily consumption of approximately 147 grams (about 5 ounces) of the Vermont butter during periods ranging from two to seven months.

It is possible that these periods were in most instances somewhat longer, that is, that the recurrence of the eruption was somewhat later, than would have been the case had the butter been absolutely devoid of preventive action. In this respect the Vermont butter did not differ appreciably from that locally produced. Our study was not on a sufficient scale to permit of sound judgment on this point; the indications afforded by our preliminary trials were so decidedly unsatisfactory as not to justify their continuation. Recalling, however, that fresh buttermilk was found to have pellagra-preventive action (3) it would seem reasonable to expect that butter may carry at least a trace of the special pellagra-preventive essential (factor P–P). Considering the very large quantity of butter daily consumed by some of our patients, its definite failure to prevent in these a recurrence of the disease seems to us, however, to indicate that if the butter with which we worked (both the Vermont and the Georgia product) contained this factor it contained it in a practically negligible quantity.

Assuming, as seems reasonable in view of Underhill and Mendel's report, that the Vermont butter contained the black-tongue-preventive substance, then it would seem as if this substance and factor P–P were not identical or that it had undergone deterioration during the time before the butter was used. The latter possibility would seem all the more plausible, as Underhill and Mendel (7) report that butter of known origin and rich in the black-tongue-protective substance

[2] We were able to do this through the kind courtesy of Professor Underhill, who introduced us to the dealer who supplied him and who undertook to secure for us some of the same butter as that secured for Professors Underhill and Mendel.

gradually loses its effectiveness when kept in cold storage for a period of approximately one year or less. In considering this possibility it must be noted that our Vermont butter began to be served to our patients about the middle of October, 1924, or about three months after it was laid down, and the first recurrence of pellagra in patients taking it developed during the latter half of February, 1925,[3] or not over about 7½ months after the butter was made. If our disappointing experience with Vermont butter was due to loss of potency, then it would seem as if the P–P factor (in butter) undergoes deterioration surprisingly quickly [4]. Since our Georgia butter was always relatively quite fresh, loss of potency incident to long storage can hardly enter into consideration in relation to the failure of this product, so that it would seem as if this must have been poor or lacking in the P–P factor from the outset. Considering our experience with butter as a whole and in the light of the fact that our study of fresh buttermilk produced near the Sanitarium showed this to contain the P–P factor, it would seem more probable that, like our Georgia butter, the Vermont product was poor or lacking in the P–P factor in the first place rather than that this had undergone deterioration and therefore that this factor and the black-tongue-preventive substance are not identical. So far as the above recorded experience with butter goes, these factors may, indeed, be distinct; but we should here perhaps state that our own experience with butter in experimental black tongue is in harmony with that in pellagra. In our own study, butter has failed us in the treatment and prevention of experimental black tongue just about as it has failed us in the treatment and prevention of pellagra. We have no explanation to suggest of the difference in our results with butter in black tongue from those reported by Underhill and Mendel, except the possibility that the black-tongue-preventive factor entered into their basal diet from some unsuspected source. It was just such occurrence in our own work that led to the discovery of the black-tongue-preventive potency of yeast.

### Beef

The belief that fresh meat contains the pellagra-preventive factor or factors was, up to 1924, based on indirect evidence of the character cited in a preceding section of this report. In that year Goldberger and Tanner (3) added to that evidence by reporting very favorable results of treatment in eight well-marked though not very severe (mainly dermal) cases, with fresh beef as the only known therapeutic element in the diet. Though carried out with all possible care it was

[3] In a patient who had come under observation and had begun taking the full allowance of this butter at about the middle of December, 1924.

[4] A test of the vitamin A potency of this butter made during December, 1925, when it was about 17 months old, showed it to be quite efficient in curing xeropthalmia in a dose of 100 mgm. of the fat daily. A smaller dose was not tested.

realized that a therapeutic test on so restricted a scale could at best hardly be more than strongly suggestive; and while it was in harmony with and strengthened previous indications that fresh beef contains the pellagra-preventive factor or factors, it was, nevertheless, felt that a preventive feeding test would be needed to prove this conclusively. We have carried out such a test as a detail of the study of pellagra prevention that has been in progress at the Georgia State Sanitarium since 1914, the pertinent facts in relation to which are as follows:

In this test we used fresh beef drawn from the Sanitarium supply. The muscle meat was trimmed free of tendon, gristle, and visible fat, run through a meat chopper and a weighed amount, at the rate of seven ounces (200 grams) per patient per day, was stirred into a little water, seasoned with salt, and quickly brought to a boil. This daily ration was served and well taken in equal portions at breakfast and at the midday meal.

The determination of the daily allowance was largely arbitrary. Since our purpose was, if possible, to show that the disease could be prevented completely by a liberal though not excessive quantity of this food, we decided on the allowance (200 grams) that had served us very satisfactorily in the treatment of active cases (3), judging that this would be very likely to fulfill the, presumably, somewhat less exacting requirements of prevention. The approximate composition of the diet thus supplemented is shown in Tables 2 and 3.

The test was begun December 17, 1924, and carried on for one year to December 31, 1925. During this period 26 pellagrins were taken under observation for preventive treatment with the beef-supplemented diet. Of this number, two were under observation for periods so brief as to have no significance, three were under observation for fully ten months, and the remaining 21 for fully one year. In none of these patients was there observed any recognizable evidence of a recurrence of pellagra, although in the light of repeated experience with this class of patients [5] it is safe to state that in the absence of the beef or other equivalent preventive food upward of 40 or 50 per cent of them would have suffered a return of the disease within a period of from three to seven or eight months. The complete absence of any indication of a recurrence in any of this group of pellagrins—twenty-one of whom, as stated, were under observation for a year—would therefore seem to be conclusive evidence of the preventive action of the fresh lean beef.

Although no recurrence of pellagra was observed in any of these patients it is of much interest to note that mild evidence of beriberi developed in five of them. The most striking and constant indication

[5] Five of the 21 who were under observation a full year had had at least two previous attacks of the disease.

of beriberi was a slight and variable edema of the legs beginning over the shins, in the feet, or in both these parts, and was noted in the first case of this group of patients about June 11, 1925, or nearly six months after the patient had begun the beef diet. Following an increase in the whole maize meal and the cowpeas at the expense of the grits and rice, designed to increase the vitamin B (antineuritic) content of the diet (compare Table 3 with Table 2), the edema began to subside and before the close of the period of observation this and such other symptoms as may have been present (tachycardia, pain and tenderness of the legs) had cleared up completely. Evidently the beef diet, while adequate to prevent pellagra, was, during about the first six months of this study, slightly deficient in the beriberi vitamin.

**Yeast**

Some very favorable indications afforded by therepeutic and preventive tests of yeast in experimental black tongue of dogs (8) led to a study of the action of this preparation in pellagra. The results of that study were published a year ago (4); they indicated that dried yeast was an efficient pellagra-preventive. Toward the close of the study its favorable progress, particularly in view of the failure of casein, suggested the desirability of studying in a similar way the protein-free yeast fraction of Osborne and Wakeman (9), and this all the more as a commercial preparation of what we understood was this fraction was available on the market. This has been done with results as follows:

We have worked with the commercial preparation marketed under the name of "Yeast Vitamin-Harris Powder" of the Harris Laboratories, Tuckahoe, N. Y. This preparation appears to have come into use in a number of laboratories as a convenient supposedly protein-free concentrate of vitamin B and is commonly but, we find, erroneously assumed to be the Osborne and Wakeman yeast fraction II (9). It is possible that when first marketed it may have been this yeast fraction; we are advised, however, by Dr. I. F. Harris, director of the Harris Laboratories, and, with his permission, state that now this preparation is simply the dried watery (acidulated) extract of yeast prepared, Doctor Harris states, according to a somewhat modified Osborne and Wakeman (9) technique. This is claimed by Doctor Harris to be but negligibly, if at all, inferior in vitamin B potency to fraction II of Osborne and Wakeman (9).

The dose of this preparation decided on for administration to our patients was one-half of that used in the study of dried yeast, that is, 15 grams a day.[6] In a few instances and for brief periods this was increased for therapeutic purposes to 30 grams. It was given dissolved in a little tap water in equal portions at each meal

[6] It may well be that considerably less than this may suffice as a preventive.

during the first three months of the study. After this period it was all given at one time at the supper meal.

The basic diet given the patients receiving this vitamin powder supplement was essentially identical with that given the patients receiving beef, and is shown in Tables 4 and 5.

The study was begun May 26, 1924, with the treatment of a case in a recently admitted patient with a sharp attack (dermal and mental). Since then 22 patients in all have come under this treatment. Of these, 12 presented more or less pronounced active symptoms, including the dermatitis, and 3 the stomatitis, etc. of a *pellagra sine pellagra*. Seven came under observation for purely preventive treatment, being without active symptoms of the disease at the time.

Of these 22 patients, 1 has been under observation for 16 months, 1 for 14 months, 1 for 13 months, 5 for 12 months, 2 for 8 months, 2 for 7 months, and the others for various shorter periods.

Under the treatment, the active symptoms of the disease, in those presenting such, cleared up and, what is of much greater significance, in no case while taking the yeast extract has there been any recognizable evidence of a recurrence.

Recalling that our expectation, based on long experience with this class of patients, was that some 40 or 50 per cent of them would have developed evidence of a recurrence within some three to seven or eight months in the absence of the vitamin powder or equivalent preventive, the absence of any recurrence whatever in any of the patients, eight of whom were under observation for at least one year, is, in our judgment, conclusive evidence of the pellagra-preventive action of this yeast extract.

Here we wish to record that, as in the case of the beef study, a number of the patients taking the yeast extract developed evidence of beriberi.[7] In these, six in all, as in the five mentioned in connection with the study of beef, the most striking and constant indication was a slight edema of the feet or feet and legs. This appeared first about May 24, 1925, in a patient of this group who began taking the yeast vitamin preparation on November 21, 1924, or about six months after beginning this treatment.

The changes in diet looking to an increase in the beriberi vitamin, mentioned in connection with the cases observed in the patients taking beef, were made between June 22 and June 26, 1925, and also affected the patients taking the "yeast vitamine" powder (compare

[7] Having been led to believe from the literature that this preparation was exceptionally rich in vitamin B (antineuritic), this occurrence both surprised and perplexed us at first, but the development of the same syndrome in some of the patients in the beef study, together with the clearing up of the symptoms following upon the changes in diet designed to increase the antineuritic vitamin, convinces us that the 15 grams of "yeast vitamine" powder supplied little if any more antineuritic than did the 200 grams of fresh beef.

Table 5 with Table 4). By this date, however, three of the patients had already completed an observation period of a year, one of fully 11 months, one of 9½ months, and one of 7 months. Following the indicated modifications in the basic diet the evidence of beriberi gradually subsided and disappeared.

Thus the yeast extract-supplemented diet, like the beef-supplemented diet, was adequate to prevent pellagra, but, until certain modifications were made (which for certain patients were not in effect until after 7 to 12 months after beginning the "yeast vitamine" treatment), was slightly deficient in the beriberi vitamin.

## Discussion

The results of previously published studies (3) (4) have been interpreted as indicating that in the prevention and, presumably, causation of pellagra there is concerned a previously unrecognized or unappreciated dietary essential (designated as factor P–P) which may be effective with but little, possibly without any, cooperation from the protein factor. The results of the studies presented above serve, we believe, to strengthen this interpretation and to increase the probability that factor P–P plays the sole essential rôle in the prevention of the disease.

It seems well established that the muscle of beef is relatively poor in all the commonly recognized dietary essentials except protein. So that, at first thought, it might plausibly be suggested that the preventive action of fresh beef is due to this constituent. When it is recalled, however, that, in a study carried out by Goldberger and Tanner (4), a daily supplement of 69 grams of casein (approximately 60 grams of protein) failed fully to prevent the disease, it is difficult to attribute the marked potency of the beef supplement to its 45 grams of protein, or, at least, to this protein alone. This difficulty is enhanced and the presence of another factor in the beef more strongly suggested when we recall the distinctly inferior pellagra-preventive potency (on the basis of protein content) of dried skim milk as compared with fresh buttermilk already referred to in the introductory section of this report.

The evidence of pellagra-preventive activity of the supplement of 15 grams of the yeast extract appears to us to point still more strongly to the existence of a special pellagra-preventive essential (factor P–P), and to the probability that this may be effective without any cooperation from the protein. This preparation is believed to be low in or lacking appreciable amounts of protein, and while it has a fairly high nitrogen content [8] it seems reasonably certain that only part of this is in a form conceivably capable of supplementing the protein

[8] One sample analyzed in the Division of Chemistry of the Hygienic Laboratory was found to contain 7.59 and another 7.14 per cent nitrogen.

of the diet. Assuming, however, that all of its nitrogen is in the form of protein, the 15 grams of the dried extract would, on this assumption, contribute at most about 7.5 grams of protein. To attribute to this small addition the preventive potency of this preparation would imply that its nitrogen is in a form possessing supplementing properties notably superior to those of not less than about 36 grams of milk proteins (dried skim milk) and to those of 60 grams of casein protein. While this may conceivably be the case it seems so highly improbable as to warrant the conclusion that the preventive action of the yeast extract is due primarily to a special pellagra-preventive substance (factor P–P).

It would appear then, that, unlike butter, fresh lean beef and yeast contain a factor (factor P–P) which probably plays the primary rôle in the prevention and the causation of pellagra.

## RELATION OF FACTOR P–P TO VITAMIN B

If the foregoing interpretation is, as we believe, sound, it follows that the "yeast vitamine" powder with which we have worked is not, as it has generally been considered, a concentrate of vitamin B alone, but contains also and, apparently, in considerable concentration, the pellagra-preventive factor P–P.[9]

It seems necessary at this juncture to anticipate the publication of the results of our experimental study of black tongue of dogs. This study, begun over four years ago, is still in progress, but we may now state that we have experimentally induced this canine disease by feeding dogs certain diets previously found associated with the occurrence of pellagra, including the Rankin prison farm experimental diet (10). Some modifications of certain of these diets have resulted in giving us our standard experimental black-tongue-producing diet. This is shown in Table 6. A somewhat simpler diet also black-tongue producing is shown in Table 7. In this study, white and yellow maize meal, casein, cod liver oil, and butter have been found very poor, or lacking, in the black-tongue preventive factor. Milk has been found to possess inferior preventive activity. A test of fresh lean beef, although not yet completed,[10] is sufficiently far advanced to warrant the statement that this possesses considerable black-tongue-preventive potency (see Table 8). Dried yeast and the commercial yeast extract referred to above have been found very efficient preventives of black tongue. Seidell's activated solid (11) in a daily dose at the rate of 2 grams per kilo of body weight as a supplement to basic diet 123, shown in Table 6, has black-tongue-preventive action. Thus the black-tongue-preventive factor is present

[9] So far as the above recorded experience with this preparation goes, it would suggest that this preparation may be richer in factor P–P than in vitamin B.

[10] It has three more months to run to complete a period of one year, our usual period in such cases.

in lean beef muscle, in yeast, and in the commercial dried watery extract of yeast, and it is adsorbed from a watery extract of yeast by English fullers' earth. Our data appear to indicate that this factor is a dietary essential, heretofore either not recognized or not appreciated as such, necessary for the nutrition of the dog.

From the foregoing it appears that the substances that have been found to possess black-tongue-preventive potency have, when tried in pellagra, been found efficient preventives of the human disease; those that had failed in pellagra or were of low pellagra-preventive potency (milk) when tried in black tongue have failed or were feeble as preventives of the canine syndrome. In view of this striking similarity, if not identity, of behavior we feel justified in adopting, and are planning our studies of pellagra on, the working hypothesis that black tongue of dogs is the analogue of pellagra in man. Accordingly, it may tentatively be assumed that factor P–P is the dietary essential primarily concerned in the prevention and causation of both black tongue and pellagra. The assumption of this identity seems all the more reasonable as otherwise it would (and it still may) be necessary to conclude that the "yeast vitamine" powder contains in addition to the pellagra-preventive essential, also a special black-tongue-preventive factor. Thus assuming that we are dealing with one factor (P–P) let us consider its relation to "water soluble B."

Although this water-soluble vitamin has quite generally been considered as representing a single dietary factor having both antineuritic and growth-promoting properties, a number of investigators (12) have dissented from this view and have advanced reasons for believing that it includes at least two distinct dietary essentials—one the antineuritic or beriberi vitamin (vitamin B *sensu stricto* according to Funk (13)) and the other a "growth-promoting" factor which some workers (14) believe identical with Wildiers' bios. Thus with the possibility before us that vitamin B may include at least two distinct dietary essentials, it becomes necessary to consider the relation of factor P–P to these two at least.

In previous publications (3) (4) evidence was adduced that was interpreted as excluding vitamin B from consideration as essential in relation to the prevention and causation of pellagra. This had reference to vitamin B in the generally accepted sense of the antineuritic or antiberiberi vitamin. That vitamin B in this sense, that is, as the antiberiberi essential, and factor P–P are distinct and may perform their physiological functions independently, is also, and we believe quite conclusively, shown by the fact of the rare association of the two diseases beriberi and pellagra. An interesting example of this independence of action is the observation, mentioned in a preceding section, of the occurrence of beriberi in some of the patients

taking the beef and in others taking the yeast extract-supplemented diets. The fact that very exceptionally the two diseases may occur together in the same patient (15) emphasizes the significance of the rarity of such association. In other words, while the diet may at the same time be deficient in both the beriberi- and the pellagra-preventive essentials, ordinarily, in endemic localities of these diseases, the diet concerned is deficient in one and not (or but inappreciably) in the other factor.

With respect to the relation of factor P–P to the second, the so-called growth-promoting essential, possibly included in the designation "water-soluble B," the studies presented in the foregoing afford no basis for judgment. It may be stated in this connection, however (again anticipating the publication of certain of the results of the experimental study of black tongue), that the discovery of the black tongue- (and pellagra-) preventive potency of yeast has led to a study designed to elucidate the characters of factor P–P and thus, perhaps, aid in the determination of its identity. This study has revealed that factor P–P is adsorbed from an acidulated watery extract [11] of yeast by English fuller's earth (Seidell's activated solid); that yeast heated to charring no longer possesses appreciable black tongue-preventive activity. After heating in the steam autoclave at 15 pounds for two and one-half hours, the yeast retains, our tests in dogs show, much, if not all, of its activity in the prevention of black tongue; but when young rats are fed a diet in which the sole source of "water-soluble B" is derived from as much as 30 or 40 per cent of this autoclaved yeast, and which is otherwise complete for growth, their growth is quickly arrested, their weight then declines, and they die with or without symptoms of polyneuritis (Chart 1, period 4, and Chart 2). The unheated yeast,[12] it may be noted, when fed young rats in diets at an 8 or 10 per cent level, provides sufficient "water-soluble B" for good, though not for optimal, growth. Thus, according to current ideas, the heating for two and one-half hours inactivates the water-soluble vitamin (as it exists in dried yeast; it does not appreciably affect it as it exists in Seidell's activated solid), but obviously does not notably affect the P–P factor. Evidently, too, factor P–P is not of itself growth promoting. Furthermore, if the so-called growth-promoting water-soluble vitamin of the yeast is distinct from the antineuritic and from the P–P factor, then either the heating has inactivated it or, like factor P–P, it is not a special "growth" factor.

But that factor P–P or some associated (and, in yeast, relatively thermostable) factor, distinct from the antineuritic, is essential for growth (of the rat at least) would appear from the following: 1.—

[11] We have gained the impression that factor P–P is relatively much more soluble in acidulated water than in 85 per cent (by volume) alcohol, whereas the antineuritic is relatively readily soluble in both.

[12] Fleischmann's wort-grown, low temperature dried yeast was used.

When young rats are fed a diet complete for growth except as to "water soluble B" and containing as the sole source of this vitamin as much as 30 or 40 per cent of yeast [12] previously heated in the autoclave at 15 pounds for two and one-half hours (and from tests

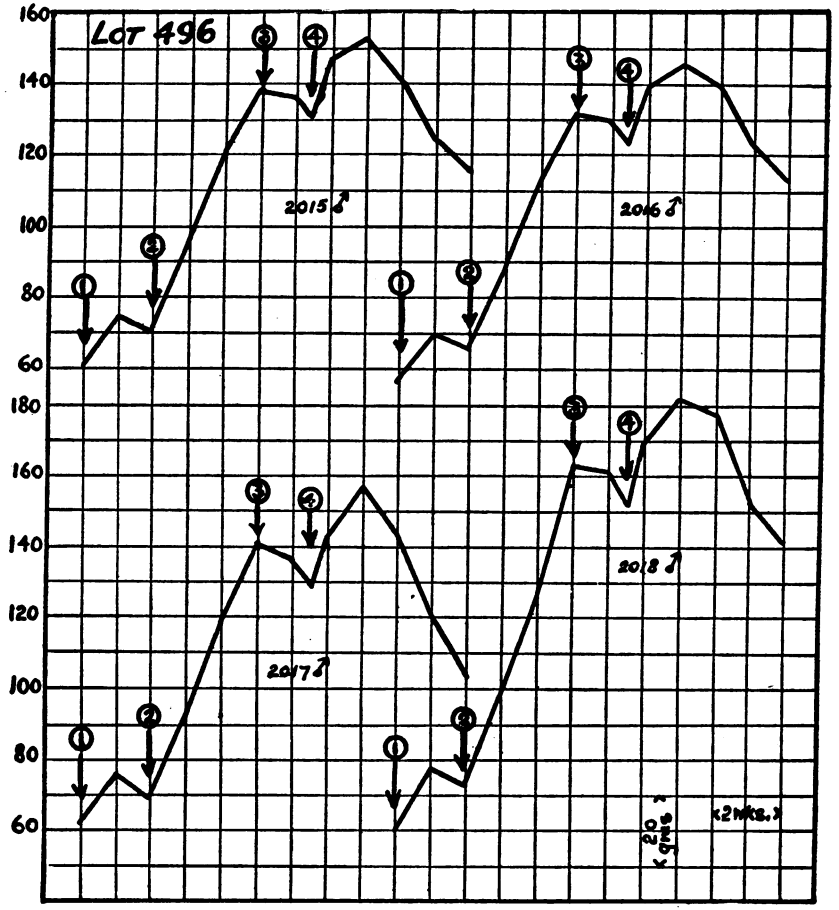


CHART 1.—Weight curves of four young albino rats during four dietary periods. During period 1 their diet (No. 218) included as the sole source of "water soluble B" 40 per cent of an alcoholic extract of corn. After an initial gain in weight they began to lose, whereupon there was added to their diet 9 per cent of yeast previously autoclaved at 15 pounds for 2½ hours. This was at once followed (period 2) with a resumption of growth which was well maintained during three weeks, at the end of which a change in diet was again made. This change consisted of the withdrawal of corn extract and autoclaved yeast thus giving them the basic diet (No. 206) without any known source of "water soluble B." Growth was at once arrested, followed by a downward trend in weight (period 3). Now another change in diet was made. The basic diet (No. 206) was replaced by one which included 40 per cent of autoclaved yeast as the sole source of "water soluble B" (diet No. 239). This change was followed by a resumption of growth, which lasted but a short time, and was followed by a progressive loss in weight. Thus neither 40 per cent of the corn extract nor 40 per cent of the autoclaved yeast when the sole source of "water soluble B" permitted the rats to grow, but when only 9 per cent of the autoclaved yeast was added to the diet containing the corn extract growth took place and was maintained.

in dogs shown to contain P–P), they quickly decline in weight after a slight initial rise and die with or without signs of polyneuritis (Chart 1, period 4, and Chart 2) (antineuritic deficient). 2.—When young rats are fed a diet complete for growth except as to the "water

[12] Fleischmann's wort-grown, low temperature dried yeast was used.

soluble B," but containing as the sole source of this vitamin as much as 40 per cent of a preparation of an alcohol extract [13] of corn meal that can alleviate or cure polyneuritis in the rat, the weight of such animals, after slight initial growth, is arrested and then declines (Chart 1, period 1, and Chart 3). 3.—If, however, young rats are fed a diet, as before, complete for growth except as to the "water-soluble B," but containing as sources of this vitamin as little as 8 or 10 per cent of the autoclaved yeast and as little as 5 per cent of our extract of maize meal, the animals grow (Chart 4. See also Chart 1, period 2).

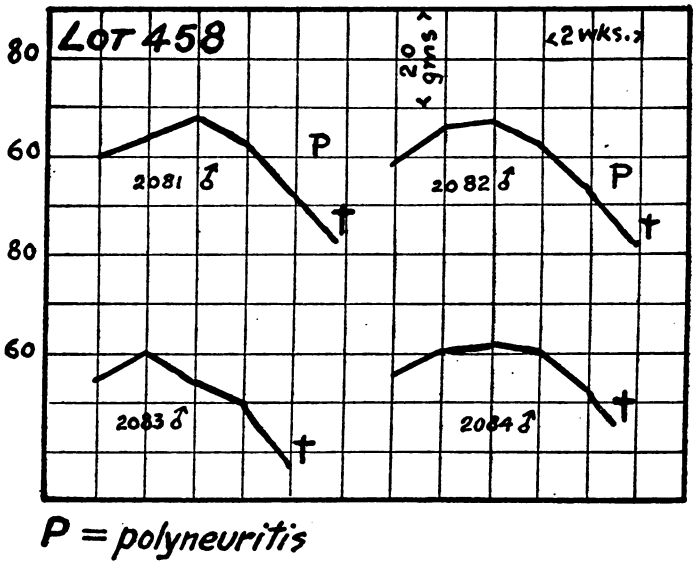


CHART 2.—Weight curves of four young albino rats whose diet (No. 227) included as the sole source of "water soluble B" 27 per cent of autoclaved yeast. Slight initial growth was followed by arrest and continued loss of weight terminating in death. Two of the animals developed signs of polyneuritis.

Again, when young rats are fed a diet complete for growth except as to the "water soluble B" and containing 20 per cent of dried fresh lean beef (which, judging by experience with pellagra and black tongue, contains factor P–P) as the sole source of this vitamin, such animals, as is well known, after slight initial growth, decline in weight and die with or without polyneuritis (Chart 5, period 1) (antineuritic deficiant). If, however, when signs of polyneuritis begin to appear, there be included in such diet as little as 5 per cent of our alcoholic corn extract (40 per cent of which as the sole source of water-soluble vitamin in a diet does not enable the rat to grow), the animals, if not

[13] This extract is prepared by intermittent percolation of whole white corn meal at room temperature with alcohol of 85 per cent by volume strength, until about 6.5 liters are obtained from 5 kg. corn meal. The percolate is put into a distilling flask and concentrated to about one-fifth to one-fourth its volume. This is then poured into a pan on a water bath and corn starch stirred into it at the rate of 125 gm. of starch to 5 kg. of corn meal used. The remaining alcoholic liquid is driven off by fanning. The damp residue is then transferred to glass dishes and further dried in a current of warm air, after which it is ground into a powder. For each 18 to 18.5 gm. of corn meal 1 gm. of this product is thus obtained.

too far gone, recover from polyneuritis and resume growth (Chart 5, period 2). Evidently our alcoholic extract of maize contains an essential that cures polyneuritis in the rat, and while not growth promoting [14] of itself, permits or promotes growth when combined in a diet otherwise complete for growth except for "water soluble B" with a suitable proportion of a P–P-containing substance such as autoclaved yeast or beef (which itself, within certain limits, neither prevents polyneuritis nor permits growth).

Thus, autoclaved yeast and beef muscle contain a factor distinct from the polyneuritis-preventing vitamin which in combination with the antineuritic is essential for the growth of the rat. From the facts presented, it seems probable that this is the same as factor P–P, and some of the work in the very confusing literature relating to the identity of the "growth-promoting" complex of "water soluble B" with bios appears to us to be in harmony with this interpretation. Further investigation will, however, be required to determine this.

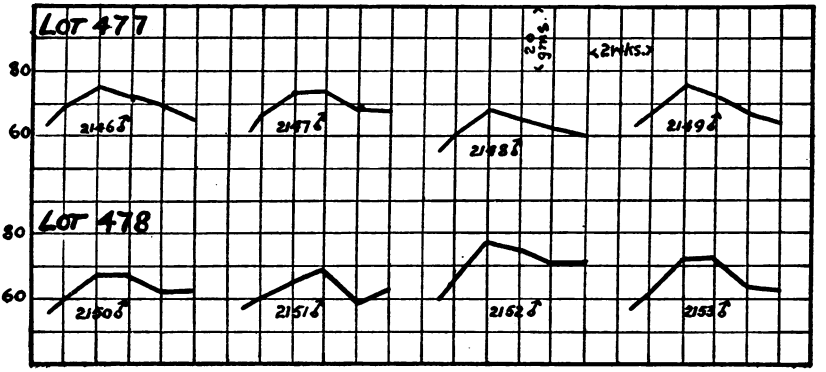


CHART 3.—Weight curves of two lots of young albino rats. The diet of both was free of "water soluble B" except as supplied by 6 per cent (lot 477, diet 238 B) and 12 per cent (lot 478, diet 238 C), respectively, of our corn extract. Growth was quickly arrested.

In any event investigators using the rat-growth test must hereafter recognize and take due account of at least two essentials (B *sensu stricto* and P–P) where heretofore only one was considered. This is, perhaps, of special importance to those heretofore occupied in the chemical isolation of the beriberi vitamin. It may well be suspected that the highly "active" concentrates, supposedly of vitamin B (*sensu stricto*) that some of these workers have succeeded in preparing, in proportion as they enable the rat to grow in the absence of any other source of the "water soluble B" in the diet are concentrates of at least two factors. The rat-growth test may continue to be used as a test of the purity of a concentrate, but must be interpreted in a sense opposite to that heretofore current. The pure concentrate will be seemingly inert. The complete test of such a

[14] Relatively, not absolutely so.

concentrate (or a food substance) will necessitate combining it alternately with an adequate proportion of a proved preparation of the antineuritic and of the P–P factor, respectively, and, perhaps, of both, and this or some equivalent test will have to be made before an apparently inactive preparation (or food) can be adjudged as really inert. It is, at least, possible that in the past, workers in discarding "inactive" fractions have unwittingly been throwing away the very thing they were laboriously seeking. This may perhaps explain, at least in part, the somewhat unaccountable losses of vitamin in the process of fractionation of "active" preparations.

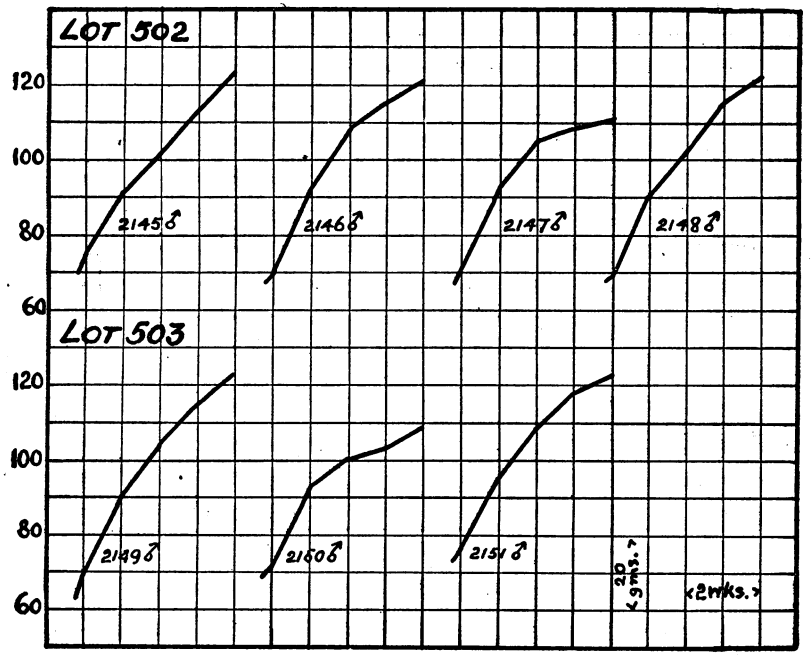


CHART 4.—Weight curves of two lots of young albino rats. The diet of both was free of "water soluble B" except as supplied by 5 per cent of our corn extract combined with, in the case of lot 502, 8 per cent (diet 243 E) and, in the case of lot 503, 10 per cent (diet 243 F) of autoclaved yeast. Although neither preparation alone when the sole source of "water soluble B" even to the extent of 40 per cent of the diet permits growth when, as here, much smaller proportions of each are combined growth takes place, thus proving conclusively that this is not simply an additive phenomenon. The growth of these animals is at a somewhat reduced rate; for optimal growth the percentages of both corn extract and autoclaved yeast would have to be increased.

In closing it may be permitted to suggest that investigators interested in the isolation of vitamin B may find maize a better source of this factor than yeast, since maize is much poorer in the associated thermostable factor or factors than is yeast.

## Summary and Conclusions

1. Previous trials of butter in a daily quantity of about 140 grams (5 ounces) using a Georgia product had practically invariably failed

to prevent recurrence of pellagra. Further trials with a Vermont product proved no more favorable than those with the Georgia butter.

Butter would seem to be poor, or lacking, in the pellagra-preventive factor or factors.

2. The pellagra-preventive action of a daily allowance of 200 grams (7 ounces) of fresh meat in the form of lean beef was tested and found capable of completely preventing the disease, thus proving that fresh beef contains the pellagra-preventive factor or factors.

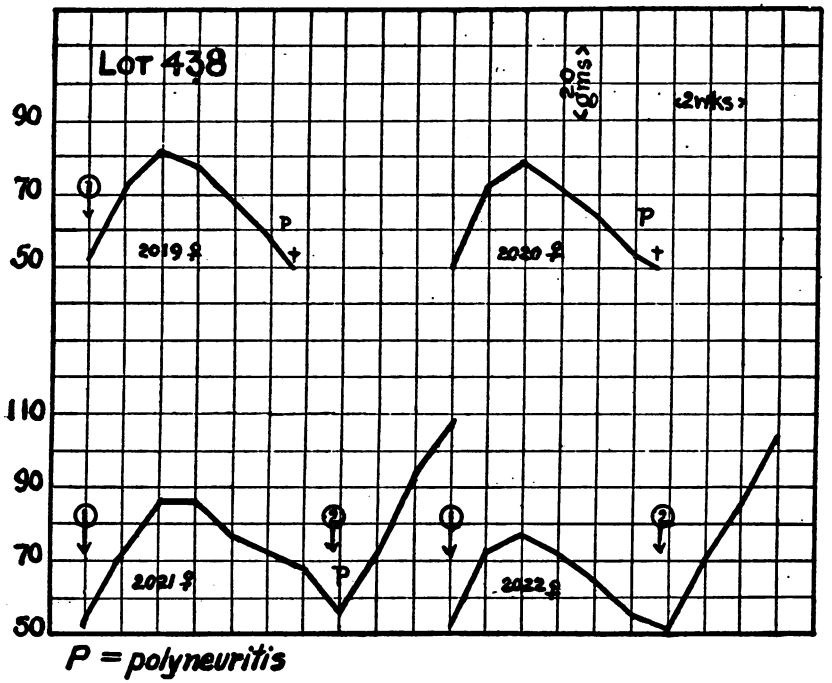


CHART 5.—Growth curves of young albino rats whose diet during period 1 included as the sole source of "water soluble B" 20 per cent of dried fresh beef. After some initial growth there was arrest followed by loss of weight with the development of signs of polyneuritis in three of the animals. After two of these died the diet was modified by adding 5 per cent of our corn extract (diet 219 A). This was followed by disappearance of the signs of polyneuritis in the survivor showing these, with prompt resumption of growth in both survivors (period 2). The beef contained sufficient P-P but was deficient in antineuritic. The small addition of corn extract supplied enough of this to supplement P-P sufficiently to permit growth to take place.

The beef-supplemented diet, though adequate for pellagra prevention, was, during about half of the period of study, slightly deficient in the beriberi vitamin.

3. The pellagra-preventive action of a dried yeast extract was tested in a daily quantity of 15 grams (half an ounce) and found efficient in preventing the disease.

The yeast-extract-supplemented diet was adequate to prevent pellagra, but, during a part of the period of observation, was slightly deficient in the beriberi vitamin.

4. The results of the studies presented are believed to strengthen the interpretation of those previously reported, namely, that in the

prevention and presumably causation of pellagra there is concerned a heretofore unrecognized or not fully appreciated dietary essential (factor P–P), and to indicate the probability that this may play the sole essential rôle in relation to the disease.

5. A statement of a preliminary character is made of some of the results of an experimental study of black tongue, and it is briefly pointed out that the substances that have been found to possess black-tongue-preventive potency have, when tried in pellagra, been found efficient preventives of the human disease and that those that had failed in pellagra, or were of low pellagra-preventive potency, when tried in black tongue have failed, or were feeble, as preventives of the canine disease. The working hypothesis has therefore been adopted that black tongue of dogs is the analogue of pellagra in man, and thus that factor P–P is concerned in the prevention and causation of both black tongue and pellagra.

6. The relation of the factor P–P to "water soluble B" is considered and evidence is cited showing—First, that the antineuritic factor (vitamin B *sensu stricto*) is distinct from the factor P–P and does not in itself suffice for the growth of the rat; second, that if the term "water soluble B" includes, as some investigators have suggested, in addition to the antineuritic factor a so-called growth-promoting essential (possibly identical with Wildiers' bios), this, like the antineuritic factor, is either inactivated by autoclaving, or does not suffice by itself for the growth of the rat; third, that factor P–P or some associated, and, in yeast, like P–P, thermostable factor (possibly the so-called growth-promoting factor) distinct from the antineuritic vitamin, though not sufficing in itself for the growth of the rat, is, in combination with the antineuritic, essential for growth in rats.

7. Whether factor P–P is, as at present seems most probable, identical with the so-called growth-promoting essential heretofore included (with the antineuritic) in the term "water-soluble vitamin B," or whether these are distinct, further investigation must determine.

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TABLE 1.—*Approximate composition of butter-supplemented diet offered daily to certain pellagrins during the fall, winter, and spring of 1924–25*

[Total calories: 2,301]

| Diet | | Nutrients | | |
|---|---|---|---|---|
| Articles of diet | Quantity | Protein | Fat | Carbohydrate |
| Basic: | *Grams* | *Grams* | *Grams* | *Grams* |
| Corn meal [1] | 185 | 15.5 | 8.7 | 136.9 |
| Wheat flour | 85 | 9.7 | .9 | 63.8 |
| Rice | 14 | 1.1 | .0 | 11.1 |
| Cowpeas (*Vigna sinensis*) [2] | 28 | 6.0 | .4 | 17.0 |
| Lard | 4 | | 4.0 | |
| Tomato juice [3] | 130 | | | |
| Supplemental: | | | | |
| Creamery butter (Vermont) [4] | 147 | 1.5 | 125.0 | |
| Calcium carbonate [5] | 1.5 | | | |
| Dilute hydrochloric acid (U. S. P.) (90 drops) [6] | | | | |
| Sirup iodid iron (U. S. P.) (2 drops) [6] | | | | |
| Total nutrients | | 33.8 | 139.0 | 228.8 |
| Nutrients per 1,000 calories | | 14.7 | 60.4 | 99.5 |

[1] Whole maize meal, sifted in the kitchen and made into corn bread and mush.
[2] Served in place of the variable dry legume ration of the institution.
[3] From canned tomatoes, pressed through a cloth.
[4] A portion served at each meal; thoroughly stirred into the hot mush or mush, rice, and peas.
[5] Given to improve the mineral composition of the diet.
[6] Given with a view of correcting a possible gastric anacidity so common in pellagrins.

TABLE 2.—*Approximate composition of fresh beef-supplemented diet offered daily to each of a group of colored female pellagrins during the period December 17, 1924–June 22, 1925*

[Total calories: 2,080]

| Diet | | Nutrients | | |
|---|---|---|---|---|
| Articles of diet | Quantity | Protein | Fat | Carbohydrate |
| Basic: | *Grams* | *Grams* | *Grams* | *Grams* |
| Cornmeal [1] | 140 | 11.8 | 6.3 | 103.6 |
| Corn grits | 48 | 4.4 | .9 | 36.2 |
| Wheat flour | 70 | 8.0 | .7 | 52.5 |
| Rice | 28 | 2.2 | .1 | 22.1 |
| Cowpeas (*Vigna sinensis*) [2] | 14 | 3.0 | .2 | 8.5 |
| Sirup | 90 | | | 63.9 |
| Lard | 42 | | 42.0 | |
| Tomato juice [3] | 130 | | | |
| Supplemental: | | | | |
| Fresh beef [4] | 200 | 44.8 | 5.8 | |
| Cod liver oil [5] | 15 | | 15.0 | |
| Calcium carbonate [6] | 3 | | | |
| Dilute hydrochloric acid (U. S. P.) (90 drops) [7] | | | | |
| Sirup iodid of iron (U. S. P., (2 drops) [6] | | | | |
| Total nutrients | | 74.2 | 71.0 | 286.8 |
| Nutrients per 1,000 calories | | 35.7 | 34.1 | 137.9 |

[1] Whole maize meal sifted in the kitchen and made into corn bread and mush.
[2] Served in place of the variable dry legume ration of the institution.
[3] From canned tomatoes, pressed through a cloth.
[4] Lean muscle free of visible fat.
[5] Given in place of the variable butter or margarine ration of the institution
[6] Given to improve the mineral composition of the diet.
[7] Given with a view of correcting a possible gastric anacidity so common in pellagrins.

TABLE 3.—*Approximate composition of fresh beef-supplemented diet offered daily to each of a group of colored female pellagrins during the period June 26, 1925–December 31, 1925. (The period June 22 to June 26 was a period of change from the diet shown in Table 2 to that shown here)*

[Total calories: 2,097]

| Diet | | Nutrients | | |
|---|---|---|---|---|
| Articles of diet | Quantity | Protein | Fat | Carbohydrate |
| Basic: | *Grams* | *Grams* | *Grams* | *Grams* |
| Corn meal [1] | 190 | 16.0 | 8.7 | 140.6 |
| Wheat flour | 70 | 8.0 | .7 | 52.5 |
| Rice | 14 | 1.1 | .0 | 11.1 |
| Cowpeas (*Vigna sinensis*) [2] | 28 | 6.0 | .4 | 17.0 |
| Sirup | 90 | | | 63.9 |
| Lard | 42 | | 42.0 | |
| Tomato juice [3] | 130 | | | |
| Supplemental: | | | | |
| Fresh beef [4] | 200 | 44.8 | 5.8 | |
| Cod liver oil [5] | 15 | | 15.0 | |
| Calcium carbonate [6] | 3 | | | |
| Dilute hydrochloric acid (U. S. P.) (90 drops) [7] | | | | |
| Sirup iodid of iron (U. S. P.) (2 drops) [6] | | | | |
| Total nutrients | | 75.9 | 72.6 | 285.1 |
| Nutrients per 1,000 calories | | 36.1 | 34.6 | 135.6 |

[1] Whole maize meal sifted in the kitchen and made into corn bread and mush.
[2] Served in place of the variable dry legume ration of the institution.
[3] From canned tomatoes, pressed through a cloth.
[4] Lean muscle free of visible fat.
[5] Given in place of the variable butter or margarine ration of the institution.
[6] Given to improve the mineral composition of the diet.
[7] Given with a view of correcting a possible gastric anacidity so common in pellagrins.

TABLE 4.—*Approximate composition of "yeast vitamine"-supplemented diet offered daily to each of a group of colored female pellagrins during the period up to June 22, 1925*

[Total calories: 2,104]

| Diet | | Nutrients | | |
|---|---|---|---|---|
| Articles of diet | Quantity | Protein | Fat | Carbohydrate |
| Basic: | *Grams* | *Grams* | *Grams* | *Grams* |
| Corn meal [1] | 140 | 11.8 | 6.3 | 103.6 |
| Corn grits | 48 | 4.4 | .9 | 36.2 |
| Wheat flour | 70 | 8.0 | .7 | 52.5 |
| Rice | 28 | 2.2 | .1 | 22.1 |
| Cowpeas (*Vigna sinensis*) [2] | 14 | 3.0 | .2 | 8.5 |
| Sirup | 90 | | | 63.9 |
| Lard | 42 | | 42.0 | |
| Vegetable cooking oil | 28 | | 28.0 | |
| Tomato juice [3] | 130 | | | |
| Supplemental: | | | | |
| Yeast vitamine (Harris) powder [4] | 15 | | | |
| Cod liver oil [5] | 15 | | 15.0 | |
| Calcium carbonate [6] | 3 | | | |
| Dilute hydrochloric acid (U. S. P.) (90 drops) [7] | | | | |
| Sirup iodid of iron (U. S. P.) (2 drops) [6] | | | | |
| Total nutrients | | 29.4 | 93.2 | 286.8 |
| Nutrients per 1,000 calories | | 14.0 | 44.4 | 136.6 |

[1] Whole maize meal sifted in the kitchen and made into corn bread and mush.
[2] Served in place of the variable dry legume ration of the institution.
[3] From canned tomatoes, pressed through a cloth.
[4] A commercial preparation.
[5] Given in place of the variable butter or margarine ration of the institution.
[6] Given to improve the mineral composition of the diet.
[7] Given with a view of correcting a possible gastric anacidity so common in pellagrins.

TABLE 5.—*Approximate composition of "yeast vitamine"-supplemented diet offered daily to each of a group of colored female pellagrins during the period June 26, 1925–December 31, 1925. (The period June 22 to June 26 was a period of change from the diet shown in Table 4 to that shown here)*

[Total calories: 2,118]

| Diet | | Nutrients | | |
|---|---|---|---|---|
| Articles of diet | Quantity | Protein | Fat | Carbohydrate |
| Basic: | *Grams* | *Grams* | *Grams* | *Grams* |
| Cornmeal [1] | 190 | 16.0 | 8.7 | 140.6 |
| Wheat flour | 70 | 8.0 | .7 | 52.5 |
| Rice | 14 | 1.1 | .0 | 11.1 |
| Cowpeas (*Vigna sinensis*) [2] | 28 | 6.0 | .4 | 17.0 |
| Sirup | 90 | | | 63.9 |
| Lard | 42 | | 42.0 | |
| Vegetable cooking oil | 28 | | 28.0 | |
| Tomato juice [3] | 130 | | | |
| Supplemental: | | | | |
| Yeast vitamine (Harris) powder [4] | 15 | | | |
| Cod-liver oil [7] | 15 | | 15.0 | |
| Calcium carbonate [5] | 3 | | | |
| Dilute hydrochloric acid (U. S. P.) (90 drops) [6] | | | | |
| Sirup iodid of iron (U. S. P.) (2 drops) [5] | | | | |
| Total nutrients | | 31.1 | 94.8 | 285.1 |
| Nutrients per 1,000 calories | | 14.8 | 45.1 | 135.8 |

[1] Whole maize meal sifted in the kitchen and made into corn bread and mush.
[2] Served in place of the variable dry legume ration of the institution.
[3] From canned tomatoes pressed through a cloth.
[4] A commercial preparation.
[5] Given to improve the mineral composition of the diet.
[6] Given with a view of correcting a possible gastric anacidity so common in pellagrins.
[7] Given in place of the variable butter or margarine ration of the institution.

TABLE 6.—*Composition of experimental black tongue producing diet No. 123.*[1] *On this diet recognizable signs of black tongue begin to appear in from one to three or four months. When adequately supplemented with "yeast vitamine" powder, Seidell's activated solid, autoclaved yeast, etc., black tongue does not develop. See also Table 8*

[Total calories: 2,400]

| Diet | | Nutrients | | |
|---|---|---|---|---|
| Articles of diet | Quantity | Protein | Fat | Carbohydrate |
| | *Grams* | *Grams* | *Grams* | *Grams* |
| Cornmeal [2] | 400 | 33.6 | 18.8 | 296.0 |
| Cowpeas (*Vigna sinensis*) [3] | 50 | 10.7 | .7 | 30.4 |
| Casein [4] (purified) | 60 | 52.0 | | |
| Sucrose | 32 | | | 32.0 |
| Cottonseed oil | 30 | | 30.0 | |
| Cod-liver oil | 15 | | 15.0 | |
| Sodium chlorid [5] | 10 | | | |
| Calcium carbonate [5] | 3 | | | |
| Total nutrients | | 96.3 | 64.5 | 358.4 |
| Nutrients per 1,000 calories | | 40.3 | 26.9 | 149.3 |

[1] The cornmeal, cowpeas, and salt are stirred into water and cooked one and one-half hours. Then the other ingredients are well stirred in, the total weight being brought to 2,400 grams with water (so that one gram equals one calorie) and this finished mixture is served to the dog *ad libitum*.
[2] This is whole maize meal sifted as for human consumption.
[3] The variety known as the California black-eye pea.
[4] Leached for a week in daily changes of acidulated water, after McCollum.
[5] The salt and calcium carbonate may be replaced by 22 grams of the well-known Osborne and Mendel salt mixture.

TABLE 7.—*Composition of diet No. 149,*[1] *a slight modification of rat ration, "Chart 5, Lot 568," of McCollum, Simmonds, and Pitz (J. Biol. Chem., 1916, vol. 28, p. 160), and on this authority considered complete for normal growth of the rat to the usual adult size. In the dog it permits of the development of black tongue; for this animal the diet is too low in factor P–P*

[Total calories: 2,354]

| Diet | | Nutrients | | |
|---|---|---|---|---|
| Articles of diet | Quantity | Protein | Fat | Carbohydrate |
| | *Grams* | *Grams* | *Grams* | *Grams* |
| Entire corn meal | 450 | [2] 45.5 | [2] 22.5 | [2] 328.0 |
| Casein [3] (purified) | 90 | 78.8 | | |
| Salts [4] | 22 | | | |
| Cod liver oil | 8 | | 8.0 | |
| Butterfat | 30 | | 30.0 | |
| Total nutrients | | 124.3 | 60.5 | 328.0 |
| Nutrients per 1,000 calories | | 52.9 | 25.7 | 139.6 |

[1] The cornmeal is stirred into water and boiled one and one-half hours, after which the other ingredients are stirred in and the weight of the whole is brought up to 2,354 grams with water (so that one gram equals one calorie) and the mixture then fed *ad libitum*.
[2] The factors used are those given by Henry & Morrison ("Feeds and Feeding") for dent corn.
[3] Leached for a week in daily changes of acidulated water, after McCollum.
[4] McCollum's salt mixture 185.

TABLE 8.—*Composition of diet No. 196.*[1] *Essentially the same as diet No. 123 (Table 6), except that the casein of the latter is replaced by lean beef. Unlike diet No. 123, this has well-marked black-tongue-preventive action, thus indicating that the lean of fresh beef contains factor P–P*

[Total calories: 2,400]

| Diet | | Nutrients | | |
|---|---|---|---|---|
| Articles of diet | Quantity | Protein | Fat | Carbohydrate |
| | *Grams* | *Grams* | *Grams* | *Grams* |
| Cornmeal [2] | 400 | 33.6 | 18.8 | 296.0 |
| Cowpeas (*Vigna sinensis*) [3] | 50 | 10.7 | .7 | 30.4 |
| Beef [4] (lean round) | 233 | 52.3 | 6.8 | |
| Cane sugar | 32 | | | 32.0 |
| Cottonseed oil | 23 | | 23.0 | |
| Cod liver oil | 15 | | 15.0 | |
| Sodium chlorid | 10 | | | |
| Calcium carbonate | 3 | | | |
| Total nutrients | | 96.6 | 64.3 | 358.4 |
| Nutrients per 1,000 calories | | 40.2 | 26.7 | 149.3 |

[1] The cornmeal, cowpeas, and salt are stirred into water and cooked one and one-half hours. Then the other ingredients are well stirred in, the total weight being brought to 2,400 grams with water (so that one gram equals one calorie) and this finished mixture is fed *ad libitum*.
[2] This is whole maize meal sifted as for human consumption.
[3] The variety known as the California black-eye pea.
[4] Fresh round steak, freed of gristle, tendon and visible fat, run through a meat chopper.

TABLE 9.—*Composition of rat diets used in the experiments illustrated in charts 1 to 5*

| Diet No. | Purified casein [1] | Salt mixture [2] | A cottonseed fat [3] | Cod liver oil | Corn starch | Alcoholic extract of corn meal | Autoclaved yeast [4] | Dried beef [5] |
|---|---|---|---|---|---|---|---|---|
| 206 | 20 | 4 | 3 | 2 | 71 | | | |
| 218 | 20 | 4 | 3 | 2 | 31 | 40 | | |
| 219A | 20 | 4 | 3 | 2 | 46 | 5 | | 20 |
| 227 | 20 | 4 | 3 | 2 | 44 | | 27 | |
| 228 | 20 | 4 | 3 | 2 | 22 | 40 | 9 | |
| 238B | 20 | 4 | 3 | 2 | 65 | 6 | | |
| 238C | 20 | 4 | 3 | 2 | 59 | 12 | | |
| 239 | 20 | 4 | 3 | 2 | 31 | | 40 | |
| 243E | 20 | 4 | 3 | 2 | 58 | 5 | 8 | |
| 243F | 20 | 4 | 3 | 2 | 56 | 5 | 10 | |

[1] After leaching for a week in daily changes of acidulated water (after McCollum), extracted, by intermittent percolation, with ether, followed by 95 per cent alcohol.
[2] Osborne and Mendel J. Biol. Chem., 1919 (37): 572.
[3] Crisco brand.
[4] In steam autoclave at 15 pounds pressure for two and one-half hours.
[5] Fresh round steak, trimmed free of visible fat, ground in meat chopper and dried in a current of warm air, then ground to a powder.

ACKNOWLEDGMENTS

We must again express our warmest appreciation of the cooperation extended to us by the Board of Trustees, the Superintendent, the Clinical Director, the Staff, and other officers of the Georgia State Sanitarium.

# QUANTITATIVE STUDIES OF BACTERIAL POLLUTION AND NATURAL PURIFICATION IN THE OHIO AND THE ILLINOIS RIVERS [1]

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The United States Public Health Service has been engaged for some years in studies of various phenomena concerned with the pollution and natural purification of streams. One general purpose of these studies has been to evaluate the intensity of bacterial pollution to be expected from known populations discharging sewage into streams of known discharge and velocity of flow. With this end in view detailed bacteriological data have been collected from two streams of quite different types, the Ohio and Illinois Rivers. Published observations on the Ohio River [2] covered a period of three years, and those of the Illinois River were continued for a complete year, so that in each instance information was obtained throughout an entire seasonal cycle.

From a consideration of the data of these studies some general tendencies in bacterial changes are indicated, which may be of assistance to sanitary engineers in forming an estimate of the effect, both immediate and prolonged, of adding sewage, from a definite population, to a watercourse of determined hydrometric characteristics.

The degree of bacterial pollution contributed by cities, about which information is most generally desired, may be separated into two principal cases. The first is concerned with the intensity of bacteria that will result in the stream in the zone of highest pollution below the point at which the sewage is discharged. The second and sometimes more important consideration is the proportion of such contributed bacteria that will remain in the stream at a known distance, or time of flow, below the point at which they were added.

## DISCUSSION

Due to fluctuations in discharge and inflow of all streams, the bacterial concentration resulting from a constant rate of contribution may vary widely. It is essential therefore, for a comparative study of results that not only the concentration of bacteria be considered, but that the actual quantities of organisms be taken into account as well. The quantities of bacteria present in, or added to, a watercourse can be expressed most conveniently in terms of a unit in which is combined the elements of volume, time, and bacterial concentration. Such a unit, called the "quantity unit," has been used for this purpose. The quantity unit may be defined to be the

[1] The last of four papers comprising a symposium on stream pollution which was presented at the meeting of the sanitary engineering of the American Society of Civil Engineers at Cincinnati, Ohio, April 23, 1925, and published in the Proceedings of the Society, Vol. LI, No. 9, November, 1925. The other papers were published in Public Health Reports for January 15, February 5, and February 12, 1926, respectivly.

[2] A study of the Pollution and Natural Purification of the Ohio River, Part II: Report on Surveys and Laboratory Studies. Public Health Bulletin No. 143, U. S. Public Health Service, Washington, D. C., 1924.

product of the discharge of 1 cubic foot per second and a concentration of 1,000 bacteria per cubic centimeter. Hence the number of quantity units of bacteria in a stream equals

$$\frac{\text{Discharge, in second-feet} \times \text{bacteria per cubic centimeter}}{1{,}000}$$

Obviously, this unit is convertible into bacterial numbers per unit of time, such as the day. Thus, an average of 1,000 bacteria per cubic centimeter in a flow of 1 second-foot for 1 day, or 86,400 seconds, is equivalent to 28,317 (=number of cubic centimeters in 1 cubic-foot) $\times 1{,}000 \times 86{,}400$, or 2,446,589,000,000 bacteria per day in one quantity unit.

## IMMEDIATE POLLUTION

In observations of the effect of pollution by sewered communities, it has been noted consistently that the zone of greatest bacterial density in the receiving stream does not occur immediately below the sewer outfalls, but at a point 10 to 30 hours downstream from the place where such pollution is added. Moreover, the location of this maximum zone seems to be influenced by seasonal temperatures, being farthest downstream during the winter months. Whether an actual multiplication of organisms in the stream takes place until this maximum is reached, or whether the observed increase in bacterial numbers is due to the physical separation of organic matter has not been definitely determined, although the evidence seems to point to the former assumption as the most logical explanation.

Observations extending over the entire seasonal cycle have been made of the numbers of bacteria per capita added to the stream by the sewage pollution from Cincinnati, Ohio, Louisville, Ky., Chicago, and Peoria, Ill. In each instance the numbers appear to vary with seasonal temperature conditions, being considerably greater in summer than in winter. These seasonal fluctuations are shown for each of the four cities, both in terms of quantity units per capita and in billions of bacteria per capita per day, in Table 5, wherein the values for summer, for winter, and the averages for the entire year are presented.

By combining the yearly per capita contributions of gelatin, agar, and *B. coli* counts, respectively, of all the four cities, a general average is obtained which may be considered to be roughly representative of the annual average quantity units of the respective types of bacteria contributed to these streams per capita of the sewered population.

The variation from month to month in the numbers of bacteria contributed is, in general, reasonably consistent, increasing quite rapidly to a maximum in June or July and declining again gradually until October and then more rapidly to the lower numbers found throughout the winter season. These changes in the contribution of

*B. coli* from each of the four cities are shown in more detail in Table 6, in which the figures represent the ratio of the count each month to the annual average, the latter being taken as equivalent to 100. The averages of the ratios for these four cities for corresponding months represent what might be considered a general measure of the degree of change from month to month in numbers of *B. coli* contributed by urban sewered population. Similar averages have been derived for the monthly variations in numbers of bacteria growing on gelatin at 20° C. in 48 hours and an agar at 37° C. in 24 hours, all of which are assembled in Table 7 and plotted in Figure 11. For purposes of comparison the average monthly river water temperatures are also given in Tables 6 and 7.

TABLE 5.—*Seasonal changes in numbers of bacteria added to streams by sewered populations of Cincinnati, Ohio, Louisville, Ky., and Chicago and Peoria, Ill.*

| Added by— | Quantity units of bacteria per capita[1] | | | Billions of bacteria per capita per day | | |
|---|---|---|---|---|---|---|
| | | | | Growing on— | | |
| | Gelatin | Agar | *B. coli* | Gelatin at 20° C. for 48 hours | Agar at 37° C. for 24 hours | *B. coli* |
| Chicago: | | | | | | |
| Summer | 10.148 | 10.485 | 0.175 | 24 828 | 25 652 | 428 |
| Winter | 1.740 | .346 | .017 | 4 257 | 847 | 42 |
| Year | 6.252 | 4.566 | .094 | 15 296 | 11 171 | 230 |
| Peoria: | | | | | | |
| Summer | 6.447 | 10.480 | .0912 | 15 773 | 25 640 | 231 |
| Winter | .869 | 3.125 | .0577 | 2 126 | 7 646 | 141 |
| Year | 4.518 | 7.894 | .0763 | 11 054 | 19 313 | 187 |
| Cincinnati: | | | | | | |
| Summer | 5.764 | 7.486 | .238 | 14 102 | 18 314 | 583 |
| Winter | 1.058 | .410 | .0486 | 2 538 | 1 002 | 119 |
| Year | 4.811 | 5.009 | .1463 | 11 770 | 12 256 | 358 |
| Louisville: | | | | | | |
| Summer | 5.544 | 6.475 | .1189 | 13 564 | 15 842 | 291 |
| Winter | 3.008 | .3707 | .0789 | 7 359 | 907 | 193 |
| Year | 4.431 | 3.254 | .0907 | 10 841 | 7 962 | 222 |
| Averages: | | | | | | |
| Summer | 6.976 | 8.731 | .1565 | 17 067 | 21 362 | 383 |
| Winter | 1.669 | 1.063 | .0507 | 4 083 | 2 600 | 124 |
| Year | 5.003 | 5.181 | .1018 | 12 240 | 12 676 | 249 |

[1] One quantity unit=2,446,589,000,000,000 bacteria per day.

TABLE 6.—*Monthly variation in water temperature and in numbers of B. coli added to streams by sewered populations of cities*

[Average for year = 100]

| Month | Cincinnati, Ohio | | Louisville, Ky. | | Chicago, Ill. | | Peoria, Ill. | | Average | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Water temperature | Bacteria, percentage of annual average | Water temperature | Bacteria, percentage of annual average | Water temperature | Bacteria, percentage of annual average | Water temperature | Bacteria, percentage of annual average | Water temperature | Bacteria, percentage of annual average |
| | °C. | | °C. | | °C. | | °C. | | °C. | |
| January | 2.4 | 29 | 2.6 | 60 | 0.3 | 12 | 0.6 | 2 | 1.5 | 26 |
| February | 3.3 | 39 | 3.3 | 109 | 1.0 | 16 | .4 | 77 | 2.0 | 60 |
| March | 4.1 | 32 | 4.3 | 91 | 3.7 | 13 | 4.9 | 228 | 4.3 | 91 |
| April | 10.9 | 53 | 11.3 | 69 | 8.6 | 33 | 9.6 | 13 | 10.1 | 42 |
| May | 17.9 | 93 | 18.5 | 123 | 15.0 | 136 | 18.6 | 158 | 17.5 | 128 |
| June | 23.2 | 116 | 23.2 | 79 | 20.9 | 200 | 24.6 | 494 | 23.0 | 222 |
| July | 26.2 | 185 | 26.8 | 174 | 22.4 | 393 | 25.8 | 51 | 25.3 | 201 |
| August | 25.5 | 151 | 26.3 | 122 | 23.8 | 110 | 25.5 | 24 | 25.3 | 102 |
| September | 22.4 | 111 | 23.4 | 174 | 20.1 | 123 | 23.5 | 64 | 22.3 | 118 |
| October | 16.7 | 252 | 17.5 | 108 | 13.8 | 98 | 14.5 | 66 | 15.6 | 131 |
| November | 9.3 | 84 | 11.0 | 26 | 7.4 | 35 | 7.6 | 23 | 8.8 | 42 |
| December | 3.9 | 56 | 5.0 | 66 | 3.2 | 30 | 4.2 | 0 | 4.1 | 38 |
| Year | | 100 | | 100 | | 100 | | 100 | | 100 |

TABLE 7.—*Seasonal variation in numbers of bacteria contributed to streams by sewered populations*

(Yearly average=100)

| Month | Temperature | Percentage of annual average | | |
|---|---|---|---|---|
| | | Gelatin count | Agar count | *B. coli* |
| | °C. | | | |
| January | 1.5 | 27 | 13 | 26 |
| February | 2.0 | 52 | 20 | 60 |
| March | 4.3 | 31 | 22 | 91 |
| April | 10.1 | 77 | 32 | 42 |
| May | 17.5 | 162 | 107 | 128 |
| June | 23.0 | 186 | 227 | 222 |
| July | 25.3 | 115 | 168 | 201 |
| August | 25.3 | 134 | 188 | 102 |
| September | 22.3 | 132 | 161 | 118 |
| October | 15.6 | 155 | 166 | 131 |
| November | 8.8 | 91 | 69 | 42 |
| December | 4.1 | 59 | 27 | 38 |
| Year | | 100 | 100 | 100 |

If these average values as derived are representative of the bacterial changes in streams in general, as brought about by sewage pollution, they supply a ready means of estimating the maximum concentration of bacteria to be expected in a stream of known discharge resulting from the sewage of a known population. The bacteria per cubic centimeter thus added can be computed at once by the relationship:

$$\left.\begin{array}{l}\text{Bacteria per cubic}\\ \text{centimeter added}\end{array}\right\} = \frac{\text{Population} \times \text{quantity units per capita}}{\text{Discharge, in thousands of second-feet}}$$

As an example, the average yearly numbers per cubic centimeter of *B. coli* contributed by Cincinnati (with a sewered population of

494,300) to the Ohio River, where the mean annual flow is 97,500 second-feet, is

$$\frac{494{,}300 \times 0.1018}{97.5} = 516$$

Similarly, the concentration for any season or month may be estimated by applying to the yearly average the proper seasonal factor

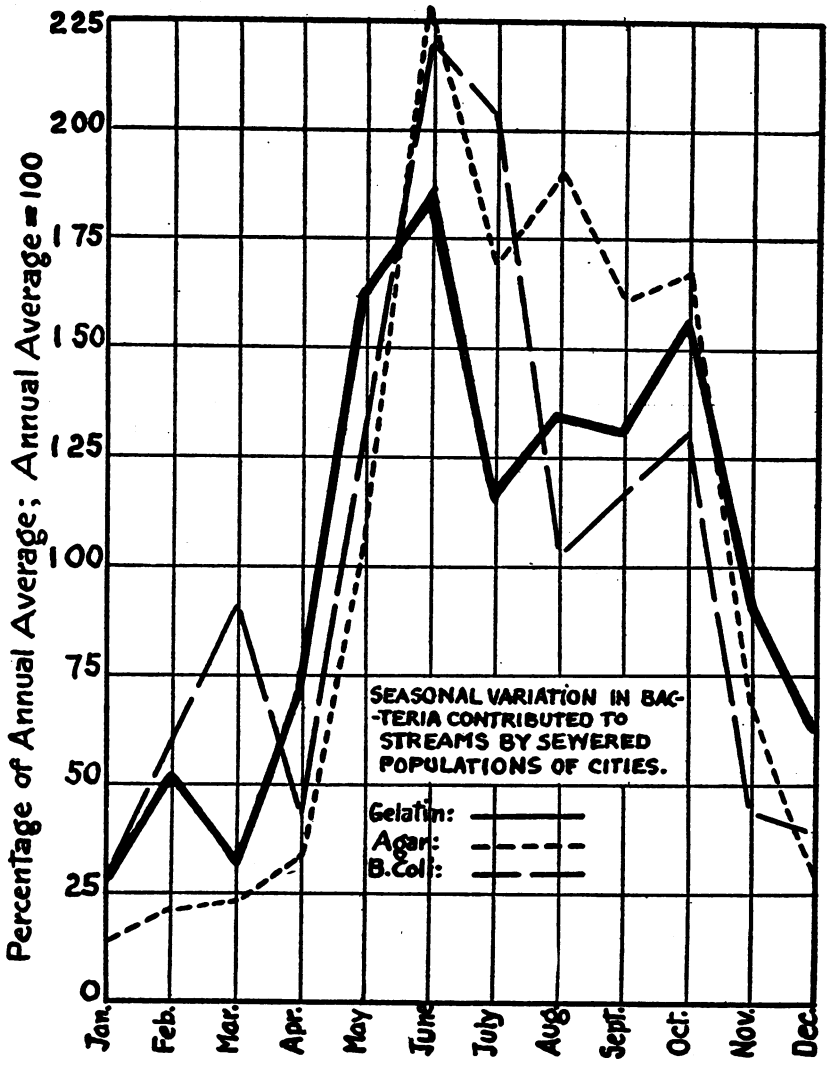


FIG. 11

given in Table 7. Thus, in July, when the discharge of the Ohio River is 19,000 second-feet, the estimated concentration of *B. coli* per cubic centimeter contributed by Cincinnati would be

$$\frac{494{,}300 \times 0.1018 \times 2.01}{19{,}000} = 5{,}320$$

Applying this method of estimation to the four cities of Cincinnati, Louisville, Chicago, and Peoria, it is possible to compare directly the computed concentrations of bacteria to be expected in each case with the densities actually observed to have resulted from the sewage pollution contributed. Such a comparison of computed and observed concentrations of *B. coli* is presented in Table 8, together with the average monthly rates of stream discharge and other related data. It will be noted that, although the estimated concentrations for some individual months differ quite widely from those actually observed, yet in the main the two sets of values are comparable and generally of the same degree of magnitude. Bearing in mind that the actual enumeration of *B. coli* is subject to considerable variation, it would appear that the use of the formula as a rough working model may be justified.

TABLE 8.—*Comparison of computed and observed concentrations of B. coli contributed by sewered populations*

($B.\ coli$ per cubic centimeter (computed value) $= \frac{\text{Population} \times 0.1018 \times \text{factor}}{\text{Discharge (thousands of second-feet)}}$)

| Month | Temperature range | Factor | Cincinnati,[1] Ohio, (population, 494,300) | | | Louisville,[2] Ky., (population, 179,800) | | | Chicago, Ill., (population, 2,834,000) | | | Peoria, Ill (population, 76,500) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Discharge | *B. coli* | | Discharge | *B. coli* | | Discharge | *B. coli* | | Discharge | *B. coli* | |
| | | | | Computed | Actual | | Computed | Actual | | Computed | Actual | | Computed | Actual |
| | °C. | | 1,000 sec.-ft. | Per c. c. | Per c. c. | 1,000 sec.-ft. | Per c. c. | Per c. c. | 1,000 sec.-ft. | Per c. c. | Per c. c. | 1,000 sec.-ft. | Per c. c. | Per c. c. |
| January | 1.5 | 0.26 | 195.8 | 67 | 106 | 108.0 | 14 | 91 | 8.31 | 9,030 | 3,890 | 20.50 | 99 | 4 |
| February | 2.0 | .60 | 212.7 | 142 | 131 | 221.0 | 50 | 80 | 8.38 | 20,600 | 5,200 | 16.10 | 290 | 265 |
| March | 4.3 | .91 | 149.7 | 306 | 156 | 192.0 | 87 | 77 | 8.74 | 30,000 | 4,050 | 23.40 | 303 | 541 |
| April | 10.1 | .42 | 165.5 | 128 | 232 | 297.0 | 26 | 38 | 8.48 | 14,300 | 10,400 | 47.80 | 68 | 15 |
| May | 17.5 | 1.28 | 92.9 | 693 | 720 | 147.0 | 159 | 136 | 8.91 | 41,400 | 40,500 | 24.40 | 409 | 358 |
| June | 23.0 | 2.22 | 68.3 | 1,640 | 1,230 | 28.8 | 1,410 | 445 | 9.37 | 68,400 | 56,800 | 16.90 | 1,020 | 1,622 |
| July | 25.3 | 2.01 | 47.1 | 2,150 | 2,830 | 23.1 | 1,550 | 1,230 | 8.85 | 65,500 | 118,000 | 11.70 | 1,340 | 241 |
| August | 25.3 | 1.02 | 38.5 | 1,330 | 2,830 | 18.3 | 1,020 | 1,090 | 8.52 | 34,500 | 34,500 | 10.10 | 786 | 131 |
| September | 22.3 | 1.18 | 29.4 | 2,020 | 2,720 | 20.9 | 1,030 | 1,360 | 8.23 | 41,400 | 39,600 | 11.90 | 772 | 297 |
| October | 15.6 | 1.31 | 37.2 | 1,770 | 4,900 | 22.4 | 1,070 | 736 | 8.54 | 44,300 | 30,500 | 12.90 | 790 | 284 |
| November | 8.8 | .42 | 29.5 | 716 | 2,070 | 12.3 | 625 | 340 | 8.87 | 13,700 | 10,400 | 16.10 | 203 | 78 |
| December | 4.1 | .38 | 100.3 | 191 | 468 | 96.5 | 72 | 111 | 8.67 | 12,600 | 9,200 | 25.10 | 118 | ------ |
| Year | ------ | 1.00 | ------ | 929 | 1,530 | ------ | 599 | 482 | ------ | 33,000 | 30,300 | ------ | 517 | 349 |

[1] Averages for three years, 1914, 1915, and 1916. [2] Data for 1914.

## RATES OF DECREASE IN BACTERIAL POLLUTION

Quite extensive observations of the decrease of bacteria in polluted waters indicate that such changes follow a fairly regular course, modified by variations in environment, such as temperature and other factors, but yet having on orderly arrangement of reduction. Just what agency is primarily responsible for the death of such bacteria has not been definitely determined. However, there is considerable

evidence suggesting that plankton activity rather than lack of food supply is the dominant influence in bacterial diminution.[3]

A simple and direct method for determining the rates of baterial decrease in streams, if it were practicable, would be to observe the changes occurring in stored samples of the water under consideration. Unfortunately, the decreases in such stored samples do not correspond invariably with the natural rates occurring in the stream. Long-continued efforts—still in progress—to place the study of bacterial death rates on such an experimental basis, have thus far not been successful. Resort must then be made to the observation of natural purification occurring in streams. Under such conditions, all modifying factors are impossible of accurate control and in many cases

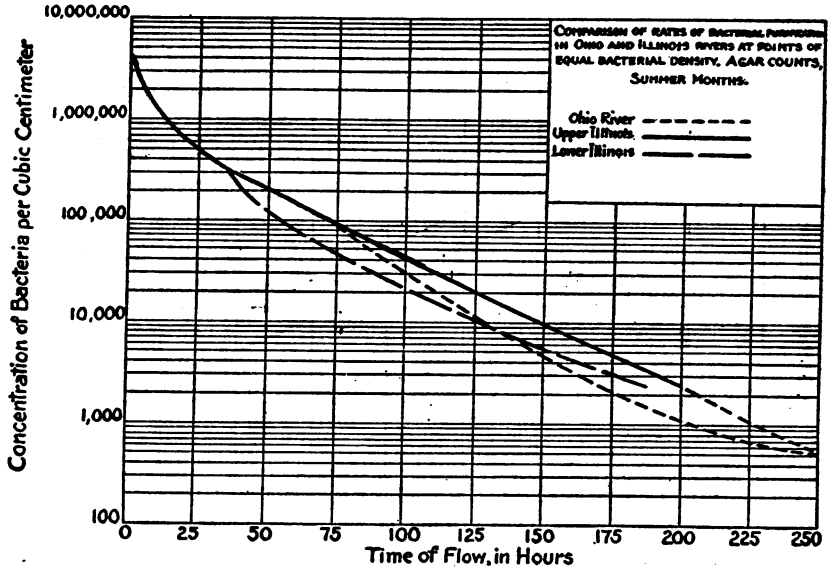


FIG. 12

corrections for them can be applied only in an approximate manner. Therefore, rates of decrease thus determined must necessarily be interpreted with these limitations clearly understood.

Studies of natural purification of the Ohio River[4] indicate that changes in the bacterial content between Cincinnati and Louisville are quite orderly and that the rates of decrease can be represented in a general way by empirical curves and formulas. Similar observations on the Illinois River have tended to confirm this conclusion and have indicated that such changes may be of general occurrence, rather than confined to these two streams. The rates of decrease in all instances are not directly comparable, however, and, as stated in the Public

[3] The effect of plankton animals upon bacterial death rates. By W. C. Purdy and C. T. Butterfield. American Journal of Public Health, Vol. VIII, No. 7, July, 1918, pp. 499-505.

[4] Presented in detail in Public Health Bulletin No. 143.

Health Bulletin referred to, these rates must be considered as approximate only, since they apparently are modified by other factors, such as density or concentration, and perhaps, also, by relative age or staleness of the sewage contributed. It is certain, at least, that the rates of bacterial decrease from the point of maximum concentration in the Ohio River are quite different from those observed in the Illinois. However, when the disparity in initial concentrations is taken into account and comparisons are made at points of equal bacterial density, the rates coincide much more closely. This condition is perhaps best illustrated by the summer rates of decrease in bacteria growing on agar at 37° C., as observed in the Ohio, in the Illinois River below Chicago, and, again, below Peoria, the base data of which

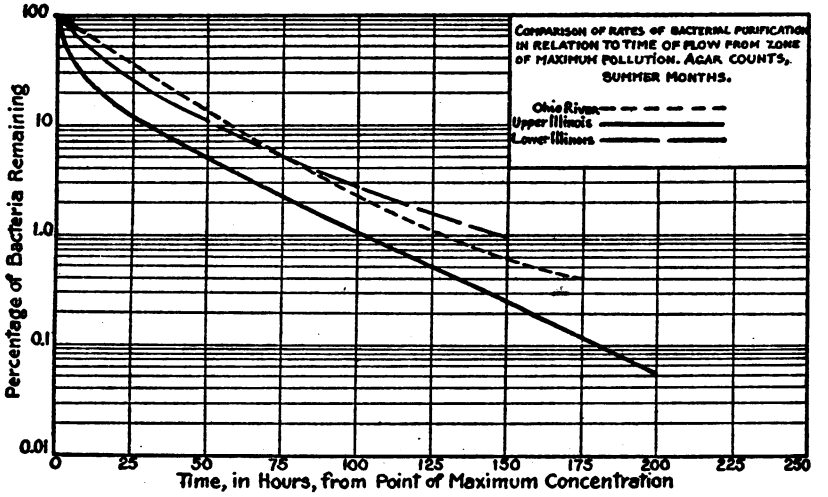


FIG. 13

are given in Table 9. Figure 12 shows these rates plotted from the same origin, and Figure 13 shows the same curves shifted so that at the points of maximum concentration they coincide with the corresponding density of the upper Illinois River curve.

Although such an adjustment according to maximum density brings the rates into closer harmony, characteristic preliminary decreases, probably due to other unknown factors, are still evident in each of the curves. It may finally prove to be impracticable, therefore, to develop a composite expression or curve defining accurately the general rate of bacterial decrease in all streams. A series of such expressions or curves, taking into consideration various modifying factors, may be found to portray best the actual rates of most probable change.

TABLE 9.—*Decrease in agar counts, summer season*

[As read from curves]

| Time from maximum, in hours | Ohio River | | Upper Illinois River | | Lower Illinois River | |
|---|---|---|---|---|---|---|
| | Per cubic centimeter | Percentage of maximum | Per cubic centimeter | Percentage of maximum | Per cubic centimeter | Percentage of maximum |
| 0 | 99,300 | 100.00 | 3,890,000 | 100.000 | 243,000 | 100.00 |
| 10 | 66,800 | 67.26 | 1,180,000 | 30.300 | 121,000 | 48.70 |
| 20 | 45,100 | 45.37 | 640,000 | 16,450 | 75,000 | 30.20 |
| 30 | 30,500 | 30.71 | 410,000 | 10.550 | 52,000 | 21.00 |
| 40 | 20,800 | 20.90 | 275,000 | 7.070 | 38,000 | 15.30 |
| 50 | 14,200 | 14.31 | 197,000 | 5.060 | 28,200 | 11.40 |
| 70 | 6,840 | 6.89 | 106,000 | 2.720 | 16,500 | 6.65 |
| 100 | 2,540 | 2.56 | 43,000 | 1.100 | 7,800 | 3.14 |
| 125 | 1,290 | 1.30 | 20,500 | .526 | 4,200 | 1.69 |
| 150 | 755 | .76 | 9,600 | .247 | 2,150 | .87 |
| 175 | 497 | .50 | 4,500 | .116 | ---------- | ---------- |
| 200 | 357 | .36 | 2,150 | .055 | ---------- | ---------- |

However, the decreases in bacterial numbers are in a broad way quite similar, and it is possible, from the available data collected, to indicate the general trend of such decreases. Such a general rate of purification, if applicable to a specific case, may assist in forming an estimate of the relative numbers of bacteria that may be expected to survive in the stream after any definite interval of time.

TABLE 10.—*Decreases in B. coli from various maximum concentrations, in relation to time of flow, summer season*

| Ohio River Curve [1] | | Upper Illinois River | | Lower Illinois River | |
|---|---|---|---|---|---|
| Time from maximum, in hours | *B. coli* per cubic centimeter | Time from maximum, in hours | *B. coli* per cubic centimeter | Time from maximum, in hours | *B. coli* per cubic centimeter |
| 0 | 2,280 | 0 | 65,600 | 0 | 3,550 |
| 10 | 1,459 | 10 | 22,200 | 10 | 1,300 |
| 20 | 934 | 20 | 11,800 | 20 | 620 |
| 30 | 599 | 30 | 6,700 | 30 | 340 |
| 40 | 385 | 40 | 4,100 | 40 | 190 |
| 70 | 105 | 70 | 1,100 | 70 | 40 |
| 100 | 32 | 100 | 385 | 100 | 11 |
| 125 | 14 | 125 | 170 | 125 | 4 |
| 150 | 8 | 150 | 76 | ---------- | ---------- |
| 175 | 5 | 175 | 34 | ---------- | ---------- |
| 200 | 4 | 200 | 15 | ---------- | ---------- |

[1] Table No. 125, Public Health Bulletin No. 143.

Such general rates of decrease for *B. coli*, under both summer and winter seasonal conditions, have been outlined by the data of the Ohio and Illinois River studies, and are assembled in Tables 10, 11, and 12. The rates of decrease for the Illinois River were derived from observations on the upper Illinois River in which the sewage of Chicago is the agency of pollution, whereas in the lower Illinois River, the major pollution is contributed by the metropolitan district of

Peoria. Daily observations at successive downstream sampling stations were averaged over both the summer and winter seasons, and smooth curves defining the rates of natural purification were drawn through these experimentally determined results, plotted on semi-logarithmic paper. The method of obtaining the Ohio River rates of decrease is described in Public Health Bulletin No. 143 previously referred to. In addition to these general curves of the Ohio, data defining rates of purification at different maximum densities of bacterial content are presented in Table No. 114 of that publication, wherein are presented observations of bacterial numbers at successive sampling stations grouped according to volume of discharge of the river. By grouping these data according to initial concentration and by times from origin, average densities for each group have been obtained at various average intervals of time in hours from the point of maximum density. The results of such grouping for different initial densities are also presented in Tables 10, 11, and 12 for summer and winter, respectively, and define average rates of decrease of *B. coli* starting from the various maximum concentrations.

TABLE 11.—*Decreases in B. coli from various maximum concentrations, in relation to time of flow, summer season*

[Ohio River observations grouped by initial concentrations [1]]

| Time from maximum, in hours | *B. coli* per cubic centimeter | Time from maximum, in hours | *B. coli* per cubic centimeter | Time from maximum, in hours | *B. coli* per cubic centimeter | Time from maximum, in hours | *B. coli* per cubic centimeter | Time from maximum, in hours | *B. coli* per cubic centimeter | Time from maximum, in hours | *B. coli* per cubic centimeter | Time from maximum, in hours | *B. coli* per cubic centimeter | Time from maximum, in hours | *B. coli* per cubic centimeter |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 8,237 | 0 | 4,623 | 0 | 2,557 | 0 | 1,684 | 0 | 1,211 | 0 | 607 | 0 | 239 | 0 | 165 |
| | | | | 4.7 | 1,746 | | | 4.6 | 1,091 | 2.3 | 325 | 3.8 | 138 | 2.5 | 77 |
| | | | | 7.3 | 1,560 | 7.3 | 961 | 8.9 | 728 | 6.0 | 286 | 6.3 | 100 | | |
| | | 14.9 | 1,741 | | | 11.5 | 1,264 | | | | | 12.5 | 70 | | |
| 17.7 | 1,460 | | | | | | | | | | | | | 18.2 | 70 |
| 24.9 | 1,548 | 22.8 | 1,953 | | | | | 23.5 | 336 | 23.6 | 417 | | | | |
| 28.6 | 1,359 | 29.2 | 951 | | | 25.9 | 197 | | | 27.3 | 174 | 28.3 | 25 | | |
| | | 36.4 | 604 | | | 38.2 | 178 | 38.7 | 396 | | | | | 35.4 | 51 |
| | | 43.5 | 450 | 49.4 | 325 | 45.1 | 402 | | | | | | | | |
| | | | | 62.8 | 429 | 64.2 | 88 | 35.1 | 73 | 30.8 | 98 | | | | |
| | | 96 | 122 | | | | | 84.5 | 70 | | | | | | |
| 110 | 94 | | | 118 | 21 | 101 | 35 | | | | | | | | |
| | | 131 | 328 | 136 | 18 | | | | | | | | | | |
| | | | | 159 | 9 | | | | | | | | | | |
| | | 255 | 5 | | | | | | | | | | | | |

[1] Data from Table No. 114, Public Health Bulletin No. 143.

TABLE 12.—*Decreases in B. coli from various maximum concentrations, in relation to time of flow, winter season*

| Ohio River curve [1] | | Upper Illinois curve | | Lower Illinois curve | | Ohio River observations grouped by initial concentrations [2] | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Time from maximum, in hours | *B. coli* per cubic centimeter | Time from maximum, in hours | *B. coli* per cubic centimeter | Time from maximum, in hours | *B. coli* per cubic centimeter | Time from maximum, in hours | *B. coli* per cubic centimeter | Time from maximum, in hours | *B. coli* per cubic centimeter | Time from maximum, in hours | *B. coli* per cubic centimeter |
| 0 | 260 | 0 | 7,200 | 0 | 180 | 0 | 368 | 0 | 231 | 0 | 173 |
| | | | | | | 4.6 | 62 | 3.4 | 115 | 2.3 | 92 |
| | | | | | | 7.4 | 133 | 6.6 | 98 | 6.0 | 86 |
| 10 | 156 | 10 | 4,120 | 10 | 111 | 12.8 | 175 | | | 12.5 | 130 |
| | | | | | | | | | | 18.8 | 66 |
| | | | | | | | | 20.5 | 117 | 21.6 | 70 |
| 25 | 78 | 25 | 2,500 | 25 | 68 | | | 26.1 | 40 | 27.3 | 70 |
| | | | | | | 38.3 | 46 | 33.9 | 86 | | |
| | | | | | | 44.3 | 54 | | | 49.7 | 41 |
| 50 | 31 | 50 | 1,400 | 50 | 37 | 59.3 | 25 | 64.2 | 33 | 51.6 | 35 |
| 75 | 17 | 75 | 890 | 75 | 22 | 83.3 | 18 | | | | |
| 100 | 12 | 100 | 610 | 100 | 14 | 104 | 8 | | | | |
| 125 | 9 | 125 | 422 | | | 131 | 11 | | | | |
| | | 150 | 300 | | | | | | | | |
| | | 175 | 210 | | | | | | | | |
| | | 200 | 150 | | | | | | | | |

[1] Table No. 127, Public Health Bulletin No. 143.
[2] Data from Table No. 114, Public Health Bulletin No. 143.

If these data are plotted on semilogarithmic paper, in which the concentrations of *B. coli* are plotted as ordinates on the logarithmic scale and the times from maximum concentration as abscissas on the plain scale, it will be observed that these points define, in a general way, fairly smooth curves, all of which have the same general trend. It may be noted also that the curves of winter purification are of much flatter slope than are those of summer, indicating that natural purification proceeds at much slower rates during cold weather. It is entirely possible, therefore, regardless of the generally lower numbers of bacteria contributed during the winter season, that the critical or most severe period of bacterial pollution to be expected from a given sewage discharged upstream may occur during the winter, rather than during the summer. This is, of course, the reverse of what would be expected of the critical oxygen depletion condition resulting from the same sewage pollution.

Having obtained the general rates of decrease in *B. coli* for various initial concentrations, it is possible to interpolate intermediate rates of decrease, starting from definite initial concentrations. Such interpolated rates should indicate, in a general way, the numbers of *B. coli* that may be expected to survive after definite intervals of time have elapsed beyond the point of greatest bacterial density in the stream. Such rates of decrease are for convenience placed in tabular form for ready reference in Tables 13 and 14, Table 13 repre-

senting summer conditions and defining numbers of bacteria remaining after definite intervals of time, starting from various densities at the maximum point, and Table 14 presenting the same data for winter months.

TABLE 13.—*Numbers of B. coli per cubic centimeter remaining after stated times of flow from point of maximum concentration, summer season*

| Initial maximum concentration of *B. coli* | *B. coli* per cubic centimeter remaining after interval of— | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 10 hours | 25 hours | 50 hours | 75 hours | 100 hours | 125 hours | 150 hours | 175 hours | 200 hours |
| 75,000 | 30,000 | 9,800 | 2,900 | 1,000 | 420 | 190 | 84 | 37 | 17 |
| 60,000 | 20,000 | 7,900 | 2,300 | 800 | 350 | 150 | 70 | 32 | 15 |
| 40,000 | 14,000 | 5,900 | 2,000 | 600 | 270 | 120 | 57 | 27 | 14 |
| 20,000 | 7,600 | 3,000 | 1,070 | 420 | 190 | 94 | 47 | 25 | 13 |
| 10,000 | 4,000 | 1,600 | 640 | 270 | 130 | 68 | 36 | 20 | 12 |
| 5,000 | 2,300 | 1,100 | 410 | 170 | 78 | 42 | 24 | 15 | 12 |
| 1,000 | 440 | 210 | 80 | 30 | 13 | 5 | | | |
| 500 | 260 | 130 | 70 | 25 | 8 | | | | |
| 100 | 40 | 20 | 12 | | | | | | |

TABLE 14.—*Numbers of B. coli per cubic centimeter remaining after stated times of flow from point of maximum concentration, winter season*

| Initial maximum concentration of *B. coli* | *B. coli* per cubic centimeter remaining after interval of— | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 10 hours | 25 hours | 50 hours | 75 hours | 100 hours | 125 hours | 150 hours | 175 hours | 200 hours |
| 10,000 | 6,000 | 3,500 | 2,000 | 1,200 | 840 | 600 | 420 | 300 | 200 |
| 5,000 | 3,000 | 1,800 | 960 | 600 | 400 | 300 | 200 | 140 | 100 |
| 1,000 | 520 | 280 | 140 | 80 | 54 | 38 | 26 | | |
| 500 | 240 | 120 | 60 | 32 | 21 | 15 | | | |
| 100 | 62 | 40 | 20 | 12 | 7 | | | | |

However, before such estimates can be accepted with complete confidence it is obviously necessary that they be checked by observations on a considerable number of streams of different physical characteristics. The empirical results herein presented outline what the observations thus far have indicated to take place and endeavor to suggest their practical application. The explanation of the phenomena concerned in such changes must await additional research.

## SUMMARY

Quite extended observations of the pollution of Illinois and Ohio Rivers have indicated that the numbers of bacteria contributed per capita by the sewered populations of various cities are reasonably constant; these numbers change, however, with seasonal temperature, being much greater in summer than in winter. Such bacteria tend to increase in numbers in the receiving stream for a short period and then decrease at orderly rates as the time from the point

of maximum density is increased. These rates of decrease were found to be affected by water temperature and apparently by concentration, being most intensive during the warmer months and under conditions where the density of bacteria was greatest.

Having established definite quantitative relationships from these observations, and assuming that they are fairly representative of stream conditions in general, a method is suggested for estimating the maximum concentration of *B. coli* in streams of known volume of flow that may be expected to result from pollution contributed by known sewered populations. Furthermore, the concentration of such organisms remaining at any point downstream may be estimated, providing the velocity of flow is ascertained.

If the observations are representative of general biological laws, they are of practical value for estimating the increasing burden placed on streams receiving the sewage of growing communities and, consequently, the added loads that water-purification plants must be prepared to handle where such polluted watercourses are used as sources of water supply.

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## MEASLES IN THE UNITED STATES, 1923, 1924, AND 1925

The following table gives the numbers of cases of measles reported each quarter during the years 1923, 1924, and 1925 by State health officers of 42 States. The figures are preliminary for most of the States. Final figures will be published later.

The numbers of cases fluctuate widely. This is a characteristic of statistics for measles. In general, the figures for 1925 are low, but the last quarter of that year shows a relative increase in many parts of the country.

*Cases of measles reported during 1925, by State health officers, compared with similar reports for the years 1923 and 1924*

| | First quarter | Second quarter | Third quarter | Fourth quarter | Total 12 months |
|---|---|---|---|---|---|
| **New England:** | | | | | |
| Maine— | | | | | |
| 1925 | 137 | 134 | 59 | 33 | 363 |
| 1924 | 1,725 | 1,242 | 124 | 53 | 3,144 |
| 1923 | 937 | 2,359 | 578 | 415 | 4,289 |
| New Hampshire— | | | | | |
| 1925 | 269 | 411 | 85 | 18 | 783 |
| 1924 | 1,005 | 777 | 43 | 133 | 1,958 |
| 1923 | 158 | 860 | 588 | 1,384 | 2,990 |
| Vermont— | | | | | |
| 1925 | 88 | 278 | 144 | 69 | 579 |
| 1924 | 2,224 | 999 | 143 | 229 | 3,595 |
| 1923 | 259 | 2,529 | 889 | 1,698 | 5,375 |
| Massachusetts— | | | | | |
| 1925 | 6,272 | 10,696 | 1,644 | 10,204 | 28,816 |
| 1924 | 9,943 | 9,944 | 1,235 | 1,303 | 22,425 |
| 1923 | 11,105 | 11,208 | 1,465 | 3,076 | 26,854 |
| Connecticut— | | | | | |
| 1925 | 1,122 | 2,813 | 436 | 1,173 | 5,544 |
| 1924 | 2,420 | 1,769 | 320 | 117 | 4,626 |
| 1923 | 4,968 | 2,593 | 400 | 1,699 | 9,660 |
| Total— | | | | | |
| 1925 | 7,888 | 14,332 | 2,368 | 11,497 | 36,085 |
| 1924 | 17,317 | 14,731 | 1,865 | 1,835 | 35,748 |
| 1923 | 17,427 | 19,549 | 3,920 | 8,272 | 49,168 |
| **Middle Atlantic:** | | | | | |
| New York— | | | | | |
| 1925 | 5,240 | 10,722 | 2,157 | 11,482 | 29,601 |
| 1924 | 32,703 | 32,098 | 3,428 | 1,970 | 70,199 |
| 1923 | 14,364 | 33,742 | 6,662 | 9,857 | 64,625 |
| New Jersey— | | | | | |
| 1925 | 2,154 | 5,003 | 741 | 2,703 | 10,601 |
| 1924 | 6,165 | 8,234 | 813 | 575 | 15,787 |
| 1923 | 14,238 | 10,802 | 868 | 1,881 | 27,789 |
| Pennsylvania— | | | | | |
| 1925 | 11,075 | 21,049 | 2,497 | 7,109 | 41,730 |
| 1924 | 9,042 | 7,792 | 1,530 | 3,681 | 22,045 |
| 1923 | 59,230 | 32,118 | 2,474 | 5,469 | 99,291 |
| Total— | | | | | |
| 1925 | 18,469 | 36,774 | 5,395 | 21,294 | 81,932 |
| 1924 | 47,910 | 48,124 | 5,771 | 6,226 | 108,031 |
| 1923 | 87,832 | 76,662 | 10,004 | 17,207 | 191,705 |
| **East North Central:** | | | | | |
| Ohio— | | | | | |
| 1925 | 1,909 | 5,369 | 724 | 6,031 | 14,033 |
| 1924 | 4,348 | 8,836 | 878 | 488 | 14,550 |
| 1923 | 18,732 | 26,334 | 1,356 | 1,301 | 47,723 |
| Indiana— | | | | | |
| 1925 | 1,750 | 1,712 | 209 | 422 | 4,093 |
| 1924 | 7,730 | 4,960 | 274 | 313 | 13,277 |
| 1923 | 2,448 | 13,752 | 739 | 2,161 | 19,080 |
| Illinois— | | | | | |
| 1925 | 8,854 | 16,232 | 1,302 | 1,823 | 28,211 |
| 1924 | 7,430 | 10,124 | 1,251 | 1,339 | 20,144 |
| 1923 | 12,769 | 28,716 | 1,851 | 3,369 | 46,705 |
| Michigan— | | | | | |
| 1925 | 2,181 | 5,729 | 636 | 1,786 | 10,332 |
| 1924 | 7,867 | 8,182 | 935 | 1,306 | 18,290 |
| 1923 | 2,253 | 21,238 | 2,606 | 3,944 | 30,041 |
| Wisconsin— | | | | | |
| 1925 | 5,643 | 5,635 | 1,075 | 1,374 | 13,727 |
| 1924 | 5,033 | 4,045 | 630 | 1,217 | 10,925 |
| 1923 | 14,830 | 14,396 | 1,783 | 3,112 | 34,121 |
| Total— | | | | | |
| 1925 | 20,337 | 34,677 | 3,946 | 11,436 | 70,396 |
| 1924 | 32,408 | 36,147 | 3,968 | 4,663 | 77,186 |
| 1923 | 51,032 | 104,416 | 8,335 | 13,887 | 177,670 |

*Cases of measles reported during 1925, by State health officers, compared with similar reports for the years 1923 and 1924*—Continued

| | First quarter | Second quarter | Third quarter | Fourth quarter | Total 12 months |
|---|---|---|---|---|---|
| West North Central: | | | | | |
| Minnesota— | | | | | |
| 1925 | 385 | 362 | 43 | 68 | 858 |
| 1924 | 3,798 | 1,740 | 173 | 171 | 5,882 |
| 1923 | 4,395 | 8,422 | 687 | 2,255 | 15,759 |
| Iowa— | | | | | |
| 1925 | 38 | 92 | 13 | 94 | 237 |
| 1924 | 3,008 | 576 | 66 | 51 | 3,701 |
| 1923 | 520 | 1,662 | 75 | 430 | 2,687 |
| Missouri— | | | | | |
| 1925 | 152 | 282 | 72 | 91 | 597 |
| 1924 | 7,261 | 3,194 | 177 | 64 | 10,696 |
| 1923 | 5,434 | 14,061 | 635 | 2,587 | 22,717 |
| North Dakota— | | | | | |
| 1925 | 41 | 32 | 11 | 30 | 114 |
| 1924 | 3,354 | 732 | 79 | 223 | 4,388 |
| 1923 | 118 | 559 | 298 | 1,630 | 2,605 |
| South Dakota— | | | | | |
| 1925 | 31 | 26 | 18 | 15 | 90 |
| 1924 | 4,792 | 1,699 | 102 | 11 | 6,604 |
| 1923 | 222 | 961 | 275 | 1,483 | 2,941 |
| Nebraska— | | | | | |
| 1925 | 22 | 37 | 14 | 23 | 96 |
| 1924 | 5,413 | 1,551 | 21 | 13 | 6,998 |
| 1923 | 177 | 349 | 84 | 1,260 | 1,870 |
| Kansas— | | | | | |
| 1925 | 103 | 155 | 54 | 132 | 444 |
| 1924 | 13,692 | 6,401 | 125 | 45 | 20,263 |
| 1923 | 1,398 | 7,227 | 669 | 1,485 | 10,779 |
| Total— | | | | | |
| 1925 | 772 | 986 | 225 | 453 | 2,436 |
| 1924 | 41,318 | 15,893 | 743 | 578 | 58,532 |
| 1923 | 12,264 | 33,241 | 2,723 | 11,130 | 59,358 |
| South Atlantic: | | | | | |
| Delaware— | | | | | |
| 1925 | 16 | 108 | 38 | 37 | 199 |
| 1924 | 51 | 121 | 16 | 4 | 192 |
| 1923 | 783 | 301 | 20 | 68 | 1,172 |
| Maryland— | | | | | |
| 1925 | 598 | 602 | 270 | 1,798 | 3,268 |
| 1924 | 2,276 | 3,112 | 335 | 184 | 5,907 |
| 1923 | 3,960 | 10,068 | 992 | 511 | 15,531 |
| District of Columbia— | | | | | |
| 1925 | 209 | 451 | 89 | 48 | 797 |
| 1924 | 134 | 248 | 20 | 23 | 425 |
| 1923 | 1,916 | 5,437 | 93 | 64 | 7,510 |
| Virginia— | | | | | |
| 1925 | 1,610 | 3,121 | 534 | 930 | 6,195 |
| 1924 | 9,717 | 5,861 | 414 | 905 | 16,897 |
| 1923 | 11,678 | 29,042 | 3,620 | 3,503 | 47,843 |
| West Virginia— | | | | | |
| 1925 | 462 | 1,447 | 103 | 359 | 2,371 |
| 1924 | 486 | 1,238 | 155 | 171 | 2,050 |
| 1923 | 2,791 | 7,273 | 601 | 174 | 10,839 |
| North Carolina— | | | | | |
| 1925 | 489 | 249 | 47 | 217 | 1,002 |
| 1924 | 23,632 | 10,449 | 488 | 369 | 34,938 |
| 1923 | 14,513 | 27,035 | 2,963 | 7,555 | 52,066 |
| South Carolina— | | | | | |
| 1925 | 6 | 76 | 64 | 64 | 210 |
| 1924 | 3,741 | 502 | 7 | 6 | 4,256 |
| 1923 | 289 | 623 | 135 | 888 | 1,935 |
| Georgia— | | | | | |
| 1925 | 151 | 354 | 19 | 24 | 548 |
| 1924 | 3,046 | 439 | 34 | 103 | 3,622 |
| 1923 | 2,282 | 3,002 | 547 | 2,005 | 7,836 |
| Florida— | | | | | |
| 1925 | 50 | 43 | 9 | 26 | 128 |
| 1924 | 2,712 | 491 | 15 | 6 | 3,224 |
| 1923 | 228 | 1,323 | 246 | 1,107 | 2,904 |
| Total— | | | | | |
| 1925 | 3,591 | 6,451 | 1,173 | 3,503 | 14,718 |
| 1924 | 45,795 | 22,161 | 1,484 | 1,771 | 71,511 |
| 1923 | 38,440 | 84,104 | 9,217 | 15,875 | 147,636 |
| East South Central: | | | | | |
| Mississippi— | | | | | |
| 1925 | 1,507 | 1,354 | 456 | 1,497 | 4,814 |
| 1924 | 17,697 | 7,225 | 499 | 276 | 25,697 |
| 1923 | 10,810 | 10,339 | 1,321 | 2,806 | 25,276 |

*Cases of measles reported during 1925, by State health officers, compared with similar reports for the years 1923 and 1924*—Continued

| | First quarter | Second quarter | Third quarter | Fourth quarter | Total 12 months |
|---|---|---|---|---|---|
| West South Central: | | | | | |
| Arkansas— | | | | | |
| 1925 | 431 | 292 | 40 | 15 | 778 |
| 1924 | 3,707 | 2,140 | 310 | 122 | 6,279 |
| 1923 | 935 | 2,807 | 522 | 649 | 4,913 |
| Louisiana— | | | | | |
| 1925 | 34 | 25 | 6 | 17 | 82 |
| 1924 | 4,731 | 1,365 | 61 | 33 | 6,190 |
| 1923 | 127 | 1,029 | 205 | 1,702 | 3,063 |
| Oklahoma— | | | | | |
| 1925 | 172 | 54 | 19 | 33 | 278 |
| 1924 | 1,932 | 2,097 | 16 | 21 | 4,066 |
| 1923 | 1,821 | 1,901 | 102 | 172 | 3,996 |
| Texas— | | | | | |
| 1925 | 1,172 | 438 | 33 | 9 | 1,652 |
| 1924 | 9,208 | 2,666 | 331 | 426 | 12,631 |
| 1923 | 1,436 | 1,076 | 229 | 1,516 | 4,257 |
| Total— | | | | | |
| 1925 | 1,809 | 809 | 98 | 74 | 2,790 |
| 1924 | 19,578 | 8,268 | 718 | 602 | 29,166 |
| 1923 | 4,319 | 6,813 | 1,058 | 4,039 | 16,229 |
| Mountain: | | | | | |
| Montana— | | | | | |
| 1925 | 277 | 169 | 9 | 31 | 486 |
| 1924 | 5,237 | 732 | 20 | 60 | 6,049 |
| 1923 | 80 | 296 | 226 | 1,933 | 2,535 |
| Wyoming— | | | | | |
| 1925 | 43 | 76 | 4 | 6 | 129 |
| 1924 | 1,522 | 826 | 28 | 78 | 2,454 |
| 1923 | 61 | 234 | 159 | 812 | 1,266 |
| Colorado— | | | | | |
| 1925 | 58 | 109 | 58 | 51 | 276 |
| 1924 | 6,160 | 3,226 | 67 | 29 | 9,482 |
| 1923 | 255 | 4,677 | 474 | 1,454 | 6,860 |
| New Mexico— | | | | | |
| 1925 | 418 | 169 | 6 | 5 | 598 |
| 1924 | 1,853 | 1,828 | 102 | 461 | 4,244 |
| 1923 | 252 | 453 | 95 | 256 | 1,056 |
| Arizona— | | | | | |
| 1925 | 766 | 613 | 20 | 9 | 1,408 |
| 1924 | 1,115 | 735 | 36 | 216 | 2,102 |
| 1923 | 26 | 376 | 28 | 129 | 559 |
| Nevada— | | | | | |
| 1925 | 5 | 0 | 1 | 2 | 8 |
| 1924 | 443 | 158 | 3 | 10 | 614 |
| 1923 | 7 | 31 | 15 | 87 | 140 |
| Total— | | | | | |
| 1925 | 1,567 | 1,136 | 98 | 104 | 2,905 |
| 1924 | 16,330 | 7,505 | 256 | 854 | 24,945 |
| 1923 | 681 | 6,067 | 997 | 4,671 | 12,416 |
| Pacific: | | | | | |
| Washington— | | | | | |
| 1925 | 144 | 79 | 22 | 102 | 347 |
| 1924 | 19,821 | 1,367 | 77 | 107 | 21,372 |
| 1923 | 79 | 795 | 290 | 7,180 | 8,344 |
| Oregon— | | | | | |
| 1925 | 57 | 46 | 23 | 61 | 187 |
| 1924 | 4,470 | 691 | 40 | 41 | 5,242 |
| 1923 | 64 | 50 | 84 | 5,157 | 5,355 |
| California— | | | | | |
| 1925 | 758 | 1,111 | 289 | 242 | 2,400 |
| 1924 | 14,278 | 12,082 | 599 | 414 | 27,373 |
| 1923 | 5,382 | 14,228 | 3,370 | 3,901 | 26,881 |
| Total— | | | | | |
| 1925 | 959 | 1,236 | 334 | 405 | 2,934 |
| 1924 | 38,569 | 14,140 | 716 | 562 | 53,987 |
| 1923 | 5,525 | 15,073 | 3,744 | 16,238 | 40,580 |
| Grand total— | | | | | |
| 1925 | 56,899 | 97,755 | 14,093 | 50,263 | 219,010 |
| 1924 | 276,922 | 174,494 | 16,020 | 17,367 | 484,803 |
| 1923 | 228,330 | 356,264 | 41,319 | 94,125 | 720,038 |

## QUALIFICATIONS REQUIRED OF MUNICIPAL BACTERIOLOGIST IN ALEXANDRIA, EGYPT

The president of the municipal commission of Alexandria, Egypt, has recently invited applications for the position of chief bacteriologist in the city of Alexandria. This position is a full-time office and does not permit of private practice. The initial salary is £E 900 (approximately $4,450), with biennial increases of $400 to a maximum salary £E 1,140 ($5,650).[1]

Candidates must not be over 45 years of age, must have proper medical qualifications, and must have had considerable experience in municipal bacteriological work, especially in water examination. Preference will be given to persons having a degree in public health and to those with experience in the bacteriology of tropical diseases.

The following documents must accompany applications:

1. Official certificate of birth (certified copy).
2. Certified copies of diplomas and documents proving candidate's attainments and experience in bacteriology.
3. Certificate of moral character.
4. Certificate of good health signed by two physicians, who must be officials of Federal, State, or local government.
5. A formal agreement to take up the duties of the position, in case of appointment, within one month from date of appointment.

The applicant should note in his application the languages which he understands.

Applications should be addressed to the president of the municipal commission, Alexandria, Egypt, and must be received not later than March 10, 1926.

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## ABSTRACT OF CURRENT PUBLIC HEALTH COURT DECISION

*Sexual sterilization act held valid.*—(Virginia Supreme Court of Appeals; decided November 12, 1925.) The special board of directors of the State colony for epileptics and feeble-minded, acting under authority of chapter 394 of the acts of 1924, entered an order, in compliance with a petition of the superintendent of the colony, that the plaintiff be sexually sterilized. On appeal to the circuit court this order was upheld and a further appeal to the supreme court of appeals was taken. The constitutionality of the act was challenged on the grounds that (1) it did not provide due process of law; (2) it imposed a cruel and unusual punishment; and (3) it denied the plaintiff and other inmates of the colony the equal protection of the law. The supreme court of appeals decided adversely to the plaintiff on all three contentions and held the law to be a valid enactment under the State and Federal Constitutions. (Buck *v.* Bell, Superintendent of State Colony for Epileptics and Feeble-Minded, 130 S. E. 516.)

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[1]The Egyptian pound is worth $4.943.

## Examination for Entrance Into the Regular Corps of the Public Health Service

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

Washington, D. C., March 15, 1926.
Chicago, Ill., March 15, 1926.
New Orleans, La., March 15, 1926.
San Francisco, Calif., March 15, 1926.

Candidates must be not less than 23 nor more than 32 years of age, and they must have been graduated in medicine at some reputable medical college, and have had one year's hospital experience or two years' professional practice. They must pass satisfactorily, oral, written, and clinical tests before a board of medical officers and undergo a physical examination.

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

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

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## DEATHS DURING WEEK ENDED FEBRUARY 6, 1926

*Summary of information received by telegraph from industrial insurance companies for week ended February 6, 1926, and corresponding week of 1925. (From the Weekly Health Index, February 9, 1926, issued by the Bureau of the Census, Department of Commerce)*

| | Week ended Feb. 6, 1926 | Corresponding week, 1925 |
|---|---|---|
| Policies in force | 63, 335, 002 | 58, 552, 142 |
| Number of death claims | 12, 377 | 11, 254 |
| Death claims per 1,000 policies in force, annual rate | 10. 2 | 10. 0 |

*Deaths from all causes in certain large cities of the United States during the week ended February 6, 1926, infant mortality, annual death rate, and comparison with corresponding week of 1925. (From the Weekly Health Index, February 9, 1926, issued by the Bureau of the Census, Department of Commerce)*

| City | Week ended Feb. 6, 1926 | | Annual death rate per 1,000 corresponding week 1925 | Deaths under 1 year | | Infant mortality rate week ended Feb. 6, 1926 [2] |
|---|---|---|---|---|---|---|
| | Total deaths | Death rate [1] | | Week ended Feb. 6, 1926 | Corresponding week, 1925 | |
| Total (67 cities) | 8,172 | 15.2 | 14.4 | 895 | 969 | [3] 73 |
| Akron | 49 | | | 7 | 9 | 74 |
| Albany [4] | 33 | 14.6 | 19.5 | 1 | 6 | 21 |
| Atlanta | 63 | | | 8 | 6 | |
| White | 27 | | | 4 | | |
| Colored | 36 | (5) | | 4 | | |
| Baltimore [4] | 339 | 22.2 | 16.7 | 26 | 34 | 76 |
| White | 259 | | | 19 | | 68 |
| Colored | 80 | (5) | | 7 | | 114 |
| Birmingham | 98 | 24.8 | 18.0 | 9 | 8 | |
| White | 50 | | | 3 | | |
| Colored | 48 | (5) | | 6 | | |
| Boston | 228 | 15.2 | 19.3 | 30 | 35 | 85 |
| Bridgeport | 30 | | | 2 | 3 | 34 |
| Buffalo | 156 | 15.0 | 12.5 | 13 | 20 | 79 |
| Cambridge | 29 | 12.6 | 15.3 | 1 | 2 | 17 |
| Camden | 42 | 17.0 | 14.6 | 5 | 4 | 85 |
| Canton | 24 | 11.8 | 8.8 | 6 | 3 | 133 |
| Chicago [4] | 753 | 13.1 | 13.1 | 86 | 121 | 76 |
| Cincinnati | 163 | 20.8 | 16.8 | 10 | 12 | 62 |
| Cleveland | 237 | 13.2 | 11.6 | 25 | 25 | 65 |
| Columbus | 84 | 15.7 | 14.7 | 7 | 9 | 64 |
| Dallas | 57 | 15.4 | 16.4 | 7 | 7 | |
| White | 44 | | | 5 | | |
| Colored | 13 | (5) | | 2 | | |
| Dayton | 30 | 9.0 | 12.4 | 2 | 3 | 31 |
| Denver | 92 | 17.1 | 14.1 | 9 | 7 | |
| Des Moines | 45 | 15.7 | 11.2 | 4 | 3 | 67 |
| Detroit | 312 | 13.1 | 11.4 | 57 | 49 | 92 |
| Duluth | 24 | 11.3 | 14.6 | 4 | 2 | 94 |
| El Paso | 57 | 28.3 | 19.4 | 11 | 7 | |
| Erie | 34 | | | 3 | 5 | 57 |
| Fall River [4] | 32 | 12.9 | 10.1 | 7 | 4 | 102 |
| Flint | 27 | 10.8 | 9.6 | 4 | 6 | 66 |
| Fort Worth | 44 | 15.1 | 10.3 | 6 | 2 | |
| White | 36 | | | 5 | | |
| Colored | 8 | (5) | | 1 | | |
| Grand Rapids | 32 | 10.9 | 11.2 | 5 | 6 | 72 |
| Houston | 60 | 19.0 | 17.4 | 6 | 10 | |
| White | 42 | | | 5 | | |
| Colored | 18 | (5) | | 1 | | |
| Indianapolis | 91 | 13.2 | 13.1 | 5 | 9 | 37 |
| White | 77 | | | 5 | | 42 |
| Colored | 14 | (5) | | 0 | | 0 |
| Jacksonville, Fla | 41 | 20.4 | 21.9 | 6 | 3 | 131 |
| White | 24 | | | 3 | | |
| Colored | 17 | (5) | | 3 | | |
| Jersey City | 94 | 15.5 | 13.9 | 15 | 12 | 106 |
| Kansas City, Kans | 32 | 14.4 | 13.5 | 2 | 4 | 35 |
| White | 28 | | | 2 | | 42 |
| Colored | 4 | (5) | | 0 | | 0 |
| Kansas City, Mo | 123 | 17.5 | 13.8 | 12 | 11 | |
| Los Angeles | 285 | | | 23 | 24 | 64 |
| Louisville | 88 | 15.2 | 13.5 | 8 | 12 | 69 |
| White | 71 | | | 6 | | 60 |
| Colored | 17 | (5) | | 2 | | 126 |
| Lowell | 42 | 19.9 | 18.4 | 2 | 11 | 37 |
| Lynn | 23 | 11.6 | 16.2 | 1 | 4 | 25 |

[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] Deaths for week ended Friday, Feb. 5, 1926.
[5] In the cities for which deaths are shown by color, the colored population in 1920 constituted the following percentages of the total population: Atlanta 31, Baltimore 15, Birmingham 39, Dallas 15, Fort Worth 14, Houston 25, Kansas City, Kans., 14, Louisville 17, Memphis 38, Nashville 30, New Orleans 26, Norfolk 38, Richmond 32, and Washington, D. C., 25.

*Deaths from all causes in certain large cities of the United States during the week ended February 6, 1926, infant mortality, annual death rate, and comparison with corresponding week of 1925. (From the Weekly Health Index, February 9, 1926, issued by the Bureau of the Census, Department of Commerce)*—Continued

| City | Week ended Feb. 6, 1926 | | Annual death rate per 1,000 corresponding week 1925 | Deaths under 1 year | | Infant mortality rate week ended Feb. 6, 1926 |
|---|---|---|---|---|---|---|
| | Total deaths | Death rate | | Week ended Feb. 6, 1926 | Corresponding week, 1925 | |
| Memphis | 75 | 22.4 | 20.3 | 3 | 12 | |
| White | 34 | | | 2 | | |
| Colored | 41 | (5) | | 1 | | |
| Milwaukee | 118 | 12.3 | 11.1 | 15 | 24 | 69 |
| Minneapolis | 99 | 12.1 | 11.4 | 17 | 9 | 95 |
| Nashville [4] | 60 | 23.0 | 16.8 | 10 | 0 | |
| White | 41 | | | 8 | | |
| Colored | 19 | (5) | | 2 | | |
| New Bedford | 23 | 10.0 | 12.6 | 5 | 5 | 87 |
| New Haven | 43 | 12.5 | 11.9 | 3 | 3 | 41 |
| New Orleans | 220 | 27.7 | 20.8 | 21 | 17 | |
| White | 129 | | | 11 | | |
| Colored | 91 | (5) | | 10 | | |
| New York | 1,654 | 14.7 | 15.0 | 183 | 180 | 74 |
| Bronx Borough | 192 | 11.5 | 12.2 | 19 | 24 | 63 |
| Brooklyn Borough | 522 | 12.4 | 12.6 | 74 | 55 | 75 |
| Manhattan Borough | 727 | 19.5 | 20.2 | 75 | 87 | 83 |
| Queens Borough | 162 | 11.8 | 10.9 | 11 | 10 | 50 |
| Richmond Borough | 51 | 19.2 | 18.5 | 4 | 4 | 70 |
| Newark, N. J | 119 | 13.7 | 11.2 | 18 | 10 | 86 |
| Norfolk | 30 | | | 2 | 5 | 37 |
| White | 12 | | | 1 | | 30 |
| Colored | 18 | (5) | | 1 | | 50 |
| Oakland | 58 | 11.9 | 9.9 | 3 | 7 | 35 |
| Oklahoma City | 19 | | | 2 | 2 | |
| Omaha | 50 | 12.3 | 19.0 | 8 | 8 | 84 |
| Paterson | 50 | 18.4 | 9.9 | 4 | 2 | 70 |
| Philadelphia | 593 | 15.6 | 15.4 | 62 | 73 | 82 |
| Pittsburgh | 180 | 14.9 | 19.3 | 19 | 37 | 63 |
| Portland, Oreg | 71 | 13.1 | 11.3 | 4 | 8 | 41 |
| Providence | 85 | 16.5 | 17.3 | 11 | 11 | 91 |
| Richmond | 50 | 14.0 | 16.8 | 7 | 10 | 88 |
| White | 28 | | | 4 | | 78 |
| Colored | 22 | (5) | | 3 | | 105 |
| Rochester | 76 | 12.5 | 14.0 | 9 | 12 | 72 |
| St. Paul | 54 | 11.4 | 11.7 | 3 | 2 | 27 |
| Salt Lake City [4] | 49 | 19.5 | 10.0 | 9 | 4 | 124 |
| San Antonio | 79 | 20.8 | 16.3 | 12 | 9 | |
| San Diego | 48 | 23.6 | 21.1 | 1 | 3 | 21 |
| San Francisco | 197 | 18.4 | 13.7 | 6 | 12 | 36 |
| Schenectady | 32 | 18.0 | 9.6 | 2 | 2 | 58 |
| Seattle | 76 | | | 6 | 6 | 56 |
| Somerville | 17 | 9.0 | 10.5 | 2 | 1 | 52 |
| Spokane | 25 | 12.0 | 12.9 | 1 | 3 | 23 |
| Springfield, Mass | 45 | 16.5 | 17.6 | 5 | 8 | 72 |
| Syracuse | 50 | 14.3 | 16.0 | 3 | 4 | 38 |
| Tacoma | 28 | 14.0 | 8.5 | 3 | 1 | 70 |
| Toledo | 63 | 11.4 | 13.4 | 6 | 5 | 58 |
| Trenton | 43 | 17.0 | 22.1 | 5 | 8 | 84 |
| Washington, D. C | 188 | 19.7 | 15.0 | 19 | 10 | 108 |
| White | 119 | | | 10 | | 83 |
| Colored | 69 | (5) | | 9 | | 164 |
| Waterbury | 24 | | | 2 | 4 | 43 |
| Wilmington, Del | 36 | 15.4 | 15.4 | 1 | 7 | 23 |
| Yonkers | 31 | 14.2 | 10.6 | 7 | 4 | 157 |
| Youngstown | 32 | 10.4 | 12.4 | 10 | 7 | 127 |

[4] Deaths for week ended Friday, Feb. 5, 1926.

[5] In the cities for which deaths are shown by color, the colored population in 1920 constituted the following percentage of the total population: Atlanta 31, Baltimore 15, Birmingham 39, Dallas 15, Fort Worth 14, Houston 25, Kansas City, Kans., 14, Louisville 17, Memphis 38, Nashville 30, New Orleans 26, Norfolk 38, Richmond 32, and Washington, D. C., 25.

# 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 February 13, 1926

| ALABAMA | Cases |
|---|---|
| Chicken pox | 72 |
| Diphtheria | 18 |
| Influenza | 688 |
| Malaria | 2 |
| Measles | 53 |
| Mumps | 9 |
| Ophthalmia neonatorum | 1 |
| Pellagra | 6 |
| Pneumonia | 187 |
| Scarlet fever | 10 |
| Smallpox | 57 |
| Tuberculosis | 25 |
| Typhoid fever | 3 |
| Whooping cough | 16 |

| ARIZONA | Cases |
|---|---|
| Chicken pox | 41 |
| Diphtheria | 5 |
| Influenza | 6 |
| Measles | 3 |
| Mumps | 13 |
| Pneumonia | 2 |
| Scarlet fever | 23 |
| Smallpox | 3 |
| Trachoma | 1 |
| Tuberculosis | 18 |
| Typhoid fever | 1 |
| Whooping cough | 1 |

| ARKANSAS | Cases |
|---|---|
| Chicken pox | 27 |
| Diphtheria | 8 |
| Hookworm disease | 1 |
| Influenza | 231 |
| Malaria | 13 |
| Measles | 7 |
| Mumps | 14 |
| Pellagra | 4 |
| Scarlet fever | 8 |
| Smallpox | 8 |
| Trachoma | 2 |
| Tuberculosis | 7 |
| Typhoid fever | 3 |
| Whooping cough | 40 |

| CALIFORNIA | Cases |
|---|---|
| Cerebrospinal meningitis: | |
| Fresno County | 1 |
| Los Angeles | 4 |
| Los Angeles County | 1 |
| Sacramento | 2 |
| San Jose | 1 |
| Santa Barbara | 2 |
| Siskiyou County | 1 |
| Chicken pox | 420 |
| Diphtheria | 91 |
| Influenza | 479 |
| Lethargic encephalitis—Los Angeles County | 1 |
| Measles | 85 |
| Mumps | 268 |
| Poliomyelitis: | |
| Fresno County | 1 |
| Los Angeles | 1 |
| Oakland | 1 |
| Sonoma County | 1 |
| Scarlet fever | 150 |
| Smallpox: | |
| Los Angeles | 122 |
| Los Angeles County | 17 |
| Oakland | 21 |
| Scattering | 40 |
| Typhoid fever | 12 |
| Whooping cough | 57 |

| COLORADO | Cases |
|---|---|
| Chicken pox | 36 |
| Diphtheria | 17 |
| Influenza | 2 |
| Measles | 4 |
| Mumps | 6 |
| Paratyphoid fever | 1 |
| Pneumonia | 3 |
| Scarlet fever | 36 |
| Smallpox | 3 |
| Tuberculosis | 36 |
| Vincent's angina | 8 |
| Whooping cough | 55 |

| CONNECTICUT | Cases |
|---|---|
| Chicken pox | 140 |
| Conjunctivitis (infectious) | 1 |

CONNECTICUT—continued

| | Cases |
|---|---|
| Diphtheria | 41 |
| German measles | 10 |
| Influenza | 9 |
| Lethargic encephalitis | 1 |
| Measles | 545 |
| Mumps | 17 |
| Pneumonia (broncho) | 24 |
| Pneumonia (lobar) | 55 |
| Scarlet fever | 78 |
| Septic sore throat | 1 |
| Tuberculosis (all forms) | 18 |
| Typhoid fever | 3 |
| Whooping cough | 68 |

DELAWARE

| | |
|---|---|
| Chicken pox | 17 |
| Diphtheria | 5 |
| Influenza | 2 |
| Measles | 257 |
| Pneumonia | 5 |
| Scarlet fever | 2 |
| Tuberculosis | 11 |
| Typhoid fever | 1 |
| Whooping cough | 3 |

DISTRICT OF COLUMBIA

| | |
|---|---|
| Chicken pox | 53 |
| Diphtheria | 32 |
| Influenza | 12 |
| Measles | 68 |
| Pneumonia | 94 |
| Scarlet fever | 29 |
| Tuberculosis | 21 |
| Whooping cough | 20 |

FLORIDA

| | |
|---|---|
| Chicken pox | 27 |
| Diphtheria | 20 |
| German measles | 1 |
| Influenza | 26 |
| Malaria | 2 |
| Measles | 2 |
| Mumps | 24 |
| Paratyphoid fever | 1 |
| Pneumonia | 14 |
| Scarlet fever | 9 |
| Smallpox | 121 |
| Tetanus | 1 |
| Tuberculosis | 9 |
| Typhoid fever | 12 |
| Whooping cough | 17 |

GEORGIA

| | |
|---|---|
| Chicken pox | 43 |
| Diphtheria | 13 |
| Dysentery | 2 |
| Influenza | 1,045 |
| Leprosy | 1 |
| Malaria | 12 |
| Measles | 88 |
| Mumps | 42 |
| Pellagra | 4 |
| Pneumonia | 132 |
| Scarlet fever | 10 |
| Septic sore throat | 11 |
| Smallpox | 33 |
| Tuberculosis | 44 |
| Typhoid fever | 7 |
| Whooping cough | 19 |

IDAHO

| | Cases |
|---|---|
| Cerebrospinal meningitis—Coeur d'Alene | 1 |
| Chicken pox | 24 |
| Diphtheria | 4 |
| Influenza | 13 |
| Measles | 5 |
| Mumps | 18 |
| Pneumonia | 1 |
| Scarlet fever | 42 |
| Smallpox | 26 |
| Whooping cough | 18 |

ILLINOIS

| | |
|---|---|
| Cerebrospinal meningitis: | |
| Cook County | 1 |
| Jersey County | 1 |
| Diphtheria | 107 |
| Influenza | 41 |
| Lethargic encephalitis—Cook County | 1 |
| Measles | 691 |
| Pneumonia | 492 |
| Poliomyelitis: | |
| Cook County | 1 |
| Tazewell County | 1 |
| Scarlet fever | 539 |
| Smallpox: | |
| White County | 12 |
| Scattering | 33 |
| Tuberculosis | 235 |
| Typhoid fever | 11 |
| Whooping cough | 202 |

INDIANA

| | |
|---|---|
| Chicken pox | 87 |
| Diphtheria | 28 |
| Influenza | 77 |
| Measles | 532 |
| Pneumonia | 15 |
| Poliomyelitis | 1 |
| Scarlet fever | 255 |
| Smallpox | 73 |
| Tuberculosis | 39 |
| Typhoid fever | 1 |
| Whooping cough | 90 |

IOWA

| | |
|---|---|
| Chicken pox | 37 |
| Diphtheria | 23 |
| German measles | 37 |
| Measles | 147 |
| Mumps | 28 |
| Pneumonia | 8 |
| Poliomyelitis | 1 |
| Scarlet fever | 84 |
| Smallpox | 108 |
| Tuberculosis | 6 |
| Whooping cough | 21 |

KANSAS

| | |
|---|---|
| Cerebrospinal meningitis | 1 |
| Chicken pox | 102 |
| Diphtheria | 27 |
| German measles | 4 |
| Influenza | 53 |
| Measles | 127 |
| Mumps | 12 |
| Pneumonia | 106 |
| Scarlet fever | 89 |

KANSAS—continued

| | Cases |
|---|---|
| Smallpox | 7 |
| Tetanus | 2 |
| Tuberculosis | 30 |
| Typhoid fever | 2 |
| Whooping cough | 98 |

LOUISIANA

| | |
|---|---|
| Diphtheria | 17 |
| Influenza | 357 |
| Pneumonia | 64 |
| Scarlet fever | 15 |
| Smallpox | 51 |
| Tuberculosis | 57 |
| Typhoid fever | 17 |
| Whooping cough | 4 |

MAINE

| | |
|---|---|
| Chicken pox | 26 |
| Diphtheria | 1 |
| Influenza | 33 |
| Measles | 20 |
| Mumps | 10 |
| Pneumonia | 29 |
| Poliomyelitis | 1 |
| Scarlet fever | 26 |
| Septic sore throat | 3 |
| Tuberculosis | 1 |
| Tuberculous meningitis | 1 |
| Typhoid fever | 1 |
| Vincent's angina | 3 |
| Whooping cough | 16 |

MARYLAND [1]

| | |
|---|---|
| Cerebrospinal meningitis | 1 |
| Chicken pox | 112 |
| Diphtheria | 39 |
| Dysentery | 3 |
| German measles | 5 |
| Influenza | 776 |
| Measles | 1,416 |
| Mumps | 153 |
| Paratyphoid fever | 1 |
| Pneumonia (broncho) | 140 |
| Pneumonia (lobar) | 140 |
| Scarlet fever | 51 |
| Septic sore throat | 3 |
| Tetanus | 2 |
| Tuberculosis | 43 |
| Typhoid fever | 4 |
| Whooping cough | 63 |

MASSACHUSETTS

| | |
|---|---|
| Cerebrospinal meningitis | 1 |
| Chicken pox | 254 |
| Conjunctivitis (suppurative) | 2 |
| Diphtheria | 85 |
| German measles | 87 |
| Influenza | 12 |
| Lethargic encephalitis | 3 |
| Measles | 1,564 |
| Mumps | 63 |
| Ophthalmia neonatorum | 32 |
| Pneumonia (lobar) | 115 |
| Poliomyelitis | 1 |
| Scarlet fever | 278 |

[1] Week ended Friday.

MASSACHUSETTS—continued

| | Cases |
|---|---|
| Septic sore throat | 3 |
| Trachoma | 1 |
| Trichinosis | 1 |
| Tuberculosis (pulmonary) | 112 |
| Tuberculosis (other forms) | 16 |
| Typhoid fever | 4 |
| Whooping cough | 346 |

MICHIGAN

| | |
|---|---|
| Diphtheria | 103 |
| Measles | 1,754 |
| Pneumonia | 201 |
| Scarlet fever | 385 |
| Smallpox | 9 |
| Tuberculosis | 61 |
| Typhoid fever | 5 |
| Whooping cough | 269 |

MINNESOTA

| | |
|---|---|
| Chicken pox | 164 |
| Diphtheria | 40 |
| Influenza | 3 |
| Measles | 76 |
| Pneumonia | 3 |
| Scarlet fever | 387 |
| Smallpox | 14 |
| Tuberculosis | 49 |
| Typhoid fever | 3 |
| Whooping cough | 47 |

MISSISSIPPI

| | |
|---|---|
| Diphtheria | 19 |
| Influenza | 651 |
| Scarlet fever | 12 |
| Smallpox | 11 |
| Typhoid fever | 3 |

MISSOURI

(Exclusive of Kansas City)

| | |
|---|---|
| Cerebrospinal meningitis | 1 |
| Chicken pox | 79 |
| Diphtheria | 70 |
| Epidemic sore throat | 4 |
| Influenza | 9 |
| Measles | 71 |
| Mumps | 74 |
| Pneumonia | 13 |
| Scarlet fever | 218 |
| Smallpox | 2 |
| Tuberculosis | 52 |
| Typhoid fever | 3 |
| Whooping cough | 20 |

MONTANA

| | |
|---|---|
| Chicken pox | 18 |
| German measles | 7 |
| Influenza | 2 |
| Measles | 6 |
| Mumps | 14 |
| Scarlet fever | 15 |
| Septic sore throat | 1 |
| Smallpox | 14 |
| Tuberculosis | 7 |
| Whooping cough | 16 |

NEBRASKA

| | Cases |
|---|---|
| Chicken pox | 23 |
| Diphtheria | 21 |
| Influenza | 14 |
| Measles | 9 |
| Mumps | 14 |
| Pneumonia | 1 |
| Scarlet fever | 41 |
| Smallpox | 17 |
| Tuberculosis | 1 |
| Typhoid fever | 1 |
| Whooping cough | 22 |

NEW JERSEY

| | |
|---|---|
| Cerebrospinal meningitis | 2 |
| Chicken pox | 311 |
| Diphtheria | 83 |
| Influenza | 41 |
| Malaria | 1 |
| Measles | 2,027 |
| Pneumonia | 189 |
| Scarlet fever | 197 |
| Typhoid fever | 5 |
| Whooping cough | 47 |

NEW MEXICO

| | |
|---|---|
| Chicken pox | 36 |
| Conjunctivitis | 1 |
| Diphtheria | 7 |
| Influenza | 368 |
| Measles | 1 |
| Mumps | 17 |
| Pneumonia | 29 |
| Rabies (in animals) | 3 |
| Scarlet fever | 10 |
| Septic sore throat | 1 |
| Smallpox | 11 |
| Tuberculosis | 22 |
| Typhoid fever | 2 |
| Whooping cough | 15 |

NEW YORK

(Exclusive of New York City)

| | |
|---|---|
| Chicken pox | 413 |
| Diphtheria | 74 |
| German measles | 267 |
| Influenza | 93 |
| Measles | 1,207 |
| Mumps | 157 |
| Ophthalmia neonatorum | 1 |
| Pneumonia | 319 |
| Poliomyelitis | 2 |
| Scarlet fever | 296 |
| Septic sore throat | 3 |
| Smallpox | 2 |
| Trachoma | 2 |
| Typhoid fever | 17 |
| Vincent's angina | 7 |
| Whooping cough | 452 |

NORTH CAROLINA

| | |
|---|---|
| Chicken pox | 218 |
| Diphtheria | 27 |
| German measles | 63 |
| Measles | 290 |
| Poliomyelitis | 1 |
| Scarlet fever | 26 |
| Smallpox | 28 |
| Typhoid fever | 3 |
| Whooping cough | 224 |

[1] Deaths.

OKLAHOMA

(Exclusive of Tulsa and Oklahoma City)

| | Cases |
|---|---|
| Cerebrospinal meningitis—Muskogee | 1 |
| Chicken pox | 34 |
| Diphtheria | 24 |
| Influenza | 664 |
| Malaria | 11 |
| Measles | 11 |
| Mumps | 12 |
| Pellagra | 11 |
| Pneumonia | 211 |
| Scarlet fever | 31 |
| Smallpox: | |
| Carter | 12 |
| Scattering | 6 |
| Typhoid fever | 3 |
| Whooping cough | 46 |

OREGON

| | |
|---|---|
| Cerebrospinal meningitis | 3 |
| Chicken pox | 24 |
| Diphtheria | 37 |
| Influenza | 191 |
| Measles | 20 |
| Mumps | 39 |
| Pneumonia[2] | 14 |
| Scarlet fever | 44 |
| Smallpox: | |
| Linn County | 11 |
| Scattering | 31 |
| Tuberculosis | 17 |
| Typhoid fever | 1 |
| Whooping cough | 20 |

PENNSYLVANIA

| | |
|---|---|
| Anthrax—Philadelphia | 1 |
| Cerebrospinal meningitis: | |
| Clay Township [3] | 1 |
| East Pittsburgh | 1 |
| Philadelphia | 1 |
| Chicken pox | 1,006 |
| Diphtheria | 264 |
| German measles | 40 |
| Impetigo contagiosa | 11 |
| Malaria | 1 |
| Measles | 3,258 |
| Mumps | 206 |
| Ophthalmia neonatorum: | |
| Oxford | 1 |
| Philadelphia | 6 |
| Pneumonia | 96 |
| Poliomyelitis | 1 |
| Scabies | 18 |
| Scarlet fever | 658 |
| Smallpox | 1 |
| Tetanus: | |
| Ambridge | 1 |
| Philadelphia | 2 |
| Trachoma—Philadelphia | 1 |
| Tuberculosis | 106 |
| Typhoid fever | 22 |
| Whooping cough | 441 |

RHODE ISLAND

| | |
|---|---|
| Chicken pox | 4 |
| Diphtheria | 4 |
| German measles | 5 |

[3] County not specified.

RHODE ISLAND—continued

| | Cases |
|---|---|
| Influenza | 3 |
| Measles | 416 |
| Mumps | 1 |
| Pneumonia | 4 |
| Scarlet fever | 6 |
| Tuberculosis | 7 |
| Whooping cough | 15 |

SOUTH DAKOTA

| | |
|---|---|
| Cerebrospinal meningitis | 1 |
| Chicken pox | 5 |
| Diphtheria | 3 |
| Measles | 4 |
| Pneumonia | 1 |
| Scarlet fever | 51 |
| Smallpox | 7 |
| Typhoid fever | 1 |
| Whooping cough | 3 |

TENNESSEE

| | |
|---|---|
| Chicken pox | 71 |
| Diphtheria | 19 |
| Influenza | 185 |
| Malaria | 6 |
| Measles | [1] 361 |
| Mumps | 50 |
| Ophthalmia neonatorum | 4 |
| Pellagra | 3 |
| Pneumonia | 147 |
| Scarlet fever | 30 |
| Smallpox | 11 |
| Tuberculosis | 43 |
| Typhoid fever | 9 |
| Whooping cough | 17 |

TEXAS

| | |
|---|---|
| Chicken pox | 67 |
| Diphtheria | 41 |
| Influenza | 634 |
| Measles | 10 |
| Mumps | 21 |
| Pellagra | 2 |
| Pneumonia | 79 |
| Poliomyelitis | 2 |
| Scarlet fever | 38 |
| Septic sore throat | 7 |
| Smallpox | 67 |
| Trachoma | 1 |
| Tuberculosis | 32 |
| Typhoid fever | 2 |
| Whooping cough | 34 |

UTAH

| | |
|---|---|
| Chicken pox | 70 |
| Diphtheria | 17 |
| Influenza | 79 |
| Measles | 4 |
| Mumps | 32 |
| Pneumonia | 10 |
| Scarlet fever | 10 |
| Smallpox | 4 |
| Whooping cough | 35 |

VERMONT

| | |
|---|---|
| Chicken pox | 48 |
| Diphtheria | 2 |
| Measles | 5 |

VERMONT—continued

| | Cases |
|---|---|
| Mumps | 5 |
| Scarlet fever | 24 |
| Whooping cough | 44 |

VIRGINIA

| | |
|---|---|
| Smallpox | 2 |

WASHINGTON

| | |
|---|---|
| Cerebrospinal meningitis—Spokane | 5 |
| Chicken pox | 120 |
| Diphtheria | 13 |
| German measles | 31 |
| Influenza | 3 |
| Measles | 23 |
| Mumps | 143 |
| Pneumonia | 2 |
| Scarlet fever | 95 |
| Smallpox: | |
| Pierce County | 26 |
| Seattle | 15 |
| Tacoma | 18 |
| Scattering | 68 |
| Tuberculosis | 42 |
| Typhoid fever | 5 |
| Whooping cough | 56 |

WEST VIRGINIA

| | |
|---|---|
| Diphtheria | 7 |
| Scarlet fever | 21 |
| Typhoid fever—Hinton | 4 |

WISCONSIN

| | |
|---|---|
| Milwaukee: | |
| Chicken pox | 107 |
| Diphtheria | 22 |
| German measles | 2 |
| Influenza | 2 |
| Measles | 14 |
| Mumps | 15 |
| Pneumonia | 17 |
| Scarlet fever | 36 |
| Tuberculosis | 25 |
| Whooping cough | 68 |
| Scattering: | |
| Cerebrospinal meningitis | 1 |
| Chicken pox | 199 |
| Diphtheria | 46 |
| German measles | 15 |
| Influenza | 45 |
| Measles | 239 |
| Mumps | 126 |
| Pneumonia | 32 |
| Poliomyelitis | 1 |
| Scarlet fever | 163 |
| Smallpox | 13 |
| Tuberculosis | 11 |
| Typhoid fever | 2 |
| Whooping cough | 143 |

WYOMING

| | |
|---|---|
| Chicken pox | 6 |
| German measles | 2 |
| Measles | 2 |
| Mumps | 3 |
| Pneumonia | 5 |
| Scarlet fever | 13 |
| Tuberculosis | 1 |
| Typhoid fever | 1 |
| Whooping cough | 8 |

[1] Incomplete report.

## Report for Week Ended February 6, 1926

| NORTH DAKOTA | Cases | NORTH DAKOTA—continued | Cases |
|---|---|---|---|
| Chicken pox | 2 | Poliomyelitis | 2 |
| Diphtheria | 1 | Scarlet fever | 83 |
| German measles | 60 | Smallpox | 9 |
| Measles | 11 | Tuberculosis | 4 |
| Mumps | 53 | Typhoid fever | 1 |
| Pneumonia | 22 | Whooping cough | 19 |

## 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 | Cerebro-spinal meningitis | Diphtheria | Influenza | Malaria | Measles | Pellagra | Poliomyelitis | Scarlet fever | Smallpox | Typhoid fever |
|---|---|---|---|---|---|---|---|---|---|---|
| *December, 1925* | | | | | | | | | | |
| Alabama | 1 | 117 | 324 | 52 | 14 | 17 | 2 | 74 | 64 | 70 |
| Hawaii Territory | 1 | 35 | 9 | | 38 | | | 4 | 1 | 5 |
| Illinois | 26 | 540 | 959 | 33 | 868 | | 11 | 1,755 | 137 | 297 |
| Iowa | 1 | 133 | | | 77 | | 5 | 216 | 90 | 23 |
| Oklahoma [1] | 3 | 157 | 497 | 62 | 16 | 9 | 1 | 166 | 39 | 149 |
| *January, 1926* | | | | | | | | | | |
| Arizona | 1 | 29 | | | 4 | 1 | 1 | 64 | 1 | 5 |
| Connecticut | | 186 | 38 | | 2,600 | | | 338 | 0 | 12 |
| Massachusetts | 17 | 391 | 57 | 1 | 6,573 | 1 | 6 | 1,289 | 0 | 27 |
| North Carolina | 2 | 206 | | | 383 | | 1 | 249 | 156 | 22 |

[1] Exclusive of Tulsa and Oklahoma City.

## PLAGUE-ERADICATIVE MEASURES IN THE UNITED STATES

The following items were taken from the reports of plague-eradicative measures from the cities named:

*Los Angeles, Calif.*

Week ended Jan. 30, 1926:

| | |
|---|---|
| Number of rats trapped | 2,631 |
| Number of rats found to be plague infected | 0 |
| Number of squirrels examined | 832 |
| Number of squirrels found to be plague infected | 0 |
| Number of mice trapped | 2,897 |
| Number of mice found to be plague infected | 0 |

Date of discovery of last plague-infected rodent, Nov. 6, 1925.
Date of last human case, Jan. 15, 1925.

*Oakland, Calif.*

*(Including other East Bay communities)*

Week ended Jan. 30, 1926:

| | |
|---|---|
| Number of rats trapped | 414 |
| Number of rats found to be plague infected | 0 |

Totals:

| | |
|---|---|
| Number of rats trapped Jan. 1, 1925, to Jan. 30, 1926 | 81, 127 |
| Number of rats found to be plague infected | 21 |
| Number of squirrels examined May 1 to Aug. 1, 1925 | 7, 277 |
| Number of squirrels found to be plague infected | 0 |
| Number of mice trapped Jan. 1, 1925, to Jan. 30, 1926 | 31, 837 |

Date of discovery of last plague-infected rat, Mar. 4, 1925.
Date of last human case, Sept. 10, 1919.

## GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

*Diphtheria.*—For the week ended January 30, 1926, 37 States reported 1,348 cases of diphtheria. For the week ended January 31, 1925, the same States reported 1,625 cases of this disease. One hundred cities, situated in all parts of the country and having an aggregate population of about 29,900,000, reported 813 cases of diphtheria for the week ended January 30, 1926. Last year for the corresponding week they reported 890 cases. The estimated expectancy for these cities was 1,137 cases. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

*Measles.*—Thirty-four States reported 10,827 cases of measles for the week ended January 30, 1926, and 2,233 cases of this disease for the week ended January 31, 1925. One hundred cities reported 7,944 cases of measles for the week this year, and 1,163 cases last year.

*Poliomyelitis.*—The health officers of 38 States reported 24 cases of poliomyelitis for the week ended January 30, 1926. The same States reported 16 cases for the week ended January 31, 1925.

*Scarlet fever.*—Scarlet fever was reported for the week as follows: Thirty-seven States—this year, 3,972 cases; last year, 3,990 cases; 100 cities—this year, 1,649 cases; last year, 1,844 cases; estimated expectancy, 1,243 cases.

*Smallpox.*—For the week ended January 30, 1926, 37 States reported 916 cases of smallpox. Last year for the corresponding week they reported 1,223 cases. One hundred cities reported smallpox for the week as follows: 1926, 234 cases; 1925, 370 cases; estimated expectancy, 120 cases. Ten deaths from smallpox were reported by these cities for the week this year—at Los Angeles, Calif.

*Typhoid fever.*—Two hundred and eight cases of typhoid fever were reported for the week ended January 30, 1926, by 36 States. For the corresponding week of 1925, the same States reported 267 cases of this disease. One hundred cities reported 45 cases of typhoid fever for the week this year and 98 cases for the corresponding week last year. The estimated expectancy for these cities was 57 cases.

*Influenza and pneumonia.*—Deaths from influenza and pneumonia were reported for the week by 93 cities, with a population of about 29,200,000, as follows: 1926, 1,245 deaths; 1925, 1,204.

*City reports for week ended January 30, 1926*

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 nonepidemic 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 1917 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, 1925, 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 | 75,333 | 3 | 2 | 0 | 0 | 0 | 8 | 3 | 3 |
| New Hampshire: | | | | | | | | | |
| Concord | 22,546 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 0 |
| Manchester | 83,097 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 |
| Vermont: | | | | | | | | | |
| Barre | 10,008 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Burlington | 24,089 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| Massachusetts: | | | | | | | | | |
| Boston | 779,620 | 115 | 67 | 19 | 4 | 1 | 158 | 18 | 29 |
| Fall River | 128,993 | 4 | 6 | 5 | 1 | 2 | 65 | 1 | 2 |
| Springfield | 142,065 | 8 | 5 | 0 | 0 | 0 | 76 | 0 | 1 |
| Worcester | 190,757 | 0 | 6 | 8 | 0 | 0 | 96 | 2 | 6 |
| Rhode Island: | | | | | | | | | |
| Pawtucket | 69,760 | 2 | 1 | 2 | 0 | 0 | 57 | 0 | 0 |
| Providence | 267,918 | 0 | 12 | 5 | 0 | 2 | 491 | 0 | 7 |
| Connecticut: | | | | | | | | | |
| Bridgeport | (1) | 5 | 9 | 3 | 0 | 0 | 83 | 0 | 1 |
| Hartford | 160,197 | 11 | 8 | 7 | 1 | 1 | 50 | 0 | 5 |
| New Haven | 178,927 | 60 | 5 | 0 | 4 | 0 | 76 | 1 | 6 |
| **MIDDLE ATLANTIC** | | | | | | | | | |
| New York: | | | | | | | | | |
| Buffalo | 538,016 | 20 | 19 | 10 | 0 | 0 | 9 | 3 | 15 |
| New York | 5,873,356 | 328 | 228 | 143 | 38 | 18 | 1,694 | 41 | 231 |
| Rochester | 316,786 | 16 | 9 | 22 | 0 | 0 | 65 | 1 | 6 |
| Syracuse | 182,003 | 26 | 9 | 3 | 0 | 0 | 24 | 27 | 5 |
| New Jersey: | | | | | | | | | |
| Camden | 128,642 | 28 | 5 | 0 | 2 | 2 | 49 | 0 | 11 |
| Newark | 452,513 | 88 | 22 | 6 | 6 | 0 | 186 | 2 | 19 |
| Trenton | 132,020 | 4 | 7 | 1 | 3 | 3 | 6 | 0 | 5 |
| Pennsylvania: | | | | | | | | | |
| Philadelphia | 1,979,364 | 198 | 79 | 57 | ---- | 10 | 317 | 11 | 108 |
| Pittsburgh | 631,563 | 51 | 22 | 19 | ---- | 4 | 25 | 5 | 34 |
| Reading | 112,707 | 8 | 5 | 0 | 0 | 0 | 6 | 3 | 3 |
| **EAST NORTH CENTRAL** | | | | | | | | | |
| Ohio: | | | | | | | | | |
| Cincinnati | 409,333 | 12 | 11 | 10 | 0 | 6 | 3 | 0 | 10 |
| Cleveland | 936,485 | 73 | 35 | 46 | 0 | 1 | 1,553 | 3 | 20 |
| Columbus | 279,836 | 15 | 4 | 7 | 0 | 4 | 52 | 0 | 9 |
| Toledo | 287,380 | 23 | 8 | 3 | 0 | 3 | 50 | 0 | 6 |
| Indiana: | | | | | | | | | |
| Fort Wayne | 97,846 | 1 | 4 | 1 | 0 | 1 | 1 | 0 | 2 |
| Indianapolis | 358,819 | 6 | 13 | 7 | 0 | 2 | 331 | 0 | 13 |
| South Bend | 80,091 | 5 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| Terre Haute | 71,071 | 3 | 1 | 1 | 0 | 0 | 2 | 0 | 2 |
| Illinois: | | | | | | | | | |
| Chicago | 2,995,239 | 160 | 117 | 54 | 7 | 1 | 61 | 24 | 62 |
| Peoria | 81,564 | 1 | 0 | 0 | 0 | 1 | 0 | 19 | 2 |
| Springfield | 63,923 | 6 | 2 | 0 | 2 | 1 | 1 | 5 | 3 |

[1] No estimate made.

*City reports for week ended January 30, 1926*—Continued

| Division, State, and city | Population July 1, 1925, 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** | | | | | | | | | |
| Michigan: | | | | | | | | | |
| Detroit | 1,245,824 | 97 | 67 | 46 | 6 | 0 | 1,017 | 7 | 94 |
| Flint | 130,316 | 10 | 8 | 1 | 0 | 0 | 11 | 11 | 2 |
| Grand Rapids | 153,698 | 9 | 4 | 0 | 1 | 2 | 9 | 0 | 2 |
| Wisconsin: | | | | | | | | | |
| Madison | 46,385 | 11 | 1 | 0 | 0 | 0 | 14 | 2 | 1 |
| Milwaukee | 509,192 | 110 | 20 | 28 | 0 | 0 | 10 | 33 | 21 |
| Racine | 67,707 | 7 | 1 | 0 | 0 | 0 | 0 | 2 | 1 |
| Superior | 39,671 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 |
| **WEST NORTH CENTRAL** | | | | | | | | | |
| Minnesota: | | | | | | | | | |
| Duluth | 110,502 | 10 | 2 | 1 | 0 | 0 | 6 | 6 | 0 |
| Minneapolis | 425,435 | 62 | 21 | 27 | 0 | 1 | 10 | 1 | 7 |
| St. Paul | 246,001 | 32 | 14 | 12 | 0 | 2 | 9 | 2 | 14 |
| Iowa: | | | | | | | | | |
| Davenport | (1) | 1 | 1 | 1 | 0 | ------- | 0 | 0 | ------- |
| Des Moines | (1) | 1 | 3 | 2 | 0 | ------- | 5 | 0 | ------- |
| Sioux City | (1) | 3 | 1 | 1 | 0 | ------- | 1 | 1 | ------- |
| Waterloo | 36,771 | 8 | 1 | 2 | 0 | ------- | 1 | 0 | ------- |
| Missouri: | | | | | | | | | |
| Kansas City | 367,481 | 72 | 10 | 11 | 3 | 3 | 91 | 3 | 9 |
| St. Joseph | 78,342 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 8 |
| St. Louis | 821,543 | 30 | 50 | 63 | 0 | ------- | 10 | 7 | ------- |
| North Dakota: | | | | | | | | | |
| Fargo | 26,403 | 6 | 0 | 0 | 0 | 0 | 9 | 31 | 1 |
| Grand Forks | 14,811 | 2 | 0 | 0 | 0 | ------- | 1 | 0 | ------- |
| South Dakota: | | | | | | | | | |
| Aberdeen | 15,036 | 0 | 0 | 0 | 0 | ------- | 7 | 55 | ------- |
| Sioux Falls | 30,127 | 1 | 0 | 0 | 0 | ------- | 0 | 0 | ------- |
| Nebraska: | | | | | | | | | |
| Lincoln | 60,941 | 11 | 3 | 1 | 0 | 0 | 0 | 0 | 0 |
| Omaha | 211,768 | 9 | 5 | 2 | 0 | 0 | 1 | 0 | 7 |
| Kansas: | | | | | | | | | |
| Topeka | 55,411 | 4 | 2 | 1 | 0 | 0 | 1 | 1 | 2 |
| Wichita | 88,367 | 10 | 4 | 4 | 0 | 0 | 0 | 1 | 4 |
| **SOUTH ATLANTIC** | | | | | | | | | |
| Delaware: | | | | | | | | | |
| Wilmington | 122,049 | 14 | 2 | 3 | 0 | 0 | 79 | 0 | 6 |
| Maryland: | | | | | | | | | |
| Baltimore | 796,296 | 114 | 30 | 16 | 949 | 8 | 961 | 111 | 69 |
| Cumberland | 33,741 | 0 | 0 | 0 | 1 | 0 | 5 | 0 | 2 |
| Frederick | 12,035 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| District of Columbia: | | | | | | | | | |
| Washington | 497,906 | 41 | 18 | 20 | 6 | 2 | 32 | 2 | 20 |
| Virginia: | | | | | | | | | |
| Lynchburg | 30,395 | 22 | 1 | 2 | 0 | 0 | 4 | 1 | 1 |
| Norfolk | (1) | 8 | 2 | 1 | 0 | 0 | 3 | 1 | 7 |
| Richmond | 186,403 | 9 | 5 | 4 | 0 | 2 | 7 | 9 | 8 |
| Roanoke | 58,208 | 3 | 2 | 5 | 0 | 0 | 12 | 1 | 0 |
| West Virginia: | | | | | | | | | |
| Charleston | 49,019 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 2 |
| Huntington | 63,485 | 1 | 1 | 3 | 0 | 0 | 2 | 0 | 0 |
| Wheeling | 56,208 | 3 | 1 | 0 | 0 | 0 | 2 | 0 | 5 |
| North Carolina: | | | | | | | | | |
| Raleigh | 30,371 | 5 | 1 | 0 | 0 | 2 | 3 | 0 | 3 |
| Wilmington | 37,061 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Winston-Salem | 69,031 | 7 | 1 | 0 | 0 | 0 | 87 | 3 | 3 |
| South Carolina: | | | | | | | | | |
| Charleston | 73,125 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 3 |
| Columbia | 41,225 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Greenville | 27,311 | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| Georgia: | | | | | | | | | |
| Atlanta | (1) | 3 | 3 | 5 | 75 | 1 | 9 | 0 | 12 |
| Brunswick | 16,809 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Savannah | 93,134 | 1 | 1 | 2 | 72 | 2 | 2 | 0 | 6 |
| Florida: | | | | | | | | | |
| St. Petersburg | 26,847 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Tampa | 94,743 | 8 | 1 | 2 | 0 | 0 | 3 | 0 | 3 |

[1] No estimate made.

*City reports for week ended January 30, 1926*—Continued

| Division, State, and city | Population July 1, 1925, 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 SOUTH CENTRAL** | | | | | | | | | |
| Kentucky: | | | | | | | | | |
| Covington | 58,309 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| Louisville | 305,935 | 6 | 8 | 1 | 5 | 1 | 4 | 0 | 6 |
| Tennessee: | | | | | | | | | |
| Memphis | 174,533 | 12 | 5 | 4 | 0 | 3 | 3 | 1 | 5 |
| Nashville | 136,220 | 5 | 1 | 3 | 0 | 3 | 66 | 0 | 11 |
| Alabama: | | | | | | | | | |
| Birmingham | 205,670 | 24 | 3 | 0 | 22 | 6 | 3 | 4 | 13 |
| Mobile | 65,955 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 2 |
| Montgomery | 46,481 | 0 | 1 | 0 | 0 | 0 | 0 | 16 | 0 |
| **WEST SOUTH CENTRAL** | | | | | | | | | |
| Arkansas: | | | | | | | | | |
| Fort Smith | 31,643 | 4 | 1 | 1 | 0 | ---- | 0 | 0 | ---- |
| Little Rock | 74,216 | 1 | 1 | 1 | 2 | ---- | 0 | 0 | 3 |
| Louisiana: | | | | | | | | | * |
| New Orleans | 414,493 | 5 | 14 | 8 | 90 | 26 | 2 | 0 | 26 |
| Shreveport | 57,857 | 2 | 1 | 0 | 0 | 2 | 1 | 1 | 7 |
| Oklahoma: | | | | | | | | | |
| Oklahoma City | (1) | 1 | 1 | 0 | 6 | 0 | 0 | 0 | 4 |
| Texas: | | | | | | | | | |
| Dallas | 194,450 | 36 | 6 | 7 | 15 | 1 | 3 | 0 | 15 |
| Galveston | 48,375 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 7 |
| Houston | 164,954 | 4 | 4 | 11 | 0 | 1 | 0 | 0 | 16 |
| San Antonio | 198,069 | 1 | 2 | 3 | 0 | 2 | 0 | 0 | 20 |
| **MOUNTAIN** | | | | | | | | | |
| Montana: | | | | | | | | | |
| Billings | 17,971 | 3 | 1 | 0 | 0 | 0 | 0 | 6 | 1 |
| Great Falls | 29,883 | 4 | 1 | 0 | 0 | 0 | 0 | 35 | 1 |
| Helena | 12,037 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Missoula | 12,668 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 1 |
| Idaho: | | | | | | | | | |
| Boise | 23,042 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Colorado: | | | | | | | | | |
| Denver | 280,911 | 32 | 11 | 18 | 0 | 1 | 10 | 5 | 6 |
| Pueblo | 43,787 | 5 | 3 | 4 | 0 | 0 | 0 | 0 | 4 |
| New Mexico: | | | | | | | | | |
| Albuquerque | 21,000 | 3 | 0 | 1 | 0 | 0 | 0 | 3 | 1 |
| Arizona: | | | | | | | | | |
| Phoenix | 38,669 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 3 |
| Utah: | | | | | | | | | |
| Salt Lake City | 130,948 | 39 | 3 | 4 | 0 | 7 | 1 | 18 | 5 |
| Nevada: | | | | | | | | | |
| Reno | 12,665 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| **PACIFIC** | | | | | | | | | |
| Washington: | | | | | | | | | |
| Seattle | (1) | 60 | 7 | 2 | 0 | ---- | 8 | 143 | ---- |
| Spokane | 108,897 | 15 | 5 | 0 | 0 | ---- | 0 | 0 | ---- |
| Tacoma | 104,455 | 2 | 2 | 4 | 0 | 0 | 0 | 0 | 4 |
| Oregon: | | | | | | | | | |
| Portland | 282,383 | 6 | 8 | 7 | 3 | 0 | 0 | 7 | 15 |
| California: | | | | | | | | | |
| Los Angeles | (1) | 59 | 46 | 39 | 89 | 3 | 9 | 12 | 29 |
| Sacramento | 72,260 | 3 | 3 | 2 | 1 | 6 | 0 | 0 | 4 |
| San Francisco | 557,530 | 32 | 25 | 15 | 16 | 13 | 10 | 5 | 12 |

[1] No estimate made.

*City reports for week ended January 30, 1926*—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 | 2 | 8 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 17 |
| New Hampshire: | | | | | | | | | | | |
| Concord | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| Manchester | 3 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 |
| Vermont: | | | | | | | | | | | |
| Barre | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 8 |
| Burlington | 1 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| Massachusetts: | | | | | | | | | | | |
| Boston | 54 | 97 | 0 | 0 | 0 | 16 | 1 | 1 | 0 | 175 | 235 |
| Fall River | 3 | 1 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 7 | 44 |
| Springfield | 11 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 41 |
| Worcester | 10 | 9 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 16 | 56 |
| Rhode Island: | | | | | | | | | | | |
| Pawtucket | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 5 | 19 |
| Providence | 9 | 10 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 4 | 76 |
| Connecticut: | | | | | | | | | | | |
| Bridgeport | 8 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 33 |
| Hartford | 7 | 0 | 0 | 0 | 0 | 3 | 0 | 2 | 0 | 3 | 40 |
| New Haven | 10 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 46 |
| **MIDDLE ATLANTIC** | | | | | | | | | | | |
| New York: | | | | | | | | | | | |
| Buffalo | 22 | 27 | 1 | 0 | 0 | 10 | 2 | 5 | 1 | 24 | 126 |
| New York | 234 | 195 | 1 | 0 | 0 | [1] 104 | 10 | 11 | 0 | 54 | 1,524 |
| Rochester | 13 | 28 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 9 | 73 |
| Syracuse | 16 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 69 | 38 |
| New Jersey: | | | | | | | | | | | |
| Camden | 4 | 16 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 4 | 46 |
| Newark | 24 | 25 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 23 | 120 |
| Trenton | 5 | 6 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 45 |
| Pennsylvania: | | | | | | | | | | | |
| Philadelphia | 70 | 96 | 1 | 0 | 0 | 53 | 3 | 1 | 2 | 49 | 630 |
| Pittsburgh | 33 | 70 | 0 | 0 | 0 | 12 | 1 | 0 | 0 | 33 | 183 |
| Reading | 1 | 9 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 10 | 27 |
| **EAST NORTH CENTRAL** | | | | | | | | | | | |
| Ohio: | | | | | | | | | | | |
| Cincinnati | 11 | 24 | 1 | 1 | 0 | 2 | 0 | 2 | 0 | 32 | 121 |
| Cleveland | 32 | 40 | 2 | 4 | 0 | 16 | 1 | 1 | 0 | 89 | 189 |
| Columbus | 11 | 11 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 5 | 81 |
| Toledo | 19 | 14 | 3 | 0 | 0 | 4 | 0 | 0 | 0 | 12 | 76 |
| Indiana: | | | | | | | | | | | |
| Fort Wayne | 4 | 7 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 28 |
| Indianapolis | 10 | 17 | 6 | 45 | 0 | 2 | 0 | 0 | 0 | 25 | 110 |
| South Bend | 3 | 4 | 1 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| Terre Haute | 3 | 5 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 21 |
| Illinois: | | | | | | | | | | | |
| Chicago | 153 | 133 | 3 | 0 | 0 | 42 | 4 | 0 | 0 | 51 | 741 |
| Peoria | 6 | 3 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 21 |
| Springfield | 2 | 2 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 3 | 21 |
| Michigan: | | | | | | | | | | | |
| Detroit | 97 | 123 | 4 | 0 | 0 | 22 | 1 | 1 | 0 | 60 | 284 |
| Flint | 9 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | 18 |
| Grand Rapids | 11 | 29 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 44 | 41 |
| Wisconsin: | | | | | | | | | | | |
| Madison | 3 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 7 |
| Milwaukee | 39 | 27 | 2 | 0 | 0 | 6 | 1 | 1 | 0 | 63 | 103 |
| Racine | 7 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 11 |
| Superior | 2 | 3 | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 14 |

[1] Pulmonary tuberculosis only.

*City reports for week ended January 30, 1926*—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** | | | | | | | | | | | |
| Minnesota: | | | | | | | | | | | |
| Duluth | 5 | 29 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 11 | 23 |
| Minneapolis | 44 | 74 | 16 | 0 | 0 | 4 | 1 | 0 | 0 | 5 | 92 |
| St. Paul | 27 | 54 | 9 | 0 | 0 | 2 | 1 | 1 | 0 | 19 | 71 |
| Iowa: | | | | | | | | | | | |
| Davenport | 2 | 1 | 2 | 0 | ---- | ---- | 0 | 0 | ---- | 0 | ---- |
| Des Moines | 7 | 4 | 3 | 1 | ---- | ---- | 0 | 0 | ---- | 0 | ---- |
| Sioux City | 2 | 3 | 1 | 11 | ---- | ---- | 0 | 0 | ---- | 0 | ---- |
| Waterloo | 2 | 4 | 0 | 0 | ---- | ---- | 0 | 0 | ---- | 0 | ---- |
| Missouri: | | | | | | | | | | | |
| Kansas City | 14 | 27 | 2 | 0 | 0 | 5 | 0 | 0 | 0 | 25 | 91 |
| St. Joseph | 3 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 36 |
| St. Louis | 38 | 111 | 4 | 4 | 0 | 8 | 1 | 0 | 0 | 5 | 226 |
| North Dakota: | | | | | | | | | | | |
| Fargo | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Grand Forks | 1 | 0 | 1 | 0 | ---- | ---- | 0 | 0 | ---- | 0 | ---- |
| South Dakota: | | | | | | | | | | | |
| Aberdeen | 1 | 1 | 0 | 0 | ---- | ---- | 0 | 0 | ---- | 0 | ---- |
| Sioux Falls | 2 | 4 | 0 | 0 | ---- | ---- | 0 | 0 | ---- | 0 | ---- |
| Nebraska: | | | | | | | | | | | |
| Lincoln | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 15 |
| Omaha | 5 | 14 | 6 | 11 | 0 | 1 | 0 | 0 | 0 | 1 | 59 |
| Kansas: | | | | | | | | | | | |
| Topeka | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 18 |
| Wichita | 4 | 6 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 34 |
| **SOUTH ATLANTIC** | | | | | | | | | | | |
| Delaware: | | | | | | | | | | | |
| Wilmington | 3 | 5 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 6 | 35 |
| Maryland: | | | | | | | | | | | |
| Baltimore | 40 | 24 | 0 | 0 | 0 | 18 | 2 | 2 | 0 | 41 | 331 |
| Cumberland | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 14 |
| Frederick | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| District of Col.: | | | | | | | | | | | |
| Washington | 23 | 27 | 1 | 0 | 0 | 9 | 1 | 0 | 0 | 7 | 145 |
| Virginia: | | | | | | | | | | | |
| Lynchburg | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 7 | 8 |
| Norfolk | 1 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 11 | ---- |
| Richmond | 5 | 9 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 51 |
| Roanoke | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 9 |
| West Virginia: | | | | | | | | | | | |
| Charleston | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4 | 17 |
| Huntington | 1 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 17 |
| Wheeling | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 19 |
| North Carolina: | | | | | | | | | | | |
| Raleigh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| Wilmington | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 14 |
| Winston-Salem | 1 | 2 | 2 | 5 | 0 | 4 | 0 | 0 | 0 | 5 | 26 |
| South Carolina: | | | | | | | | | | | |
| Charleston | 1 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 5 | 29 |
| Columbia | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- |
| Greenville | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 3 |
| Georgia: | | | | | | | | | | | |
| Atlanta | 3 | 5 | 2 | 0 | 0 | 3 | 1 | 0 | 0 | 2 | 71 |
| Brunswick | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Savannah | 1 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 34 |
| Florida: | | | | | | | | | | | |
| St. Petersburg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| Tampa | 0 | 1 | 0 | 24 | 0 | 2 | 1 | 3 | 0 | 0 | 32 |
| **EAST SOUTH CENTRAL** | | | | | | | | | | | |
| Kentucky: | | | | | | | | | | | |
| Covington | 1 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 25 |
| Louisville | 5 | 5 | 1 | 0 | 0 | 4 | 1 | 2 | 1 | 4 | 72 |
| Tennessee: | | | | | | | | | | | |
| Memphis | 4 | 9 | 3 | 2 | 0 | 5 | 0 | 0 | 1 | 0 | 73 |
| Nashville | 3 | 3 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 1 | 57 |
| Alabama: | | | | | | | | | | | |
| Birmingham | 3 | 3 | 3 | 2 | 0 | 6 | 1 | 0 | 0 | 11 | 67 |
| Mobile | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 27 |
| Montgomery | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ---- |

*City reports for week ended January 30, 1926*—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 | 0 | ---- | 1 | ---- |
| Little Rock | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | ---- |
| Louisiana: | | | | | | | | | | | |
| New Orleans | 4 | 6 | 1 | 2 | 0 | 9 | 3 | 2 | 2 | 0 | 213 |
| Shreveport | 0 | 0 | 4 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 42 |
| Oklahoma: | | | | | | | | | | | |
| Oklahoma City | 2 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |
| Texas: | | | | | | | | | | | |
| Dallas | 3 | 3 | 2 | 3 | 0 | 4 | 1 | 1 | 0 | 18 | 58 |
| Galveston | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 18 |
| Houston | 1 | 1 | 0 | 19 | 0 | 7 | 0 | 0 | 0 | 1 | 59 |
| San Antonio | 1 | 0 | 0 | 0 | 0 | 8 | 1 | 0 | 0 | 0 | 69 |
| **MOUNTAIN** | | | | | | | | | | | |
| Montana: | | | | | | | | | | | |
| Billings | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 7 |
| Great Falls | 1 | 15 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 7 |
| Helena | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Missoula | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Idaho: | | | | | | | | | | | |
| Boise | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| Colorado: | | | | | | | | | | | |
| Denver | 12 | 8 | 3 | 1 | 0 | 3 | 1 | 1 | 1 | 69 | 76 |
| Pueblo | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 14 |
| New Mexico: | | | | | | | | | | | |
| Albuquerque | 1 | 8 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 11 | 10 |
| Arizona: | | | | | | | | | | | |
| Phoenix | 0 | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 10 |
| Utah: | | | | | | | | | | | |
| Salt Lake City | 4 | 2 | 4 | 0 | 0 | 3 | 0 | 1 | 0 | 13 | 53 |
| Nevada: | | | | | | | | | | | |
| Reno | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| **PACIFIC** | | | | | | | | | | | |
| Washington: | | | | | | | | | | | |
| Seattle | 11 | 35 | 4 | 4 | ---- | ---- | 0 | 0 | ---- | 4 | ---- |
| Spokane | 3 | 15 | 5 | 0 | ---- | ---- | 0 | 0 | ---- | 1 | ---- |
| Tacoma | 3 | 3 | 2 | 28 | 0 | 0 | 1 | 0 | 0 | 2 | 22 |
| Oregon: | | | | | | | | | | | |
| Portland | 6 | 18 | 11 | 10 | 0 | 2 | 0 | 1 | 0 | 0 | ---- |
| California: | | | | | | | | | | | |
| Los Angeles | 18 | 49 | 4 | 40 | 10 | 32 | 2 | 3 | 1 | 13 | 296 |
| Sacramento | 1 | 3 | 1 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 29 |
| San Francisco | 15 | 19 | 3 | 2 | 0 | 8 | 1 | 1 | 0 | 4 | 181 |

*City reports for week ended January 30, 1926*—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** | | | | | | | | | |
| Massachusetts: | | | | | | | | | |
| Springfield | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rhode Island: | | | | | | | | | |
| Providence | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| **MIDDLE ATLANTIC** | | | | | | | | | |
| New York: | | | | | | | | | |
| Buffalo | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| New York | 2 | 2 | 7 | 1 | 0 | 0 | 1 | 1 | 0 |
| Pennsylvania: | | | | | | | | | |
| Pittsburgh | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| **EAST NORTH CENTRAL** | | | | | | | | | |
| Ohio: | | | | | | | | | |
| Cleveland | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Indiana: | | | | | | | | | |
| Indianapolis | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Illinois: | | | | | | | | | |
| Chicago | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |
| Michigan: | | | | | | | | | |
| Detroit | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| **WEST NORTH CENTRAL** | | | | | | | | | |
| Missouri: | | | | | | | | | |
| St. Louis | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **SOUTH ATLANTIC** | | | | | | | | | |
| Maryland: | | | | | | | | | |
| Baltimore | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| South Carolina: | | | | | | | | | |
| Charleston | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Georgia: | | | | | | | | | |
| Atlanta | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 0 |
| Savannah | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **EAST SOUTH CENTRAL** | | | | | | | | | |
| Tennessee: | | | | | | | | | |
| Memphis | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Alabama: | | | | | | | | | |
| Birmingham | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| **WEST SOUTH CENTRAL** | | | | | | | | | |
| Arkansas: | | | | | | | | | |
| Little Rock | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Louisiana: | | | | | | | | | |
| New Orleans | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 |
| Shreveport | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Texas: | | | | | | | | | |
| Dallas | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| Houston | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| San Antonio | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| **MOUNTAIN** | | | | | | | | | |
| Utah: | | | | | | | | | |
| Salt Lake City | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| **PACIFIC** | | | | | | | | | |
| Washington: | | | | | | | | | |
| Seattle | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spokane | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oregon: | | | | | | | | | |
| Portland | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| California: | | | | | | | | | |
| Los Angeles | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| San Francisco | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |

The following table gives the rates per 100,000 population for 103 cities for the five-week period ended January 30, 1926, compared with those for a like period ended January 31, 1925. The population figures used in computing the rates are approximate estimates as of July 1, 1925 and 1926, respectively, authoritative figures for many of the cities not being available. The 103 cities reporting cases had an estimated aggregate population of nearly 30,000,000 in 1925 and nearly 30,500,000 in 1926. The 96 cities reporting deaths had more than 29,250,000 estimated population in 1925 and more than 29,750,000 in 1926. The number of cities included in each group and the estimated aggregate populations are shown in a separate table below.

*Summary of weekly reports from cities, December 27, 1925, to January 30, 1926—Annual rates per 100,000 population—Compared with rates for the corresponding period of 1924–25* [1]

DIPHTHERIA CASE RATES

| | Week ended— | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Jan. 3, 1925 | Jan. 2, 1926 | Jan. 10, 1925 | Jan. 9, 1926 | Jan. 17, 1925 | Jan. 16, 1926 | Jan. 24, 1925 | Jan. 23, 1926 | Jan. 31, 1925 | Jan. 30, 1926 |
| 103 cities | 149 | 129 | 145 | 170 | 167 | 145 | 159 | 142 | [2] 160 | [3] 142 |
| New England | 249 | 139 | 247 | 139 | 173 | 144 | 165 | 132 | 192 | [4] 110 |
| Middle Atlantic | 140 | 124 | 130 | 182 | 187 | 151 | 174 | 137 | 155 | 130 |
| East North Central | 141 | 129 | 122 | 151 | 132 | 135 | 121 | 131 | [3] 126 | 138 |
| West North Central | 171 | 154 | 139 | 283 | 247 | 253 | 193 | 206 | 243 | [5] 261 |
| South Atlantic | 138 | 126 | 161 | 178 | 115 | 141 | 144 | 152 | 121 | 116 |
| East South Central | 84 | 109 | 110 | 52 | 84 | 67 | 74 | 73 | 89 | 42 |
| West South Central | 141 | 146 | 137 | 189 | 185 | 120 | 154 | 155 | 141 | 142 |
| Mountain | 102 | 109 | 231 | 182 | 148 | 127 | 231 | 155 | 129 | 264 |
| Pacific | 160 | 124 | 185 | 97 | 196 | 81 | 213 | 140 | 279 | 167 |

MEASLES CASE RATES

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 103 cities | 150 | 601 | 207 | 1,146 | 188 | 973 | 204 | 1,335 | [2] 204 | [3] 1,384 |
| New England | 367 | 2,373 | 381 | 3,094 | 424 | 2,867 | 479 | 2,572 | 467 | [4] 2,845 |
| Middle Atlantic | 120 | 550 | 168 | 995 | 157 | 845 | 186 | 1,088 | 205 | 1,185 |
| East North Central | 277 | 736 | 391 | 1,761 | 327 | 1,302 | 352 | 2,068 | [3] 340 | 2,088 |
| West North Central | 10 | 59 | 18 | 148 | 12 | 127 | 26 | 156 | 20 | [5] 113 |
| South Atlantic | 50 | 460 | 79 | 1,289 | 42 | 1,356 | 36 | 2,477 | 35 | 2,280 |
| East South Central | 16 | 104 | 26 | 52 | 42 | 239 | 68 | 235 | 84 | 394 |
| West South Central | 9 | 0 | 4 | 0 | 22 | 17 | 13 | 13 | 13 | 26 |
| Mountain | 111 | 82 | 129 | 55 | 259 | 91 | 240 | 118 | 277 | 100 |
| Pacific | 75 | 46 | 185 | 65 | 152 | 51 | 52 | 65 | 17 | 73 |

SCARLET FEVER CASE RATES

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 103 cities | 284 | 221 | 307 | 270 | 344 | 285 | 356 | 292 | [2] 346 | [3] 287 |
| New England | 587 | 300 | 637 | 295 | 542 | 381 | 575 | 300 | 515 | [4] 409 |
| Middle Atlantic | 285 | 166 | 323 | 210 | 292 | 237 | 325 | 237 | 299 | 235 |
| East North Central | 227 | 243 | 166 | 333 | 350 | 321 | 344 | 324 | [3] 366 | 300 |
| West North Central | 549 | 493 | 733 | 580 | 731 | 548 | 780 | 669 | 756 | [5] 709 |
| South Atlantic | 192 | 137 | 148 | 158 | 246 | 186 | 190 | 186 | 175 | 154 |
| East South Central | 158 | 99 | 210 | 119 | 168 | 140 | 168 | 202 | 200 | 109 |
| West South Central | 79 | 120 | 141 | 112 | 110 | 90 | 185 | 69 | 194 | 69 |
| Mountain | 157 | 246 | 370 | 237 | 518 | 319 | 296 | 373 | 250 | 255 |
| Pacific | 155 | 205 | 180 | 243 | 174 | 270 | 210 | 256 | 215 | 334 |

[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, 1925 and 1926, respectively.
[2] Racine, Wis., not included.
[3] Hartford, Conn., and Kansas City, Mo., not included.
[4] Hartford, Conn., not included.
[5] Kansas City, Mo., not included.

*Summary of weekly reports from cities, December 27, 1925, to January 30, 1926—Annual rates per 100,000 population—Compared with rates for the corresponding period of 1924–25*—Continued

SMALLPOX CASE RATES

| | Week ended— | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Jan. 3, 1925 | Jan. 2, 1926 | Jan. 10, 1925 | Jan. 9, 1926 | Jan. 17, 1925 | Jan. 16, 1926 | Jan. 24, 1925 | Jan. 23, 1926 | Jan. 31, 1925 | Jan. 30, 1926 |
| 103 cities | 41 | 23 | 55 | 33 | 56 | 47 | 68 | 35 | [3] 65 | [3] 41 |
| New England | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | [4] 0 |
| Middle Atlantic | 3 | 1 | 3 | 0 | 10 | 2 | 6 | 0 | 9 | 1 |
| East North Central | 25 | 22 | 38 | 48 | 37 | 37 | 45 | 33 | [2] 33 | 43 |
| West North Central | 125 | 18 | 213 | 65 | 187 | 51 | 175 | 36 | 189 | [5] 62 |
| South Atlantic | 36 | 24 | 29 | 43 | 58 | 68 | 35 | 56 | 42 | 58 |
| East South Central | 341 | 73 | 362 | 47 | 200 | 57 | 620 | 47 | 599 | 21 |
| West South Central | 31 | 22 | 62 | 52 | 31 | 146 | 31 | 99 | 57 | 125 |
| Mountain | 46 | 36 | 28 | 36 | 55 | 18 | 92 | 27 | 46 | 18 |
| Pacific | 108 | 148 | 141 | 111 | 202 | 286 | 199 | 194 | 168 | 205 |

TYPHOID FEVER CASE RATES

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 103 cities | 36 | 10 | 32 | 13 | 20 | 11 | 17 | 13 | [2] 17 | [3] 8 |
| New England | 24 | 7 | 14 | 31 | 24 | 2 | 19 | 9 | 7 | [4] 5 |
| Middle Atlantic | 58 | 7 | 49 | 14 | 21 | 16 | 20 | 10 | 19 | 9 |
| East North Central | 26 | 6 | 13 | 11 | 22 | 8 | 10 | 3 | [2] 10 | 4 |
| West North Central | 4 | 6 | 6 | 2 | 10 | 4 | 6 | 4 | 12 | [5] 2 |
| South Atlantic | 38 | 11 | 52 | 9 | 19 | 8 | 12 | 8 | 35 | 9 |
| East South Central | 37 | 31 | 47 | 16 | 16 | 16 | 26 | 5 | 21 | 10 |
| West South Central | 35 | 47 | 66 | 22 | 66 | 13 | 40 | 151 | 57 | 17 |
| Mountain | 0 | 9 | 9 | 9 | 0 | 9 | 46 | 0 | 18 | 18 |
| Pacific | 11 | 8 | 25 | 11 | 6 | 13 | 14 | 16 | 3 | 11 |

INFLUENZA DEATH RATES

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 96 cities | 18 | 15 | 20 | 21 | 21 | 23 | 21 | 20 | [2] 22 | [3] 28 |
| New England | 2 | 12 | 17 | 9 | 26 | 14 | 10 | 7 | 26 | [4] 15 |
| Middle Atlantic | 21 | 10 | 20 | 18 | 18 | 16 | 20 | 14 | 16 | 18 |
| East North Central | 9 | 8 | 15 | 12 | 14 | 11 | 17 | 8 | [2] 11 | 12 |
| West North Central | 8 | 15 | 13 | 8 | 2 | 19 | 19 | 10 | 15 | [5] 7 |
| South Atlantic | 25 | 19 | 33 | 15 | 42 | 23 | 21 | 39 | 36 | 36 |
| East South Central | 58 | 31 | 42 | 83 | 42 | 88 | 58 | 57 | 68 | 73 |
| West South Central | 48 | 43 | 39 | 47 | 82 | 80 | 87 | 94 | 77 | 151 |
| Mountain | 37 | 27 | 18 | 46 | 28 | 64 | 9 | 18 | 37 | 73 |
| Pacific | 11 | 39 | 18 | 57 | 11 | 46 | 11 | 39 | 18 | 78 |

PNEUMONIA DEATH RATES

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 96 cities | 195 | 184 | 185 | 220 | 206 | 211 | 202 | 199 | [2] 198 | [3] 194 |
| New England | 168 | 210 | 117 | 246 | 151 | 208 | 208 | 210 | 232 | [4] 143 |
| Middle Atlantic | 225 | 186 | 227 | 229 | 259 | 236 | 233 | 227 | 229 | 217 |
| East North Central | 155 | 142 | 143 | 176 | 143 | 153 | 132 | 139 | [2] 136 | 136 |
| West North Central | 91 | 117 | 87 | 140 | 104 | 125 | 117 | 81 | 114 | [5] 106 |
| South Atlantic | 232 | 261 | 232 | 289 | 271 | 276 | 242 | 287 | 238 | 284 |
| East South Central | 278 | 259 | 268 | 332 | 173 | 285 | 294 | 228 | 278 | 208 |
| West South Central | 324 | 312 | 247 | 335 | 426 | 354 | 343 | 312 | 218 | 444 |
| Mountain | 222 | 264 | 222 | 127 | 240 | 328 | 314 | 273 | 305 | 164 |
| Pacific | 167 | 135 | 164 | 220 | 145 | 167 | 185 | 185 | 193 | 174 |

[2] Racine, Wis., not included.
[3] Hartford, Conn., and Kansas City Mo., not included.
[4] Hartford, Conn., not included.
[5] Kansas City, Mo., not included.

*Number of cities included in summary of weekly reports, and aggregate population of cities in each group, approximated as of July 1, 1925 and 1926, respectively*

| 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 | |
|---|---|---|---|---|---|---|
| | | | 1925 | 1926 | 1925 | 1926 |
| Total | 103 | 96 | 29,944,996 | 30,473,129 | 29,251,658 | 29,764,201 |
| New England | 12 | 12 | 2,176,124 | 2,206,124 | 2,176,124 | 2,206,124 |
| Middle Atlantic | 10 | 10 | 10,346,970 | 10,476,970 | 10,346,970 | 10,476,970 |
| East North Central | 16 | 16 | 7,481,656 | 7,655,436 | 7,481,656 | 7,655,436 |
| West North Central | 14 | 11 | 2,594,962 | 2,634,662 | 2,461,380 | 2,499,036 |
| South Atlantic | 21 | 21 | 2,716,070 | 2,776,070 | 2,716,070 | 2,776,070 |
| East South Central | 7 | 7 | 993,103 | 1,004,953 | 993,103 | 1,004,953 |
| West South Central | 8 | 6 | 1,184,057 | 1,212,057 | 1,078,198 | 1,103,695 |
| Mountain | 9 | 9 | 563,912 | 572,773 | 563,912 | 572,773 |
| Pacific | 6 | 4 | 1,888,142 | 1,934,084 | 1,434,245 | 1,469,144 |

# FOREIGN AND INSULAR

## THE FAR EAST

*Report for week ended January 16, 1926.*—The following report for the week ended January 16, 1926, was transmitted by the Far Eastern Bureau of the health section of the League of Nations' secretariat, located at Singapore, to the headquarters at Geneva:

| Port | Plague | | Cholera | | Smallpox | | Port | Plague | | Cholera | | Smallpox | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Cases | Deaths | Cases | Deaths | Cases | Deaths | | Cases | Deaths | Cases | Deaths | Cases | Deaths |
| Bombay | ---- | 0 | ---- | 0 | 19 | 9 | Saigon and Cholon | 0 | 0 | ---- | 1 | 1 | 0 |
| Madras | ---- | 0 | ---- | 6 | 8 | 0 | Haiphong | 0 | 0 | 0 | 0 | 0 | 0 |
| Rangoon | ---- | 5 | ---- | 0 | 5 | 0 | Hongkong | 0 | 0 | 0 | 0 | 1 | 0 |
| Karachi | ---- | 0 | ---- | 0 | 7 | 5 | Shanghai | 0 | 0 | 0 | 0 | ---- | 23 |
| Negapatam | ---- | 0 | ---- | 1 | 0 | 0 | Amoy | 0 | 0 | 0 | 0 | 0 | 0 |
| Colombo | 1 | 1 | 0 | 0 | 2 | 0 | Nagasaki | 0 | 0 | 0 | 0 | 0 | 0 |
| Basra | 0 | 0 | 0 | 0 | 8 | 3 | Yokohama | 0 | 0 | 0 | 0 | 0 | 0 |
| Singapore | 1 | 1 | 0 | 0 | 2 | 1 | Simonoseki | 0 | 0 | 0 | 0 | 0 | 0 |
| Port Swettenham | 0 | 0 | 0 | 0 | 0 | 0 | Moji | 0 | 0 | 0 | 0 | 0 | 0 |
| Penang | 0 | 0 | 0 | 0 | 0 | 0 | Kobe | 0 | 0 | 0 | 0 | 0 | 0 |
| Batavia | 0 | 0 | 0 | 0 | 0 | 0 | Osaka | 0 | 0 | 0 | 0 | 0 | 0 |
| Soerabaya | 2 | 2 | 0 | 0 | 2 | 2 | Niigata | 0 | 0 | 0 | 0 | 0 | 0 |
| Samarang | 0 | 0 | 0 | 0 | 0 | 0 | Tsuruga | 0 | 0 | 0 | 0 | 0 | 0 |
| Belawan Deli | 0 | 0 | 0 | 0 | 0 | 0 | Hakodate | 0 | 0 | 0 | 0 | 0 | 0 |
| Padang (Sumatra) | 0 | 0 | 0 | 0 | 0 | 0 | Keelung | 0 | 0 | 0 | 0 | 0 | 0 |
| Sabang (Rhio) | 0 | 0 | 0 | 0 | 0 | 0 | Fusan | 0 | 0 | 0 | 0 | 0 | 0 |
| Macassar | 1 | 1 | 0 | 0 | 0 | 0 | Dairen | 0 | 0 | 0 | 0 | 4 | 0 |
| Sandakan (North Borneo) | 0 | 0 | 0 | 0 | 0 | 0 | Adelaide | 0 | 0 | 0 | 0 | 0 | 0 |
| Manila | 0 | 0 | 4 | 0 | 0 | 0 | Brisbane | 0 | 0 | 0 | 0 | 0 | 0 |
| Zamboanga | 0 | 0 | 0 | 0 | 0 | 0 | Fremantle | 0 | 0 | 0 | 0 | 0 | 0 |
| Bangkok | 1 | 0 | 26 | 16 | 3 | 1 | Melbourne | 0 | 0 | 0 | 0 | 0 | 0 |
| Rockhampton | 0 | 0 | 0 | 0 | 0 | 0 | Sydney | 0 | 0 | 0 | 0 | 0 | 0 |
| Townsville | 0 | 0 | 0 | 0 | 0 | 0 | Port Said | 0 | 0 | 0 | 0 | 0 | 0 |
| Port Darwin | 0 | 0 | 0 | 0 | 0 | 0 | Mombasa (Kenya) | 0 | 0 | 0 | 0 | 0 | 0 |
| Broome | 0 | 0 | 0 | 0 | 0 | 0 | Massowah | 0 | 0 | 0 | 0 | 0 | 0 |
| Port Moresby | 0 | 0 | 0 | 0 | 0 | 0 | Djibuti | 0 | 0 | 0 | 0 | 0 | 0 |
| Auckland | 0 | 0 | 0 | 0 | 0 | 0 | Mozambique | 0 | 0 | 0 | 0 | 0 | 0 |
| Wellington | 0 | 0 | 0 | 0 | 0 | 0 | Lourenco Marques | 0 | 0 | 0 | 0 | 0 | 0 |
| Christchurch | 0 | 0 | 0 | 0 | 0 | 0 | Durban | 0 | 0 | 0 | 0 | 0 | 0 |
| Invercargill | 0 | 0 | 0 | 0 | 0 | 0 | East London | 0 | 0 | 0 | 0 | 0 | 0 |
| Honolulu | 0 | 0 | 0 | 0 | 0 | 0 | Port Elizabeth | 0 | 0 | 0 | 0 | 0 | 0 |
| Suez | 0 | 0 | 0 | 0 | 0 | 0 | Cape Town | 0 | 0 | 0 | 0 | 0 | 0 |
| Alexandria | 0 | 0 | 0 | 0 | 0 | 0 | Port Louis (Mauritius) | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | Seychelles | 0 | 0 | 0 | 0 | 0 | 0 |

## CANADA

*Communicable diseases— Week ended January 30, 1926.*—The following table shows the numbers of cases of certain communicable diseases in six provinces of Canada during the week ended January 30, 1926. The information was supplied by the Canadian Ministry of Health.

| | Nova Scotia | New Brunswick | Quebec | Ontario | Manitoba | Saskatchewan | Total |
|---|---|---|---|---|---|---|---|
| Cerebrospinal fever | ---- | ---- | ---- | 1 | ---- | ---- | 1 |
| Lethargic encephalitis | ---- | ---- | ---- | 1 | ---- | ---- | 1 |
| Smallpox | ---- | ---- | ---- | 6 | 1 | 6 | 13 |
| Typhoid fever | ---- | ---- | 9 | 7 | ---- | ---- | 16 |

*Communicable diseases—Ontario—January, 1926 (comparative).*—During the month of January, 1926, communicable diseases were notified in the Province of Ontario as follows:

| Disease | 1926 | | 1925 | |
|---|---|---|---|---|
| | Cases | Deaths | Cases | Deaths |
| Cerebrospinal meningitis | 6 | 2 | 1 | 1 |
| Chancroid | | | 11 | |
| Chicken pox | 1,010 | | 971 | |
| Diphtheria | 288 | 16 | 318 | 25 |
| German measles | 63 | | 21 | |
| Gonorrhea | 135 | | 142 | |
| Influenza | | 46 | 20 | 6 |
| Lethargic encephalitis | 2 | | 5 | 3 |
| Measles | 1,305 | 3 | 1,222 | 7 |
| Mumps | 566 | | 627 | |
| Pneumonia | | 281 | | 218 |
| Poliomyelitis | 2 | 1 | | |
| Scarlet fever | 811 | 7 | 870 | 13 |
| Septic sore throat | 8 | | 14 | 1 |
| Smallpox | 80 | | 50 | |
| Syphilis | 114 | | 113 | |
| Tuberculosis | 138 | 82 | 172 | 89 |
| Typhoid fever | 51 | 4 | 38 | 5 |
| Whooping cough | 240 | 3 | 181 | 6 |

*Smallpox distribution.*—The greatest numbers of cases of smallpox in the Province of Ontario, Canada, during the month of January, 1926, were reported at Toronto, with 23 cases; Admaston, with 11 cases; and Trenton with 7 cases. Smallpox was reported at 20 localities, the total number of cases being 80, as compared with 50 cases reported for the corresponding month of the year 1925.

*Communicable diseases—Ottawa—Year 1925.*—Communicable diseases were reported in the city of Ottawa during the year 1925, as follows: Diphtheria, 204 cases, with 15 deaths; measles, 275 cases, occurring mostly during the early summer, with 1 death; scarlet fever, 435 cases, of unusually mild type, with 1 death; tuberculosis, 100 deaths. Typhoid fever was stated to have occurred as scattered cases mostly from outside sources except for cases in September of local origin. These cases occurred in three households in different parts of the city; the source of infection was not determined. Population, 118,697.

*Measles—Regina, Saskatchewan.*—During the period December 27, 1925, to January 30, 1926, 1,285 cases of measles with 4 deaths were reported at Regina, Province of Saskatchewan, Canada.

## CANAL ZONE

*Communicable diseases—December, 1925.*—During the month of December, 1925, communicable diseases were reported in the Canal Zone, Colon, and Panama, as follows:

| Disease | Canal Zone | | Colon | | Panama | | Infected in outlying localities | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Cases | Deaths | Cases | Deaths | Cases | Deaths | Cases | Deaths | Cases | Deaths |
| Chicken pox | 2 | | 2 | | 10 | | | | 14 | |
| Diphtheria | 1 | | 3 | | 13 | 2 | 1 | | 18 | 2 |
| Dysentery | 2 | | 1 | 1 | 8 | 2 | | 1 | 11 | 4 |
| Hookworm | 130 | | 2 | | 90 | | 72 | | 294 | |
| Leprosy | 1 | | 3 | | | | 2 | | 6 | |
| Malaria | 124 | | 2 | | 3 | | 36 | 11 | 165 | 11 |
| Measles | 6 | | 5 | | 9 | | | | 20 | |
| Mumps | 3 | | | | | | 1 | | 4 | |
| Pneumonia [1] | | 2 | | 5 | | 12 | | 5 | | 24 |
| Poliomyelitis | | | | | 2 | | | | | |
| Tuberculosis [1] | | | | 3 | | 12 | | 3 | | 18 |
| Typhoid fever | | | 1 | | | | 3 | | 4 | |
| Whooping cough | 3 | | 1 | | 1 | | | | 5 | |

[1] Only deaths reported.

## CANARY ISLANDS

*Plague—Las Palmas—January 7, 1926.*—A fatal case of plague was reported at Las Palmas, Canary Islands, January 7, 1926.[1]

## GREAT BRITAIN

*Cardiff, Wales—Correction—Smallpox.*—The report of 14 cases of smallpox with 8 deaths in Cardiff, Wales, during the week ended August 8, 1925, which was published in the Public Health Reports September 4, 1925, and in subsequent issues, was erroneous. The Medical Officer of Health of Cardiff states that only one case of smallpox was reported at Cardiff during 1925, and that case was imported.

## INDO-CHINA

*Communicable diseases—October, 1925.*—During the month of October, 1925, communicable diseases were reported in Indo-China, as follows:

| Disease | Cases | Deaths | Disease | Cases | Deaths |
|---|---|---|---|---|---|
| Cerebrospinal meningitis | 7 | 2 | Mumps | 65 | |
| Cholera | 2 | 2 | Plague | 8 | 7 |
| Dengue | [a] 107 | | Poliomyelitis | 3 | |
| Diphtheria | 6 | | Puerperal infection | 2 | |
| Dysentery | 551 | 1 | Smallpox | 82 | 29 |
| Influenza | 15 | 4 | Typhoid fever | 14 | 3 |
| Measles | 20 | | | | |

[a] In epidemic form, benign.

[1] Public Health Reports, Feb. 5, 1926, p. 239.

*Occurrence according to locality and race.*—The cholera and plague occurrence was in the Province of Cochin-China. The 107 cases of dengue were notified in the Province of Laos. Of the smallpox cases, 43 cases with 14 deaths occurred in the Province of Annam, 2 cases with 1 death in the Province of Cambodia, 33 cases with 14 deaths in Cochin-China, and 4 cases in the Province of Tonkin. The cases were in natives; also, the cases of cholera and plague. Four cases of diphtheria were reported in Europeans.

*Leprosy.*—During the period under report 19 cases of leprosy were reported.

*Typhoid fever occurrence.*—Thirteen cases of typhoid fever were reported in natives, the greatest number of cases, viz, 8 with 2 deaths, occurred in the Province of Tonkin. One case occurred in a European in the Province of Cochin-China.

## JAPAN

*Typhoid fever increase—Tokyo.*—Recent information shows an increase in typhoid fever prevalence at Tokyo, Japan, during the two weeks ended January 9, 1926, the number of cases and deaths being reported as follows: Week ended January 2, 1926—cases, 146; deaths, 18; week ended January 9—cases, 105; deaths, 22. For the week ended December 26, 1925, 50 cases with 15 deaths were reported. During the period June 28 to December 26, 1925, typhoid fever prevalence was noted at Tokyo, the largest numbers of cases being 103 cases reported for the week ended August 1, and 129 for the week ended October 3, 1925. The lowest number reported during the period was 35 for the week ended October 24, 1925. Population, census of October, 1925, 1,995,000.

## LATVIA

*Communicable diseases—November, 1925.*—During the month of November, 1925, communicable diseases were reported in the Republic of Latvia as follows:

| Disease | Cases | Disease | Cases |
|---|---|---|---|
| Cerebrospinal meningitis | 4 | Paratyphoid fever | 1 |
| Diphtheria | 38 | Rabies | 2 |
| Dysentery | 1 | Scarlet fever | 241 |
| Measles | 117 | Typhoid fever | 67 |
| Mumps | 37 | Whooping cough | 51 |

## MALTA

*Communicable diseases—December, 1925.*—During the month of December, 1925, communicable diseases were reported in the island of Malta as follows:

| Disease | Cases | Disease | Cases |
|---|---|---|---|
| Broncho-pneumonia | 7 | Measles | 14 |
| Chicken pox | 10 | Pneumonia | 2 |
| Diphtheria | 4 | Scarlet fever | 1 |
| Influenza | 1 | Smallpox | 8 |
| Lethargic encephalitis | 2 | Tuberculosis | 14 |
| Malta (undulant) fever | 32 | Typhoid fever | 19 |

*Smallpox.*—From October 1 to December 28, 1925, 59 cases of smallpox were reported in the island. From October 1, 1925, to January 19, 1926, a total of 66 cases was reported, of which 15 were reported at Valetta and 22 at Floriana.

## MAURITIUS

*Plague—October, 1925.*—During the month of October, 1925, seven fatal cases of plague were reported in the island of Mauritius, of which two occurred at Pamplemousses, three at Port Louis, and two at Rivière du Rempart.

## PALESTINE

*Communicable diseases—November, 1925.*—Communicable diseases were reported in Palestine for the month of November, 1925, as follows:

| Disease | Cases | Deaths | Disease | Cases | Deaths |
|---|---|---|---|---|---|
| Cerebrospinal meningitis | 1 | 1 | Tuberculosis | 53 | 22 |
| Diphtheria | 6 | ---- | Typhoid fever | 91 | 7 |
| Measles | 473 | 26 | Typhus fever | 3 | ---- |
| Scarlet fever | 7 | 1 | | | |

Population, 1924—681,245, not including Bedouin tribes and military forces.

## TRINIDAD (WEST INDIES)

*Smallpox (reported as alastrim)—Port of Spain.*—Information dated January 22, 1926, shows the occurrence of an imported case of smallpox (alastrim) at Port of Spain, Trinidad, West Indies. The case occurred in a boy who arrived in the colony on a sloop from Yrapa, Venezuela, January 6, 1926, was taken ill with fever January 10, and developed a rash January 14, 1926. The contacts, 21 in number, were stated to have been vaccinated.

## UNION OF SOUTH AFRICA

*Plague—Kimberley District, Cape Province.*—During the week ended December 19, 1925, a case of plague, occurring in a native, was reported in Kimberley District, Cape Province, Union of South Africa.

*Typhus fever.*—Typhus fever was reported in the Union of South Africa during the two-week period ended December 26, 1925, in the Cape Province, Orange Free State, and Transvaal.

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## CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW 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 February 19, 1926 [1]

#### CHOLERA

| Place | Date | Cases | Deaths | Remarks |
|---|---|---|---|---|
| India: | | | | |
| Calcutta | Dec. 13–26 | 28 | 24 | |
| Madras | Dec. 27–Jan. 2 | 28 | 13 | |
| Philippine Islands: | | | | |
| Manila | Dec. 27–Jan. 3 | 2 | 2 | |
| Province— | | | | |
| Bataan | Nov. 29–Dec. 12 | 14 | 11 | Subject to later correction. |
| Pampanga | Dec. 13–19 | 22 | 19 | Do. |

#### PLAGUE

| | | | | |
|---|---|---|---|---|
| British East Africa: | | | | |
| Uganda | Oct., 1925 | 153 | 148 | |
| Canary Islands: | | | | |
| Las Palmas | Jan. 7 | 1 | 1 | |
| Ceylon: | | | | |
| Colombo | Dec. 27–Jan. 2 | 1 | 1 | |
| Indo-China | | | | October, 1925: Cases, 8; deaths, 7. |
| Province— | | | | |
| Cochin-China | Oct 1–31 | 8 | 7 | |
| Iraq: | | | | |
| Bagdad | Dec. 27–Jan. 2 | 3 | 2 | |
| Java: | | | | |
| Batavia | Dec. 19–25 | 37 | 35 | Province. |
| Mauritius | | | | October, 1925: Cases, 7; deaths, 7. |
| Pamplemousses | Oct. 1–31 | 2 | 2 | |
| Port Louis | do | 3 | | |
| Rivière du Rempart | do | 2 | | |
| Netherlands India | | | | |
| Celebes Island— | | | | |
| Makasser | Dec. 12 | | | Epidemic. |
| Peru: | | | | |
| Lima | Jan. 1–31 | 20 | | In hospital. In province some cases. |
| Mollendo | do | | | Present with 12 or 15 cases reported unofficially. |
| Union of South Africa | | | | |
| Cape Province— | | | | |
| Kimberley District | Dec. 13–19 | 1 | | In native. |

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

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

### Reports Received During Week Ended February 19, 1926—Continued

#### SMALLPOX

| Place | Date | Cases | Deaths | Remarks |
|---|---|---|---|---|
| Algeria: | | | | |
| Algiers | Dec. 21-31 | 68 | | |
| Do | Jan. 1-10 | 64 | | |
| British East Africa: | | | | |
| Mombasa | Dec. 13-19 | | 1 | |
| Uganda | Oct. 1-31 | 1 | | |
| Canada: | | | | |
| Manitoba | Jan. 24-30 | 1 | | |
| Winnipeg | Jan. 31-Feb. 6 | 2 | | |
| Ontario | | | | January, 1926: Cases, 80; corresponding period, year 1925—cases, 50. Present in 20 localities. |
| Admaston | Jan. 1-31 | 11 | | |
| Ottawa | Jan. 31-Feb. 6 | 1 | | |
| Toronto | Jan. 1-31 | 23 | | |
| Trenton | do | 7 | | |
| Saskatchewan | Jan. 24-30 | 6 | | |
| Regina | do | 1 | | |
| China: | | | | |
| Amoy | Dec. 21-Jan. 2 | | | Present. |
| Chungking | Dec. 27-Jan. 9 | | | Do. |
| Foochow | do | | | Do. |
| Hankow | Jan. 10-16 | 1 | | |
| Hongkong | Dec. 20-26 | 1 | | |
| Shanghai | Jan. 3-9 | 9 | 16 | Cases, foreign; deaths, foreign and native, in International Settlement and French Concession. |
| Swatow | Dec. 27-Jan. 9 | | | Present. |
| Great Britain: | | | | |
| England and Wales | Jan. 3-23 | 958 | | |
| Hull | Jan. 10-23 | 15 | | |
| Newcastle-on-Tyne | Jan. 10-16 | 1 | | |
| Nottingham | Nov. 22-Dec. 12 | 4 | | |
| Do | Dec. 27-Jan. 9 | 2 | | |
| India: | | | | |
| Calcutta | Dec. 13-26 | 19 | 7 | |
| Karachi | Dec. 27-Jan. 2 | 7 | 2 | |
| Madras | do | 3 | 1 | |
| Rangoon | Dec. 13-19 | 1 | | |
| Indo-China | | | | Oct. 1-31, 1925: Cases, 82; deaths, 29. |
| Province— | | | | |
| Annam | Oct. 1-31 | 43 | 14 | |
| Cambodia | do | 2 | 1 | |
| Cochin-China | do | 33 | 14 | |
| Tonkin | do | 4 | | |
| Iraq: | | | | |
| Bagdad | Dec. 27-Jan. 2 | 1 | | |
| Java: | | | | |
| Batavia | Dec. 19-25 | 1 | | Province. |
| Malta | Nov. 1-30 | 8 | | Oct. 1, 1925-Jan. 19, 1926: Cases, 66—Floriana, 22; Valetta, 15. |
| Mexico: | | | | |
| Aguascalientes | Jan. 24-30 | | 3 | |
| Durango | Jan. 1-31 | | 2 | |
| Guadalajara | Feb. 1 | | 1 | |
| Mexico City | Jan. 17-23 | 2 | | Including municipalities in Federal District. |
| San Luis Potosi | Jan. 24-30 | | 2 | |
| Tampico | Jan. 21-31 | 2 | | |
| Portugal: | | | | |
| Lisbon | Dec. 20-26 | 8 | | |
| Do | Dec. 27-Jan. 16 | 40 | | |
| Sierra Leone: | | | | |
| Konno District | Dec. 16-31 | 5 | | In one locality. |
| Spain: | | | | |
| Valencia | Jan. 10-16 | 3 | | |
| Trinidad (West Indies): | | | | |
| Port of Spain | Jan. 22 | 1 | | In boy arrived on sloop from Yrapa, Venezuela, Jan. 6, 1926. (Reported as alastrim). |
| Tunisia: | | | | |
| Tunis | Jan. 11-20 | 4 | | |

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

### Reports Received During Week Ended February 19, 1926—Continued

#### TYPHUS FEVER

| Place | Date | Cases | Deaths | Remarks |
|---|---|---|---|---|
| Argentina: | | | | |
| Rosario | Dec. 1-31 | 1 | | |
| Bulgaria: | | | | |
| Sofia | Dec. 25-31 | 1 | | |
| China: | | | | |
| Hongkong | Dec. 27-Jan. 2 | 1 | | |
| Mexico: | | | | |
| Durango | Jan. 1-31 | | 1 | |
| Mexico City | Jan. 10-23 | 19 | | Including municipalities in Federal District. |
| Union of South Africa: | | | | |
| Cape Province | Dec. 13-26 | | | Outbreaks. |
| Orange Free State | do | | | Do. |
| Transvaal | do | | | Do. |

### Reports Received from December 26, 1925, to February 12, 1926 [1]

#### CHOLERA

| Place | Date | Cases | Deaths | Remarks |
|---|---|---|---|---|
| India | | | | Oct. 18-Nov. 28, 1925: Cases, 10,991; deaths, 6,498. |
| Calcutta | Nov. 1-28 | 101 | 89 | |
| Do | Dec. 6-12 | 23 | 30 | |
| Madras | Nov. 15-Dec. 26 | 146 | 57 | |
| Rangoon | Nov. 8-Dec. 5 | 4 | 4 | |
| Indo-China | | | | September, 1925: Cases, 9; deaths, 5. September, 1924: Cases, 7; deaths, 4. (European cases, 2.) |
| Province— | | | | |
| Annam | Sept. 1-30 | 2 | 2 | September, 1924: None. |
| Cochin China | do | 5 | 3 | September, 1924: 1 case; 1 death. |
| Tonkin | do | 2 | | September, 1924: None. |
| Japan | Aug. 30-Oct. 17 | 409 | | |
| Philippine Islands: | | | | |
| Manila | Nov. 9-Dec. 5 | 8 | 6 | |
| Do | Dec. 14-26 | 5 | 2 | |
| Provinces— | | | | |
| Bataan | Nov. 30-Dec. 13 | 10 | 8 | |
| Bulacan | Oct. 18-Nov. 7 | 92 | 64 | |
| Do | Nov. 23-Dec. 13 | 179 | 69 | |
| Laguna | do | 16 | 13 | |
| Nueva Ecija | do | 6 | 2 | |
| Pampanga | Nov. 1-7 | 1 | 1 | |
| Do | Nov. 23-Dec. 13 | 80 | 56 | |
| Rizal | Sept. 27-Nov. 21 | 75 | 21 | |
| Romblon | Dec. 7-13 | 23 | 12 | |
| Russia | May-June | 7 | | |
| Do | July-August | 4 | | |
| Siam: | | | | |
| Bangkok | Oct. 4-Nov. 14 | 108 | 68 | |
| Do | Nov. 22-Dec. 19 | 209 | 117 | |
| On vessel: | | | | |
| Steamship | Oct. 3 | 9 | | Arrived at Bangkok, Siam; 9 cases in coolie passengers. |

#### PLAGUE

| | | | | |
|---|---|---|---|---|
| Argentina | | | | Jan. 24-30, 1926: Six cases, occurring in interior provinces of Salta and Santa Fe. |
| Brazil: | | | | |
| Bahia | Nov. 8-14 | 2 | | |
| Santos | Dec. 8-21 | | 2 | |
| British East Africa: | | | | |
| Kenya— | | | | |
| Kisumu | Nov. 22-Dec. 5 | 1 | 2 | |
| Uganda Protectorate | September | 103 | 85 | |
| Canary Islands: | | | | |
| La Laguna | Dec. 24 | 3 | 2 | |
| Las Palmas | do | 1 | | |
| Santa Cruz de Teneriffe | Dec. 18-27 | 3 | | |

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

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

### Reports Received from December 26, 1925, to February 12, 1926—Continued

#### PLAGUE—Continued

| Place | Date | Cases | Deaths | Remarks |
|---|---|---|---|---|
| Ceylon: | | | | |
| Colombo | Nov. 15-28 | 3 | 3 | |
| Do | Nov. 29-Dec. 5 | | | 1 plague rodent. |
| China: | | | | |
| Nanking | Nov. 15-Jan. 2 | | | Prevalent. |
| Ecuador: | | | | |
| Eloy Alfaro | Jan. 1-15 | 1 | | |
| Guayaquil | Nov. 1-Dec. 31 | 31 | 12 | |
| Do | Jan. 1-15 | 15 | 5 | |
| Recreo (country estate) | do | 1 | | Rats taken, Nov. 1-Dec. 31, 1925: 49,370; rats found infected, 281. Rats taken, Jan. 1-15, 1926: 11,864; rats found infected, 80. |
| Egypt | | | | Jan. 1-Dec. 9, 1925: Cases, 138. |
| Beni Suef | Nov. 18 | 1 | 1 | Corresponding period, 1924: Cases, 365. |
| Fayoum Province | Dec. 3-9 | 1 | 1 | |
| Greece: | | | | |
| Athens | Nov. 1-30 | 18 | 4 | Including Piræus. |
| Patras | Nov. 13-Dec. 12 | 4 | 1 | |
| India | | | | Oct. 18-Nov. 28, 1925: Cases, 7,420; deaths, 5,031. |
| Bombay | Dec. 6-12 | 1 | 1 | |
| Calcutta | do | 1 | 1 | |
| Karachi | Nov. 1-Dec. 19 | 4 | 3 | |
| Madras | Oct. 25-Nov. 7 | 75 | 41 | |
| Do | Nov. 15-21 | 35 | 22 | |
| Rangoon | Oct. 25-Dec. 12 | 19 | 12 | |
| Indo-China | | | | September, 1925: Cases, 17; deaths, 16. September, 1924: Cases, fatal, 12. |
| Province— | | | | |
| Cambodia | Sept. 1-30 | 11 | 11 | September, 1924: Cases, 9; deaths, 9. |
| Cochin China | do | 6 | 5 | September, 1924: 1 case, 1 death |
| Iraq: | | | | |
| Bagdad | Dec. 13-26 | 4 | 1 | |
| Java: | | | | |
| Batavia | Oct. 24-Nov. 6 | 94 | 89 | Province. |
| Do | Nov. 14-Dec. 18 | 232 | 219 | |
| Cheribon | Sept. 27-Oct. 17 | | 166 | |
| Do | Nov. 15-28 | | 59 | |
| Djokjakarta | Oct. 20-Nov. 9 | | | Epidemic in one locality. |
| Kediri | Dec. 7 | | | Do. |
| Pekalongan | Sept. 27-Oct. 17 | | 42 | |
| Do | Nov. 8-28 | | 80 | |
| Rembang | Oct. 20 | | | Do. |
| Soerabaya | Oct. 11-Dec. 5 | 37 | 37 | |
| Tegal | Sept. 27-Oct. 17 | 6 | 6 | |
| Do | Nov. 8-28 | | 14 | |
| Madagascar: | | | | |
| Province— | | | | |
| Itasy | Sept. 16-Oct. 31 | 20 | 20 | |
| Moramanga | do | 17 | 17 | |
| Tananarive | do | 174 | 159 | |
| Town— | | | | |
| Fort Dauphin | Sept. 16-Oct. 15 | 5 | 2 | |
| Tamatave (port) | Sept. 16-30 | 3 | 2 | |
| Do | Oct. 16-31 | 4 | 4 | |
| Tananarive | Sept. 16-30 | 2 | 2 | |
| Mauritius Island | Sept. 20-Nov. 14 | 9 | 9 | |
| Nigeria | August-September | 349 | 267 | |
| Peru: | | | | |
| Huacho | Jan. 26 | 15 | | Port 60 miles north of Callao. |
| Russia | May-June | 67 | | |
| Do | July-August | 139 | | |
| Senegal | September-October. | 45 | 25 | |
| Siam | Aug. 23-Oct. 13 | 50 | 40 | |
| Bangkok | Nov. 15-28 | 3 | 3 | |
| Straits Settlements: | | | | |
| Singapore | Nov. 1-Dec. 5 | 8 | 8 | |
| Syria: | | | | |
| Beirut | Nov. 11-20 | 1 | | |
| Union of South Africa: | | | | |
| Cape Province— | | | | |
| Middleburg district | Dec. 6-12 | 1 | | European. |
| Steynsburg district | Nov. 15-21 | 1 | | Native. On farm. |
| Orange Free State— | | | | |
| Bcshof district | Nov. 29-Dec. 5 | 1 | 1 | In native. |
| Bothaville district | Dec. 6-12 | 1 | 1 | Native. On farm. |

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

### Reports Received from December 26, 1925, to February 12, 1926—Continued

#### SMALLPOX

| Place | Date | Cases | Deaths | Remarks |
|---|---|---|---|---|
| Algeria: | | | | |
| Algiers | Nov. 21–Dec. 20 | 109 | | |
| Arabia: | | | | |
| Aden | Nov. 29–Dec. 5 | 1 | | Imported. |
| Argentina: | | | | |
| Rosario | October | | 1 | |
| Australia: | | | | |
| Queensland— | | | | |
| Brisbane | Dec. 9–15 | 1 | | |
| Brazil: | | | | |
| Rio de Janeiro | Nov. 1–28 | 134 | 72 | |
| Do | Dec. 6–26 | 65 | 26 | |
| British East Africa: | | | | |
| Kenya— | | | | |
| Mombasa | Nov. 15–Dec. 12 | 14 | 5 | |
| Uganda Protectorate | Sept. 1–30 | 7 | 4 | |
| British South Africa: | | | | |
| Southern Rhodesia | Nov. 13–Dec. 23 | 3 | | |
| Canada | | | | Sept. 13–Jan. 2: In 7 Provinces, 186 cases. Jan. 3–23, 1926; cases, 115. |
| Alberta | Jan. 10–23 | 17 | | |
| Calgary | Dec. 13–19 | 1 | | From Drumheller, vicinity of Calgary. |
| British Columbia— | | | | |
| Vancouver | Jan. 4–10 | 1 | | |
| Manitoba | Jan. 3–23 | 17 | | |
| Winnipeg | Dec. 13–19 | 2 | | |
| Do | Jan. 3–30 | 8 | | |
| New Brunswick— | | | | |
| Northumberland | Dec. 6–13 | 1 | | |
| Ontario | | | | December, 1925: Cases, 32; deaths, 1. Occuring in 15 localities. January 3–23, 1926: Cases, 66. |
| Ottawa | Dec. 6–12 | 2 | | |
| Do | Jan. 3–9 | 1 | | |
| Toronto | Dec. 27–Jan. 2 | 1 | | |
| Do | Jan. 3–23 | 21 | | |
| Saskatchewan | do | 15 | | |
| Moose Jaw | do | 2 | | |
| Ceylon: | | | | |
| Colombo | Dec. 6–12 | 1 | | Port case. |
| China: | | | | |
| Amoy | Oct. 25–Dec. 19 | | 1 | |
| Antung | Dec. 7–20 | 2 | | |
| Chungking | Nov. 15–Dec. 26 | | | Present. |
| Foochow | Nov. 1–Dec. 26 | | | Do. |
| Hankow | Nov. 14–Dec. 26 | 4 | | |
| Hongkong | Nov. 22–28 | 3 | | |
| Manchuria— | | | | |
| An-shan | Dec. 6–12 | 1 | | |
| Dairen | Oct. 19–Dec. 20 | 67 | 15 | |
| Mukden | Oct. 24–Nov. 15 | 1 | | |
| Tieh-ling | do | 2 | | |
| Nanking | Nov. 21–Dec. 26 | | | Do. |
| Do | Dec. 27–Jan. 2 | | | Do. |
| Shanghai | Oct. 25–Dec. 26 | 30 | 31 | |
| Do | Dec. 27–Jan. 2 | 7 | 5 | |
| Swatow | Nov. 22–Dec. 5 | | | Do. |
| Tientsin | Nov. 1–Dec. 19 | 2 | | |
| Egypt: | | | | |
| Alexandria | Dec. 3–31 | 5 | 2 | |
| France | | | | September, October, 1925: Cases, 91. |
| Gold Coast | September, 1925 | 14 | 4 | |
| Great Britain: | | | | |
| England and Wales | Nov. 15–Dec. 26 | 790 | | |
| | Dec. 27–Jan. 2 | 203 | | |
| Hull | Dec. 27–Jan. 9 | 14 | | |
| Newcastle-on-Tyne | Nov. 29–Dec. 19 | 6 | | |
| Do | Dec. 27–Jan. 2 | 1 | | |
| Nottingham | Dec. 13–26 | 5 | | |
| Sheffield | Nov. 22–Dec. 12 | 7 | | |
| Do | Dec. 20–26 | 3 | | |
| Do | Dec. 27–Jan. 9 | 2 | | |
| Greece | | | | Oct. 1–31, 1925: Cases, 16. |
| Athens | Nov. 1–30 | 17 | 1 | |
| India | | | | Oct. 18–Nov. 28, 1925: Cases, 8,827; deaths, 1,915. |
| Bombay | Nov. 8–Dec. 19 | 22 | 16 | |
| Calcutta | Nov. 29–Dec. 12 | 29 | 18 | |

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

### Reports Received from December 26, 1925, to February 12, 1926—Continued

#### SMALLPOX—Continued

| Place | Date | Cases | Deaths | Remarks |
|---|---|---|---|---|
| India—Continued. | | | | |
| Karachi | Nov. 1–21 | 23 | | |
| Do | Nov. 29–Dec. 5 | 4 | 2 | |
| Do | Dec. 13–19 | 3 | | |
| Madras | Nov. 15–Dec. 26 | 17 | 5 | |
| Rangoon | Oct. 25–Nov. 28 | 3 | | |
| Do | Dec. 6–12 | 2 | 1 | |
| Indo-China | | | | September, 1925: Cases, 122; deaths, 33. September, 1924: Cases, 78; deaths, 22. |
| Province— | | | | |
| Annam | Sept. 1–30 | 47 | 9 | September, 1924: Cases, 8; deaths, 2. |
| Cambodia | do | 29 | 8 | September, 1924: Cases, 16; deaths, 1. |
| Cochin China | do | 28 | 16 | September, 1924: Cases, 43; deaths, 19. |
| Tonkin | do | 18 | | September, 1924: Cases 11. |
| Iraq | | | | Sept. 6–Oct. 17, 1925: Cases, 81; deaths, 40. |
| Bagdad | Nov. 1–14 | 4 | 4 | |
| Do | Nov. 22–Dec. 26 | 15 | 11 | |
| Italy | | | | Aug. 2–Oct. 31, 1925: Cases, 38. |
| Rome | Oct. 12–25 | 1 | | |
| Jamaica | | | | Nov. 27–Dec. 26, 1925: Cases, 52. |
| Kingston | Nov. 27–Dec. 26 | 43 | | Reported as alastrim. |
| Japan: | | | | |
| Taiwan | Nov. 11–Dec. 10 | 3 | | |
| Yokohama | Dec. 14–20 | 1 | | |
| Java: | | | | |
| Batavia | Oct. 24–30 | 1 | | |
| Do | Nov. 14–Dec. 18 | 6 | | |
| Cheribon | Nov. 8–14 | 1 | | |
| Kraksaan | Oct. 11–17 | 11 | | |
| Malang | do | 2 | | |
| North Bantam | Oct. 4–17 | 4 | | |
| Pekalongan | Oct. 25–31 | 1 | | |
| Probolingo | Oct. 11–17 | 1 | | |
| Soerabaya | Oct. 11–Dec. 5 | 467 | 68 | |
| South Bantam | | 1 | | |
| Tegal | Oct. 4–10 | 9 | 1 | |
| Malta | November | 14 | | |
| Mexico | | | | July–September, 1925: Deaths, 1,157. |
| Aguascalientes | Dec. 13–Jan. 2 | 4 | 3 | |
| Do | Jan. 3–23 | | 4 | |
| Durango | Dec. 1–31 | | 1 | |
| Guadalajara | Dec. 29–Jan. 25 | | 6 | |
| Mexico City | Nov. 28–Dec. 5 | 1 | | Including municipalities in Federal district. |
| Do | Jan. 3–9 | 1 | | |
| San Luis Potosi | Jan. 17–23 | | 3 | |
| Torreon | Nov. 1–Dec. 31 | | 51 | |
| Nigeria | August-September | 103 | 1 | |
| Persia: | | | | |
| Teheran | July 23–Sept. 22 | | 203 | |
| Peru: | | | | |
| Arequipa | Oct. 1–31 | | 1 | |
| Poland | | | | Nov. 1–7, 1925: Cases, 8. |
| Portugal: | | | | |
| Lisbon | Oct. 4–31 | 124 | | |
| Do | Nov. 16–Dec. 27 | | 60 | |
| Do | Nov. 14–Dec. 19 | 179 | | |
| Oporto | Nov. 22–Dec. 19 | 2 | 3 | |
| Do | Dec. 27–Jan. 2 | 1 | | |
| Russia | | | | May–June, 1925: Cases, 2,333. Later than previously published reports. |
| Do | July–August | 760 | | |
| Siam | | | | July 12–Sept. 5, 1925: Cases, 21; deaths, 6. |
| Spain: | | | | |
| Madrid | Year 1925 | | 18 | |
| Malaga | Nov. 29–Dec. 5 | | 2 | |
| Do | Dec. 27–Jan. 2 | | 1 | |
| Valencia | Dec. 20–26 | 1 | | |
| Do | Dec. 27–Jan. 2 | 1 | | |
| Switzerland | | | | June 28–Nov. 21, 1925: Cases, 62. |
| Lucerne | Oct. 1–Nov. 30 | 8 | | |
| Zurich | Dec. 27–Jan. 2 | 1 | | |

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

### Reports Received from December 26, 1925, to February 12, 1926—Continued

#### SMALLPOX—Continued

| Place | Date | Cases | Deaths | Remarks |
|---|---|---|---|---|
| Tunisia: | | | | |
| Tunis | Nov. 21-30 | 2 | | |
| Do | Dec. 11-31 | 10 | 1 | |
| Do | Jan. 1-10 | 1 | | |
| Union of South Africa: | | | | |
| Transvaal— | | | | |
| Pretoria District | Dec. 6-12 | | | Outbreaks. In native compound. |

#### TYPHUS FEVER

| | | | | |
|---|---|---|---|---|
| Algeria: | | | | |
| Algiers | October-Dec. 20 | 4 | | |
| Argentina: | | | | |
| Rosario | Oct. 1-31 | 1 | | |
| Bulgaria | September-October. | 26 | 2 | |
| Chile: | | | | |
| Valparaiso | Nov. 29-Jan. 2 | | 2 | |
| China: | | | | |
| Antung | Nov. 29-Dec. 27 | 5 | 1 | |
| Manchuria— | | | | |
| Harbin | Dec. 17-23 | 1 | | |
| Czechoslovakia | October, 1925 | 8 | | |
| Egypt: | | | | |
| Port Said | Nov. 19-25 | 1 | | |
| Finland | | | | October, 1925: One case. |
| France | July-October | 4 | | |
| Germany | Oct. 25-31 | 1 | | |
| Greece: | | | | |
| Athens | Nov. 1-30 | 11 | 2 | |
| Ireland: | | | | |
| Cork County— | | | | |
| Cork | Dec. 26-Jan. 1 | 2 | | |
| Do | Jan. 2-8 | 5 | | |
| Dunmanway | Nov. 14 | 1 | | |
| Galway County | Oct. 17 | 1 | | |
| Latvia | October, 1925 | 2 | | |
| Lithuania | | | | September-October, 1925: Cases, 9; deaths, 1. |
| Mexico | | | | July-September, 1925: Deaths, 90. |
| Aguascalientes | Dec. 14-19 | 1 | | |
| Durango | Dec 1-31 | | 1 | |
| Guadalajara | Dec. 8-Jan 4 | | 3 | |
| Mexico City | Nov. 22-Jan. 9 | 165 | | Including municipalities in Federal district. |
| Tampico | Dec. 21-Jan. 10 | 1 | 1 | |
| Torreon | November, 1925 | | 1 | |
| Morocco | August, 1925 | 3 | | |
| Palestine: | | | | |
| Gaza | Dec. 18 | 1 | | |
| Jaffa | Dec. 1-7 | 1 | | |
| Nazareth | Nov. 3-9 | 1 | | |
| Safad | Nov. 24-30 | 1 | | |
| Tel-Aviv | do | 1 | | |
| Peru: | | | | |
| Arequipa | October, 1925 | | 2 | |
| Poland | Oct. 11-Nov. 14 | 142 | 16 | |
| Rumania | | | | July, 1925: Cases, 74; deaths, 9. |
| Russia | | | | May-June, 1925: Cases, 10,680. Later than previously published reports. |
| Do | | | | July-August, 1925: Cases, 3,136. |
| Union of South Africa | | | | Oct. 1-31, 1925: Cases, 88; deaths, 7 (colored); cases, 7 (European population). |
| Cape Province | Oct. 1-31 | 63 | 5 | Colored. |
| Do | Nov. 8-14 | | | Outbreaks in two districts. |
| Middleburg District | Dec. 6-12 | 1 | | European. On farm. |
| Natal | Oct. 1-Dec. 5 | 1 | | |
| Orange Free State | Nov. 29-Dec. 5 | 23 | 1 | |
| Do | Nov. 1-7 | | | Outbreaks. |
| Bethulia District | Dec. 6-12 | | | Do. |
| Bothaville District | do | 1 | | Native On farm. |
| Transvaal | Oct. 1-31 | 1 | 1 | |

#### YELLOW FEVER

| | | | | |
|---|---|---|---|---|
| Gold Coast | September | 1 | 1 | |
| Nigeria | August-September. | 2 | 1 | |

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