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THE PRESENT PANDEMIC OF PLAGUE

In general, those unfamiliar with the natural laws governing the occurrence, propagation, and spread of pestilences are still very apt to view the appearance of such diseases as mysterious, inexplicable, and more or less providential. It is not realized that man himself is usually, in one way or another, consciously or unconsciously, directly or indirectly, responsible for this spread. Still less is it realized that the application of scientific as well as common sense methods of control will often avert disaster both from a commercial and a humanitarian standpoint.

Plague is a disease as old, perhaps, as the human race. Almost the earliest human records contain references to plague. It is mentioned in the ancient Sanskrit and Egyptian writings and in the Bible. In the fifth and sixth chapters of the First Book of Samuel there is an account of an epidemic of bubonic plague. Forty-one epidemics of plague are recorded as having occurred before the beginning of the Christian era. During the 1,500 years after the birth of Christ there are records of 109 epidemics, and from 1500 to 1720 there are reported 45 pandemics of the disease.

It is impossible to estimate the number of people who have died of plague in ages past, though the figures certainly run into hundreds of millions. It is estimated that more than 10,000,000 human beings have died of plague in the last 25 or 30 years.

The present pandemic of plague began in China in 1894. In 1896 India, Japan, Asiatic Turkey, and European Russia were infected. In 1898 the disease spread to Madagascar and Mauritius, and in 1899 the disease appeared in Arabia, Persia, the Straits Settlements, Austria, Portugal, British South Africa, Egypt, the French Ivory Coast, and Portuguese Africa. About the same time plague appeared in Argentina, Brazil, Paraguay, and the Hawaiian Islands, and in 1900 the disease appeared for the first time in the United States, in San Francisco, Calif. In addition to its having appeared in other South American and European countries since 1900 it may be said that the disease reached Seattle in 1907, and, although there were only seven human cases at that city, plague-infected rats were found off and on for 10 years. In San Francisco the disease appeared several times in epidemic form.

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In 1914 plague appeared in New Orleans; in 1920 in Beaumont and Galveston, Tex. In 1904 it was discovered that plague infection had spread from the rats to the ground squirrels in California, and it has been among these ground squirrels ever since.

During the calendar year 1923 plague was reported to the Surgeon General of the Public Health Service as being present in the following countries, namely: Algeria, Australia, Azores, Brazil, British East Africa, Canary Islands, Ceylon, Chile, China, Ecuador, Egypt, France, Greece, Hawaii, India, Indo-China, Iraq, Japan, Java, Madagascar, Mauritius Island, Mexico, Morocco, Palestine, Peru, Portugal, Portuguese West Africa, Russia, Siam, Siberia, Spain, Straits Settlements, Syria, Tunis, Turkey, Union of South Africa, and Venezuela.

Some of these countries have been plague infected for many years and no doubt will remain so for many years to come, possibly for centuries even. The most common way in which plague spreads from one country to another, from one city to another, is by means of rats on board ship. With the present methods of ship construction and of wharf construction it is practically impossible to eliminate all danger of the importation of plague on vessels without paralyzing commerce to an extent that would be perhaps as disastrous as plague itself.

When the rats of a large city become infected with plague, it often takes many years to eradicate the disease. The fact that there are no human cases does not mean that there may not be rat infection. In at least one city there is a record of rat infection extending over a period of 10 years without the occurrence of a human case during that time. It should be said that an active campaign of rat proofing was carried on in that city during the time and the prevention of human cases is believed to have been due to the activities of the health authorities in combating rodent plague.

As is well known the pneumonic form of plague may, and sometimes does, spread with great rapidity among people who live under overcrowded and other insanitary conditions; that is, where there is close personal contact. Under favorable conditions pneumonic plague spreads along the lines of travel by human beings, by rail or by any other mode of travel, but this is not generally true of the bubonic type, which goes where the rat goes and reaches human beings from the rat.

Even epidemics of the pneumonic form of plague are of animal origin in so far as we can tell. The small outbreak in Oakland, Calif., five years ago started in the following way: A hunter of ground squirrels in shooting these animals evidently obtained one which was sick of plague. It is probable that a flea from this animal bit him, most likely on the arm, and he developed the bubonic type

of the disease. Before he died, however, he developed a secondary plague pneumonia. During his illness he infected others either through coughing or sneezing in close proximity or they may have gotten a very small, an invisible, quantity of secretion from the lungs of the patient on their fingers and from the fingers into the mouth or nose. After the pneumonic form developed from this first case it was passed on from one person to another until 14 people died before the epidemic was checked. Two of those who died in Oakland at that time were doctors and two were nurses.

What is the future of plague? This is hard to predict. More than a quarter of a million cases of human plague were reported from all countries last year. With the facility with which rats carry the disease from one country to another on board ship it seems likely that practically all seaports may sooner or later have to be regarded as actually or potentially infected with plague.

A reference to the statistical tables of the Public Health Reports will show that many times during recent years plague infection, either human or rodent, has been reported on vessels in almost every part of the globe. Only recently two plague-infected vessels arrived at New Orleans, La. One of them had been engaged in trade between ports in Spain and the east coast of South America. The other was from Calcutta via Colombo, Port Said, Algiers, London, and Liverpool. This latter vessel had been fumigated for the destruction of rats at Calcutta and the former at Barcelona, Spain, but evidently without ridding them of the infection, or else they were reinfected subsequent to fumigation.

Once plague infection is present in a given city or community the fight against the disease resolves itself into a fight against the rat or other rodent concerned in its spread. In pneumonic outbreaks the human cases, of course, must be promptly separated from the noninfected portion of the population.

Rats are hunted and trapped and examined for the infection. This is chiefly for the purpose of determining where plague exists. The disease is found almost invariably where the rats are thickest. Immediately steps are taken to remedy the conditions which harbor these pests. Old buildings are demolished, wooden basements are concreted; hollow double walls, floors and ceilings often must be replaced by single walls. Low-built frame houses must be elevated from one and a half feet to two feet above the ground in order that rats may not burrow and multiply beneath them.

Already a number of cities in the United States are constructing all new buildings in such manner as not to afford shelter for rats. Continuous campaigns are waged for the removal of badly constructed buildings, bad rat harbors, of whatever nature.

The ratproofing of new structures is relatively inexpensive, but the cost of ratproofing old buildings is very considerable.

There is only one way to eliminate the rat. It must be *built out of existence.* All other measures produce only very temporary results because of the great fecundity of these animals. This will be readily understood when it is recalled that a single pair of rats under favorable conditions will produce from four hundred to six hundred rats in from fifteen to eighteen months time.

In recent years some improvement has been made in the construction of ships, with a view to eliminating the rat, but much yet remains to be done along this line. A few oil tank vessels have been built so as to practically exclude the rat, but the average freight and passenger steamer may still be said to be virtually a floating hotel for rats.

A Study of the Pellagra-Preventive Action of Dried Beans, Casein, Dried Milk, and Brewers' Yeast, with a Consideration of the Essential Preventive Factors Involved[1]

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The results of the general study of the prevention of pellagra begun in the early fall of 1914, though clearly demonstrating the preventability of the disease by means of an appropriate diet (1), did not show what foods or food factors were the essential ones. The modified diet employed in that study, while satisfactorily serving its particular purpose, was relatively expensive and, it was suspected, in excess of minimal requirements. These considerations, it was felt, would stand in the way of its ready adoption by households and institutions of restricted incomes. It was extremely desirable, therefore, to attempt to devise a diet that was adequate to prevent pellagra and at the same time inexpensive. For this further investigation was of course necessary. Accordingly, as the clinical opportunities at the Georgia State Sanitarium seemed very favorable and as the trustees and officers were keenly interested in the problem and were ready and willing to cooperate, new studies were started at that institution on January 1, 1918, and have been carried on ever since. Some of the results, more particularly such as seemed to have a significant bearing on the essential dietary factors concerned in the prevention and causation of pellagra, have already been published (2) (3). In the following we record some additional results bearing on this fundamental question together with the results of the study primarily designed to afford a solution of the practical question which appealed to us at the outset.

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[1] From field studies in nutrition.

DRIED BEANS

Soon after beginning the field study of pellagra, one of us (J. G.) encountered evidence strongly suggestive of the value of beans and peas in the prevention of the disease. Influenced by this, the legumes were recommended in the treatment and prevention of the disease and were included in generous quantities in the diets used in the test of the preventability of pellagra at the orphanages and at the Georgia State Sanitarium (1). The very favorable outcome of this test tended, of course, to support the earlier indications of the value of the legumes and thus suggested that a study of individual foods might well begin with one of this class.

Soy beans.—The unusually high food value, cheapness and ready availability of the soy bean led us to begin our study with this bean, which was furnished as an addition to the general diet of the inmates of the section of the Georgia State Sanitarium for colored women. The study began January 1, 1918.

The quantity of soy beans supplied averaged fully 2½ ounces per head per day during the first month, and this was increased on February 4, and thereafter maintained at a daily average of fully 3 ounces per person.

During the first month of the study all of the beans were boiled (in a steam-jacketed kettle). Thereafter, in order to favor as large a consumption as possible, the proportion of the beans so prepared was from time to time reduced, a correspondingly increased proportion, after being ground into a coarse meal, was incorporated in the corn bread and in the boiled grits of the diet. During February (February 4 to March 8) the boiled beans constituted 80 per cent of the total served. On March 8 this proportion was reduced to 75 per cent and so maintained until June 4. During the period June 4 to July 4 the proportion was held at approximately 60 per cent and after July 4 at 50 per cent.

Despite this supplement several cases of pellagra developed among the inmates receiving it. An abstract of illustrative cases in individuals who were known to have consumed their full daily ration of soy beans follows:

Case 1.—A colored woman, 61 years old, weighing 42.6 kilos, began taking the supplement of soy beans January 1, 1918, at which time she was without symptoms of pellagra. Ate all her soy-bean ration; she nevertheless developed pellagra June 19, 1918.[2]

Case 2.—A colored woman, 37 years old, weighing 50 kilos, began taking the supplement of soy beans January 1, 1918, at which time

[2] Unless otherwise indicated, the date of onset in the cases represents the date of the first appearance of the distinctive dermatitis.

she was without symptoms of pellagra. Regularly ate all her soy-bean ration, but, nevertheless, developed pellagra June 25, 1918.

Case 3.—A colored woman, 20 years old, weighing 48.4 kilos, began taking soy beans January 1, 1918, at which time she was without symptoms of pellagra. She regularly ate all her ration of soy beans, but developed pellagra October 14, 1918.

Case 4.—A colored woman, 25 years old, weighing 59.8 kilos, began taking soy beans January 1, 1918, at which time she was without symptoms of pellagra. She regularly ate slightly more than the average allowance of the beans; nevertheless she developed pellagra September 18, 1918.

Case 5.—A colored woman, 43 years old, weighing 49 kilos, began taking the soy-bean supplement January 1, 1918, at which time she was without symptoms of pellagra. Regularly ate at least the average allowance of soy beans, but she nevertheless developed pellagra September 18, 1918.

Case 6.—A colored woman, 25 years old, weighing 42.8 kilos, began taking the soy beans January 1, 1918, at which time she presented some slight symptoms of a receding attack of pellagra, which were no longer perceptible two days later. She regularly ate all her allowance of the beans, but developed a recurrent attack on October 22, 1918.

Case 7.—A colored woman, 15 years old, weighing 43 kilos, began taking the soy beans on admission, January 10, 1918, at which time she had some symptoms of active pellagra. These symptoms cleared up between January 22 and 29. No further symptoms were noted until September 4, which date marked the onset of a recurrence. Throughout she had eaten her full allowance of the beans.

Case 8.—A colored woman, 56 years old, weighing 58 kilos, began taking the soy beans on admission, February 23, 1918, at which time she presented no symptoms of pellagra. She ate at least all of her allowance of the soy beans, but nevertheless developed the beginning of an attack of pellagra on September 17, 1918.

As has already been stated, the soy beans issued as an addition to the institution diet averaged fully 2½ ounces per head per day between January 1 and February 3. On February 4 the quantity furnished was increased and thereafter, to the end of the study, maintained at an average of fully 3 ounces per patient per day. In estimating the amount actually consumed some deduction should be made for unavoidable loss in handling in the kitchen and in distribution in the dining rooms; a small allowance should also be made for table waste, even in instances such as we have cited in which the individuals left "clean plates," consuming all of their portions. We believe that a deduction of one-half ounce probably more than covers all possible losses and that it is conservative to estimate that

in each of the cases cited the individual ingested an average of fully 2½ ounces of soy beans daily during a period varying between four and one-half and eight and one-half months before developing the attack of pellagra.

It thus appears that the daily consumption of fully 2½ ounces of soy beans as here described was inadequate to prevent the development of the disease.

Discussion.—The failure of the soy bean supplemented diet would seem to indicate that this legume in spite of its relatively high food value lacked, or, in the quantities and form in which it was used, supplied too little of the essential preventive factor or factors to serve as an adequate pellagra-preventive supplement. While it is conceivable that a larger quantity might have been effective, this consideration is not of much importance practically, since for the average individual the practicable day-to-day limit of consumption had, we believe, about been reached in the test. In this connection, however, some consideration must be given to, and allowance, perhaps, made for, the degree of digestibility of the food in question. This is particularly pertinent in the present connection, since we have found that as served after boiling, this bean still retained a rather firm consistency, requiring relatively considerable pressure to mash it, and thus suggesting that unless well masticated digestion might be interfered with, with consequent serious loss of nutrients. Holmes (4), discussing the results of a study of the digestibility of this bean, makes a very similar observation, remarking that "the digestibility of the protein supplied by steam cooked soy beans is apparently less than that of soy-bean flour, owing to the fact that the thin unbroken skin that surrounds the cooked soy bean is impervious to the action of the digestive juices." Now it is well known that among the insane the "good eaters" are very frequently those who bolt their food with little or no mastication. The possibility is therefore present that in our patients a more than ordinarily large proportion of the boiled portion of the bean ration was subjected to very imperfect mastication before exposure to the digestive juices. How much, if at all, this actually contributed to the result under consideration we are unable to state, but we are inclined to assume that a deduction of one-third from the quantity of the soy beans ingested in the boiled form would perhaps quite fully cover the possible loss from this cause. Now since several of the above-cited cases of pellagra developed after periods of upward of two or three months, during which the boiled beans formed only about one-half of the daily bean ration, it would appear on the basis of this assumption that the disease developed in some instances in spite of a daily ingestion of the equivalent of approximately 2 ounces of soy beans of average (normal) digestibility (Table I). But even this reduced

quantity would seem to be a fairly liberal day-to-day intake of this legume, so that its failure as a preventive food, while not conclusive as to its absolute deficiency in preventive power, is, nevertheless, rather strongly suggestive of at least a practical inadequacy in this respect.

Soy-bean purée.—With the idea in mind that the failure of the soy-bean supplement might have been due to an inadequate quantity and a relatively (unusually) low digestibility of the beans, a further test of their preventive power was undertaken, beginning January 25, 1919. In this test the soy bean after being boiled was rubbed up into a purée. The composition of the daily ration of this purée during the period January 25 to February 8, 1919, was as follows: Dry soy beans, 228 grams; sucrose, 228 grams; pork fat, 28 grams; table salt, 4 grams; fresh lemon juice, 4 grams; and water enough to make approximately 2 liters. In order to insure an abundance of vitamin A, the daily ration of purée was modified so that after February 9 it had the following composition: Dry soy beans, 114 grams; creamery butter, 56 grams; sucrose, 228 grams; cornstarch, 85 grams; table salt, 4 grams, fresh lemon juice, 4 grams; and water enough to make 2 liters. The purée was offered to a small group of pellagrins. It was very well taken during the first six or eight weeks, after which there was a more or less rapidly progressive decline in appetite with some nausea and vomiting, necessitating a change to another type of diet. In 3 of about 12 pellagrins in whom this treatment was tried, there was noted, either just before or very shortly after the change to another diet was made, the development of symptoms either very suggestive of, or quite definitely those of, a recurrence of pellagra or of *pellagra sine pellagra.*

Thus the daily intake of at least 114 grams (4 ounces) of soy beans in the form of a purée during a period of not less than seven to eight weeks appeared insufficient to prevent the recurrence of pellagra and tended to confirm the indications of inadequacy afforded by the result of the experience with the soy-bean supplemented diet of 1918.

Cowpeas.—The cowpea is one of the most highly esteemed legumes among the people of our Southern States. While not possessed of quite so high a food value as the soy bean, it has an important practical advantage over the latter in that it requires much less cooking to prepare it for the table. These considerations, coupled with the fact that our previous field observations and experience were largely concerned with this legume, made it seem desirable to study it more closely. Using the variety known as the California blackeye pea, a test was begun in a small group of pellagrins (nine in all) on February 4, 1919, and carried on concurrently with the study of the value of the soy bean.

To insure as high a degree of digestibility as possible, the cowpeas were prepared as a purée. The composition of the daily ration was as follows: Dry cowpeas (California blackeye) 200 grams; creamery butter, 85 grams; sucrose, 170 grams; cornstarch, 28 grams; table salt, 4 grams; fresh lemon juice, 4 grams; and water enough to make approximately 2 liters.

This soup was quite well taken during at least the first three or four months. Then, as in the case of the soy-bean purée, the appetite of the patients more or less rapidly fell off, with the development of some vomiting, eventually leading to a change of diet in all cases. In two of the pellagrins of this group, mild but definite symptoms of a recurrence of pellagra developed, in one at the end of about four, and in the other at the end of about five, months of the cowpea soup feeding.

The indication of a failure to protect in these two patients suggests that the dry cowpea has little, if any, pellagra-preventive value,[3] and thus fails to support certain of the seemingly favorable indications afforded by the earlier clinical and epidemiological observations.

Summary and conclusion.—The pellagra-preventive value of the dry soy-bean as an addition to the general diet of the colored female inmates of the Georgia State Sanitarium was studied during 1918. The daily issue was 3 ounces but, allowing for various possible losses, it is estimated that those who ate well ingested the equivalent of approximately 2 ounces (56 grams) of soy-beans of normal digestibility. In spite of this, however, several cases of pellagra developed.

Concurrently with the soy-bean soup study a trial was made of the preventive value of a daily ration of approximately 200 grams of dry California blackeye peas, also in the form of a soup, with results indicating that this, too, was inadequate fully to prevent recurrence of pellagra.

The dry soy-bean and the California blackeye pea would appear to possess little, if any, pellagra-preventive value.

CASEIN

The disappointing indications afforded by the study of the soy-bean and the cowpea led us to turn to a study of milk, another one of the foods that had been included in the diet used in the successful test of pellagra prevention (1). Some of the results of this and of related studies have already been published (2) (3). These showed that while milk (in the form of buttermilk) was capable of preventing pellagra, certain of the components of milk, namely, fresh butter (that tested was, like the buttermilk, produced in the vicinity of the

[3] We have not yet studied the preventive value of the fresh green or string bean.

Georgia State Sanitarium) and the inorganic minerals (in the form of an artificial mineral mixture resembling in composition that of the ash of milk) appeared to be devoid of this action. Since certain other evidence incidentally adduced appeared to indicate that none of the known vitamins were essential factors in the prevention of the disease, there remained for consideration in attempting to explain the pellagra-preventive action of milk only (*a*) the quality of its protein, (*b*) some as yet unrecognized or unappreciated dietary factor, or (*c*) a combination of these. Since, as between the protein and an as yet unrecognized factor, the probabilities seemed to us to favor the former, it appeared reasonable to expect that the prevention of pellagra might be accomplished by improving the quality of the protein of the diet with a sufficient supplement of a good protein. For this purpose we chose casein and (hopeful of accomplishing our aim) began a study of its therapeutic and preventive value late in the summer of 1922. The study was carried on until late in February, 1924.

The casein principally used was a grain curd casein specially prepared for us by the Grove City Creamery, Grove City, Pa.[4] Its preparation was under the supervision of Mr. A. C. Weimar, dairy manufacturing specialist of the Bureau of Animal Industry, United States Department of Agriculture, who advised us that the mode of preparation was essentially as follows: The casein was precipitated from sweet skim milk with hydrochloric acid of the pH of casein. After drawing off the whey, the curd was pressed and immediately ground fine in the moist state. Then for five days this casein was washed with tap water acidulated with acetic acid to the pH of casein, the acidulated water being changed daily. At the end of this period the casein was washed in distilled water to remove the acid and then dried and stored in sealed lacquered tin containers.[5] Desiring as highly purified a preparation (so far as vitamins were concerned) as practicable, a considerable part of this casein was subjected to further treatment before being used in our study. This additional treatment (a modification of a method of purification kindly recommended by Prof. E. V. McCollum) consisted first of a washing in three or four changes of scalding hot tap water on the first day, then of a leaching in acidulated water (acetic acid 0.2 per cent in tap water) for six days with a daily change of the acidulated water. The acid was then removed by washing in three or four quick changes

[4] Our thanks are due to Dr. L. A. Rogers, chief, Dairy Research Laboratories, Bureau of Dairying, Department of Agriculture, for his helpful cooperation in having this casein prepared for us.

[5] Young rats fed a diet which derived all its vitamin A from 18 per cent of this casein developed xerophthalmia after about eight weeks, showing a deficiency of vitamin A. When the same casein formed the sole source of vitamin B, the growth of young rats promptly ceased, followed at once by a rapid decline in weight, showing absence of factor B.

of tap water, after which the water was drained off and the casein dried in a current of air at about 80° C.

During two short periods, the first of 10 days at the very outset of the study and the second of 9 days near its close, a commercial vitamin A free casein (Harris laboratories, Tuckahoe, N. Y.) was used.

In all, some 34 pellagrins were offered the casein treatment. Of these six took it for periods (seven days to three and one-half months) too brief to serve as a sound basis for judging its value.[6] The remaining 28 took it for the more significant periods of from 5 to 13½ months.

The study included 9 pellagrins who, when treatment was begun, presented active symptoms of the disease, and 19 who were free of evidence of active pellagra when they came under observation. In the former, the casein supplement was nearly always begun at 85 or 90 grams a day and so maintained for at least 8 to 10 weeks and then reduced to 46 grams (after June 21 to 69 grams), the allowance made those pellagrins who when taken under treatment no longer presented any symptoms of the active disease.

In deciding on the allowance of casein to be made in the latter class of cases, that is, for the purpose of purely preventive treatment, we were guided by our experience with buttermilk, 1,200 grams of which (approximately 36 grams protein) was at that time proving itself adequate for preventive purposes. We began with approximately 46 grams (approximately 40 grams protein) per patient per day, in order to supply somewhat more protein than that furnished by the buttermilk, thus allowing, in some measure, for the inferiority of the casein protein as compared with the mixed proteins of milk. After some months—as will presently be explained—a suspicion arising that 46 grams of casein might not be quite sufficient in all cases, the supplement of casein was increased by 50 per cent to 69 grams a day. Toward the close of the study this was further increased to 85 grams.

Condensed clinical notes of 10 representative cases that received casein treatment follow:

Case 9.—A colored woman 34 years old, admitted to the Georgia State Sanitarium August 30, 1922, with dermal and mental manifestations of pellagra. Came under our observation September 2, 1922, presenting marked dry dermal lesions having the distinctive characters of the pellagrous dermatitis involving the back of the hands, fingers, lower third of the forearms, elbows, and the back of the neck and feet. There was present also some seborrhœa about the nose and some incrustation about the angles of the mouth. The bowels

[6] The normal tendency for the clinical manifestations of pellagra to fluctuate in intensity, at times within the widest limits, may mislead the observer in appraising the effect (particularly the seemingly favorable effect) of treatment if the period of observation is brief.

were constipated. She was confused and disoriented. With the idea in mind that gelatin might improve the protein mixture of the diet and thus prove beneficial, she was given a daily supplement of 85 grams of this protein. Stirred into her food, she took it well for some 10 or 11 days. Having lost somewhat in weight and strength during this period and the bowels having become somewhat overactive, the gelatin was replaced by an equal amount of casein on September 14. (From September 14 to September 24 the casein was the Harris "vitamin A free" casein; after September 24 it was our purified grain curd casein.) The daily allowance of 85 grams was maintained until January 3, 1923, when it was reduced to 46 grams, at which it was maintained until June 22, when it was increased to 69 grams (Table II).

A few days after the change from gelatin to casein her appetite returned and she ate well. Weighing 38.5 kilos on September 18, 1922, her weight rose, attaining 54.5 kilos on June 4 and 56.5 kilos on October 29, 1923. The dermatitis and seborrhœa slowly improved and she gained in strength so that by November 6, 1922, she felt strong enough to be up and about. By December 4 all dermal lesions had cleared up, leaving but a residual pigmentation; mentally, however, she was still somewhat confused.

Early in January, 1923, and again early in June she suffered from some menorrhagia. In June also there was noted some tachycardia. From June 24 to August 8 she received a daily dose of 15 grams of Seidell's "activated solid" with the idea that it might have a beneficial effect on the tachycardia. No notable effect on the pulse rate having been accomplished, it was discontinued on the latter date. Except for a tendency to an accelerated pulse rate she continued in good condition until September 11, 1923, at which time there was noted a slight fissuring at the angles of the mouth with dryness and scaling of the vermilion border of the lower lip. At this time, too, her bowels were constipated.

By October 4 the vermilion border of the upper lip had also become dry and scaly. This condition of the lips persisted without significant change and on October 25 there was noted a slight roughening of a patch of skin of the upper lip just under the nasal septum. At this time she was again suffering from a somewhat prolonged though scanty menstrual flow. Meantime her mental condition had improved so that she seemed about at her normal.

On November 15, 1923, she was noted to be in good general condition except for the dryness and scaling of the lips with slight fissuring of the lower one, and as she desired to go home the casein supplemented diet was discontinued. Without further change in condition she left the institution on December 20, 1923.

Summary.—A case of dermal and mental pellagra in which treatment with casein was accompanied by gain in weight and strength and a clearing up of the marked dermal and mild mental manifestations without definite evidence of relapse of the dermatitis or mental disturbance during a period of approximately 14 months. The development during the latter part of this period of dryness and scaliness of the vermilion border of the lips with slight fissuring of the lower lip and at the angles of the mouth and of a tendency to constipation and to tachycardia, is regarded, however, as suggestive of an incomplete recovery or of a relapse of a larval *pellagra sine pellagra.*

Case 10.—A colored woman, 24 years old, admitted to the Georgia State Sanitarium in 1919. Developed an attack of *pellagra sine pellagra* (a well-marked stomatitis with slight looseness of the bowels and seborrhœa of the chin) in October, 1922.

Treatment with a supplement of 85 grams of our purified grain curd casein was begun October 28, 1922. This daily allowance of casein was continued until January 3, 1923, when it was reduced to 46 grams. On June 22, 1923, it was increased to 69 grams and so continued to October 22, when treatment with casein was discontinued.

For about a week after beginning the casein the appetite was poor. It then improved and she ate well until after the middle of September, 1923. Her strength improved and she gained in weight. (During the period January 1 to July 16, 1923, her weight rose from 58.5 to 67 kilos.)

By December 28, 1922, evidence of the attack had almost completely cleared up, after which she continued in good condition until about September 11, 1923. At this time there were noted erosions of the skin at the angles of the mouth with a moist soggy appearance of the vermilion border of the lower lip and a diminution of food taking. Gradually the condition of the lower lip changed so that by October 4 it had become dry and crusty and a little reddened with fissuring at the angles. In the course of the succeeding two weeks scattered irregular, ill-defined patches of dark somewhat dry sebum developed over the forehead, nose, cheeks, and malar prominences. This washed off readily with soap and water, leaving a smooth skin, but within two or three days the condition re-formed. By October 25 there was present a definite though mild stomatitis, increased salivary flow, and a tendency to nausea. The food taking having gradually declined, a change in diet was made on October 22, 1923.

Summary.—A case of *pellagra sine pellagra* in which the inauguration of the casein supplemented diet was followed by physical improvement and a clearing up of the evidence of *pellagra sine pellagra.*

At the end of a period of about 11 months of the casein treatment symptoms of a recurrence began to develop and in the course of a month had progressed so that a diagnosis of *pellagra sine pellagra* was made.

Case 11.—A colored woman, 18 years old, admitted to Georgia State Sanitarium November 25, 1921. On October 2, 1922, she was found to have a stomatitis suspected of being pellagrous. She came under our observation on October 5, presenting a tongue with beefy red tip and margins, increase in saliva, reddened mucosa of lower lip, and constipation. A diagnosis of *pellagra sine pellagra* was made. On the same day treatment was begun with a liquid diet which included approximately 600 grams of milk, 15 grams of cod-liver oil, and 100 grams of butter. She took this well, and her symptoms subsided, so that at the end of three weeks there was nothing notable except some overactivity of the bowels. In the course of another two weeks, however, there was a relapse of mouth symptoms—a mild stomatitis. On November 11 the liquid diet was abandoned and a solid diet, including approximately 140 grams of fresh butter, was begun. She ate this well, her appetite continuing excellent. There was, however, no consistent improvement in her condition, there being alternations of improvement and relapse in the stomatitis as also of constipation and overactivity of the bowels. Although, as has been mentioned, she ate well, there was no gain in weight nor in strength.

On December 7, 1922, her diet was changed to the casein diet which case 9 and case 10 were at this time taking. During the first two weeks following this change her appetite was poor and her food consumption was considerably reduced, but she took practically her entire daily allowance of 85 grams of casein. After this there was improvement in food taking and gradual improvement in her condition. On January 3, 1923, the casein supplement was reduced to 46 grams, and by the end of that month she was practically free of any evidence of pellagra. By April 1 she had gained approximately 6 kilos in weight.

She continued in good physical condition until near the end of June, when her appetite showed some falling off, her temperature was found to have risen, and, there being indications that she might be suffering from an acute miliary tuberculosis, she was transferred to another section of the institution on July 1, 1923, and passed from observation.

Summary.—A case of *pellagra sine pellagra.* During the period of two months (October 5 to December 6) immediately after coming under observation this patient continued in a state of mild *pellagra sine pellagra,* brief periods of improvement in symptoms alternating

with periods of relapse, indicating inadequacy of the treatment with the high butter diets during this period.

On the casein supplemented diet she gained in weight and strength, her symptoms cleared up without any evidence of a relapse at any time to the close of the period of observation, which came after upward of seven and one-half months of the casein.

Case 12.—A colored woman, 42 years old, who was a pellagrin with a record of active attacks in 1913, 1915, and 1919. Taken under observation January 3, 1923, for the purpose of preventive treatment. At this time she was without recognizable evidence of active pellagra, so she began with a daily supplement of 46 grams of our purified grain curd casein. She ate well and gained slowly in weight (about 3 kilos) during the first five or six months.

On June 22, 1923, or, roughly, about five and one-half months after beginning the casein, a dermal lesion about 2 centimeters in diameter was found to be present on the back of the left hand over the proximal end of the second metacarpal. The lesion was slightly pigmented, dry, and just beginning to desquamate. In the course of the succeeding three or four days the lesion desquamated centrifugally, leaving a clean central area slightly over 1 centimeter in diameter encircled by a desquamating fringe. In appearance it resembled a pellagrous lesion. There was no other discoverable lesion. She was in good physical condition, was eating well, and presented no other symptoms. Suspecting, however, that this lesion might be pellagrous, and, if so, that the casein supplement might not be fully adequate, the daily allowance for this patient and all other patients receiving casein was at once increased to 69 grams.

Within 10 days after the discovery of the lesion on the left hand (and after the increase in the casein) practically all evidence of it had cleared up. At about the end of this period—that is, about July 2, 1923—the presence of an unusual increase or accumulation of a caseous material in the folds at the angles of the nose was observed. Removal of this caseous material exposed a slightly reddened linear surface. In two or three days, however, this lesion, which was new to us, had cleared up. She continued in good condition, eating well, and nothing further of interest was again noted until about the beginning of October, when a mild seborrhœa made its appearance over the lower part of the nose and alae nasi, and then gradually the skin of these parts became slightly rough and scaly. This condition persisted and about November 1 a small area (about 1 centimeter in diameter) of skin just below the left angle of the mouth became somewhat eroded in appearance. In the course of the succeeding two weeks—that is, by November 15—a similar lesion developed below the right angle of the mouth. At this time, too, there was noted the reappearance of the

pasty, caseous accumulation in the fold or groove at the angles of the nose and in that beneath the nasal septum.

In the course of the next two or three weeks all these lesions cleared up completely, so that by December 3, 1923, there was nothing notable in her condition.

About January 7, 1924, however, it was noted that the vermilion border of her lower lip was dry, glazed (somewhat parchment-like) in appearance. The allowance of casein was now increased to 85 grams.

Toward the end of January the patient began to complain of pain in her feet, particularly at night, and it was found that the patella reflex was much diminished. During February the pain seemed gradually to subside, but some stiffness and uncertainty in gait developed. The vermilion border of the upper lip became glazed and some fissuring at the angles of the mouth appeared.

On February 27 the treatment of the patient was radically modified, so that this marks the end of the casein preventive treatment, which had thus lasted upward of 13 months.

Summary.—A pellagrin without active manifestations when treatment was begun. At the end of about five months of the preventive casein treatment (46 grams a day) this patient developed a very suspicious but slight and evanescent dermatitis on one hand which did not reappear during a subsequent further period of observation of about eight months on an increased casein allowance. During this second period (of increased casein) other manifestations in part familiar (seborrhœa and roughening of skin of nose, erosions of skin at, and fissuring of, oral commissures, glazing of vermilion border of lips, pain in the feet suggesting *pellagra sine pellagra*) and in part (pasty accumulation overlying a reddened linear surface in the fold at angle of nose and beneath nasal septum) new to us made their appearance.

Case 13.—A colored woman 39 years old; a pellagrin with a record of an attack of the disease in 1920 and in 1921. She was taken under observation for preventive treatment with casein on January 3, 1923, at which time she was without evidence of active pellagra so, as in case 12, she began with a daily supplement of 46 grams of our purified grain curd casein. Because of suspicious development in case 12 the dose of casein in this, as in all other patients receiving the treatment, was increased to 69 grams on June 22.

Her appetite was good and she ate the casein supplemented diet (Table II) well until about the middle of September, when there began a falling off in food consumption. Up to this time, that is, during a period of about eight months, she had gained 10 kilos in weight. About the time (or a little before) her appetite began to fail, the vermilion border of the lower lip became dry and scaly and in the

course of the following week the mucosa of the lower lip became reddened: some fissuring at the angles of the mouth developed and there seemed to be some increase in salivary secretion.

During the last week of September a definite though mild stomatitis developed and a slight seborrhœa at the angles of the nose made its appearance.

Early in October a slight conjunctivitis developed with a secretion that tended to dry and accumulate on the margin of the lids at the inner canthus. The stomatitis persisting with a more marked diminution in appetite and a tendency to flurries of looseness of the bowels, the casein supplemented diet was discontinued on October 7 and a liquid nourishment offered instead.

Summary.—A pellagrin without active symptoms when preventive treatment was begun. During a period of seven to eight months following the inauguration of the preventive casein supplemented diet this patient gained in weight and appeared in good physical condition. At about the end of this period there began a falling off in food taking, with the gradual development of a stomatitis, a tendency to looseness of the bowels and a mild conjunctivitis, constituting a *pellagra sine pellagra*.

Case 14.—A colored woman 21 years old; admitted to the sanitarium April 29, 1922, with pellagra. Taken under observation for preventive treatment January 23, 1923, at which time she no longer presented evidence of active pellagra. The casein supplement offered daily was 46 grams until June 22, when, by reason of developments noted in case 12, an increase to 69 grams was made. At the outset and until about the middle of July, that is, during about six months, her appetite was good and she gained about 5 kilos in weight.

About the middle of July food taking began to lessen, and about a month later a mild conjunctivitis affecting the right eye made its appearance. Under boric acid solution irrigation the condition of the eye cleared up in the course of about a week. About a week later, that is, about August 30, erosions of the skin at the angles of the mouth appeared and in the course of the succeeding three or four days the symptoms (reddening of the mucosa of the lips, cheeks, and soft palate) of a mild but definite stomatitis developed. In the course of another three or four days the vermilion border of the lips became dry and began to exfoliate. At the same time there appeared along about the inner third of the cutaneous aspect of the margin of the eyelids what seemed to be a dark adherent film of ocular secretion. The bowels were constipated. Meanwhile the appetite had become so much diminished that a change to another type of diet was deemed desirable and was made on September 14, 1923, or toward the close of a period of approximately eight months.

Summary.—A pellagrin without active symptoms when preventive treatment was started. After about six months of the casein preventive treatment, the appetite began to diminish; then after about six weeks more a mild but definite stomatitis developed (accompanied by a peculiar, unfamiliar condition of the eyes) suggesting *pellagra sine pellagra.*

Case 15.—A colored woman 35 years old with history of pellagra in 1915, 1920 and 1921. Taken under observation for preventive treatment January 3, 1923, at which time she was free from recognizable evidence of active pellagra. The casein supplement was 46 grams daily until June 22, when it was increased to 69 grams. The diet so supplemented was well taken until early in May, when a slight diminution in food taking developed. At about this time or shortly thereafter the bowels became markedly constipated. She maintained her initial weight and physical condition until about August 7, when a further reduction in appetite developed, slight erosions appeared at the angles of the lips, the lower lip appeared somewhat reddened, and the tip and upper surface of the tongue became slightly eroded. In the course of another week the condition of the lips and tongue returned virtually to normal, but the erosions at the angles of the mouth reappeared a few days later. About September 11 it was noted that slight fissuring had developed at the oral commissures and that there was present in the fold at the angles of the nose and below the septum a somewhat linear lesion consisting of a pasty, caseous accumulation over a reddened surface. The lesion at the oral commissures persisted but fluctuated in degree at irregular intervals but the linear lesion at the angles of the nose and below the septum faded out before the end of September, only to reappear early in October. By November 12 the symptoms of a mild stomatitis developed and, as the appetite had been capricious since May and food taking had since early in August become increasingly unsatisfactory, a change to another type of diet was made on November 18, or after a period of about ten months of the casein preventive treatment.

Summary.—A pellagrin without evidence of active pellagra when preventive treatment was started. The appetite declined and became capricious after about four months of the casein treatment. After a further period of about three or four months, erosions and fissures developed at the oral commissures and a peculiar, unfamiliar dermal lesion, linear in form, appeared in the fold at the angles of the nose and below the nasal septum. Finally at the end of about 10 months there developed a definite stomatitis suggesting a *pellagra sine pellagra.*

Case 16.—A colored woman 27 years old with a record of an attack of pellagra in 1921. Was taken under observation for preventive treatment January 3, 1923, beginning with a casein supplement of 46 grams. At this time she was without evidence of active pellagra.

Her appetite was good and remained good throughout the year, that is, until January, 1924, when food taking began gradually to decline. There was a gradual and steady though slight gain in weight during the year, so that by the middle of November (1923) she had gained approximately 6½ kilos. With the falling off in appetite beginning with January, 1924, there was a decline in weight.

There was nothing notable in her condition until about the beginning of October, when the lower lip was observed to be somewhat reddened and the oral commissures slightly fissured. By October 22 there had developed a mild but definite stomatitis. The stomatitis faded out in the course of three or four days, but the reddening of the lower lip and fissuring of the angle of the mouth persisted. About November 1 it was noted that a crusty accumulation of secretion had formed about the inner canthus of each eye. About the middle of November the signs of a stomatitis reappeared. During the last week of the month all signs previously noted, except the reddening of the lower lip, cleared up. For about three weeks there was again little notable in her condition. Then, during the last week of December, the vermilion border of the lower lip became scabby and fissured.

About Janaury 8, 1924, the casein supplement was increased to 85 grams, but the slightly reddened mucosa and the scabby and fissured condition of the vermilion border of the lower lip persisted, though with some fluctuations, to the end of the period of observation, February 27, 1924, when a radical modification in her diet was made.

Summary.—A pellagrin without active symptoms when preventive treatment was begun. Signs of a mild but definite stomatitis (*pellagra sine pellagra*) appeared after about nine months.

Case 17.—A colored woman 30 years old, admitted to the sanitarium on April 3, 1923, at which time she presented an extensive pellagrous dermatitis, seborrhœa of the face, slightly reddened tongue, normal bowels, and mental confusion. At this time she was offered the infirmary diet with supplementary milk. The appetite was poor at first, but slowly improved.

On April 23 she came under our observation and treatment with a casein supplement of 90 grams was begun. She ate this well. On June 15 the casein allowance was reduced to 46 grams, but because of the suspicious developments mentioned in case 12 the casein allowance was increased to 69 grams on June 22. By the end of May 11 evidence of active pellagra had cleared up but there was still present a slight mental retardation. The food taking continued excellent and her weight rose gradually. Weighing 48 kilos on April 23, when the casein treatment was begun, she attained a weight of 54 kilos on July 9 and maintained substantially this weight to the end of the period of treatment.

About September 27, that is, at the end of a period of five months of casein, she developed a somewhat comma shaped patch of erythema, about 2 to 3 centimeters in length, extending downward and outward from the inner palebral angle of each eye. At this time she was in fair touch with surroundings but still, apparently, somewhat nervous. Within three or four days after its appearance the erythema gave place to pigmentation. At this point (September 30, 1923) she was furloughed and left the institution. She was seen by one of us about a week later, at which time the pigmented patch had faded, leaving a hardly perceptible trace, nor did she present any other recognizable indications of a recurrence of the disease.

Summary.—A case of pellagra with an extensive dry dermatitis and mild mental symptoms when patient came under observation. Signs cleared up and patient gained in weight and strength on the casein supplemented diet but at the close of a period of treatment of about five months very slight dermal lesions, suspected to be pellagrous, made their appearance but quickly faded out.

Case 18.—A colored woman, 31 years old, taken under observation for treatment with casein June 9, 1923. At this time she presented a pellagrous dermatitis over the lower third of the radial aspect of the forearms and of the back of the left hand, a seborrhœa of the face, and a reddened mucosa of the lower lip with a dry and fissured vermilion border. The bowels were normal. Her appetite was good, and by about the middle of July she had gained about 3 kilos in weight. The evidence of pellagra rapidly cleared up, so that by July 9 she was apparently free of active pellagra. She so continued until early in September when the vermilion border of the lower lip was observed to have become abnormally dry and a pasty caseous accumulation overlying a reddened surface, linear in form, along the fold at the angles of the nose had formed. This persisted thereafter without notable variation. About September 24 a little dried secretion was noted to have gathered on the lids of the left eye at the inner canthus. At about the same time the appetite began to diminish. Early in October it was noted that the angles of the mouth had become fissured and eroded. By October 11 a mild but definite stomatitis was present and dried secretion had gathered on the lids at the inner canthus of the right eye, so that both eyes were now affected. Early in November the stomatitis subsided markedly, but the lips continued dry and had become crusty and a pasty, caseous accumulation on a linear reddened surface formed in the transverse groove just below the nasal septum. The condition of the eyelids remained unchanged, but gradually the evidence of a conjunctivitis became pronounced, so that by November 22 it was quite marked. There was at this time some photophobia, particu-

larly of the right eye, which presented an ulceration apparently about 1 millimeter in diameter in the lower inner quadrant of the cornea. The secretion from the eyes seemingly overflowed and dried on the lower lids along the palpebral border. That portion of the lower lid of the right eye over the tarsal cartilage presented, in addition, a slightly reddened erythematous appearance. Food taking having meanwhile fallen off quite markedly, a change in diet was made at this time. The therapeutic preventive period of treatment extended in this case from June 9 to November 22, 1923, somewhat over five months.

Summary.—A case of dermal pellagra when treatment was started. On the case in the distinctive pellagrous dermatitis and the other signs of pellagra cleared up rapidly. The dermatitis did not relapse during the five months of observation, but at about the end of four months there developed evidence of a mild stomatitis (*pellagra sine pellagra*) and a conjunctivitis later accompanied by a mild ulceration of the cornea.

Results.—Summarizing our experience, it may be stated that following upon the inauguration of the casein supplemented diet the general physical condition (weight and strength) improved in all but one or two patients and the symptoms of active pellagra (including *pellagra sine pellagra*) if such were present at the beginning of treatment, cleared up in all but three or four. In all cases presenting the distinctive dermatitis on beginning treatment this cleared up. In a few instances (illustrated by case 11) the improvement and freedom from symptoms persisted to the end of the period of observation. In all the others in which improvement apparently had taken place, this improvement was followed after varying periods by the relapse or recurrence of unfavorable signs and symtoms. Very commonly, though not invariably, there was some falling off in food taking and generally this was the first unfavorable sign to appear. Accompanying or independently of any diminution in appetite there developed some one or more of the signs or symptoms illustrated by the cases above cited, namely, a dry, glazed, vermilion border of one (usually the lower) or both lips with or without scaling or exfoliation; erosions of the skin at the angles of the mouth with or without fissuring of the commissures; perlèche; reddening of one or both lips, alone or associated with stomatitis; slight seborrhœa about the nose and, in two or three instances, reduction in or loss of the patella reflex and some disturbance (spasticity) in gait accompanied in one by pain in the feet. All of these signs and symptoms have been observed in or associated with pellagra. In addition there appeared in several of the patients a peculiar, to us unfamiliar and heretofore undescribed, lesion (a more or less marked accumulation of a pasty, caseous material on a linear reddening of the skin) in the groove at the

angles of the nose and in the transverse groove below the nasal septum; in some there developed a conjunctivitis with a secretion that tended to accumulate and dry at the inner canthus of the eyes or on the lids along the palpebral margin. The linear lesion at the angles and below the septum of the nose and the conjunctivitis were entirely new in our experience with pellagra. That they were of dietary origin was rather strongly suggested by their very prompt response to a change in diet (dried yeast).

With three exceptions at the most, none of our patients showed any evidence of a relapse or of a recurrence of the distinctive dermatitis. The exceptions included cases 12 and 17 above cited and a case in a patient in whom there developed after about nine months of the casein supplemented diet a dry, scaly condition of the skin across the bridge of the nose subsequently extending slightly to the cheeks. This was quite suggestive of the butterfly lesion of pellagra. In none of these three cases did the suspicious lesion develop sufficiently to permit of its confident recognition as pellagrous. In other words, while nearly all of our patients sooner or later developed some symptoms either suggestive of or definitely those of *pellagra sine pellagra*, with only three possible exceptions none had a relapse or recurrence of the distinctive dermatitis of pellagra. This is all the more striking since ordinarily we would expect fully 40 or 50 per cent of such patients to develop the characteristically marked eruption.

Conclusion.—It would appear, then, that the casein supplement had had a beneficial effect on the general nutrition of our patients and in considerable measure prevented or, at least, notably delayed the development of the distinctive dermatitis. It did not prevent, though it may have delayed, the relapse or recurrence of some of the other symptoms and signs of the disease (*pellagra sine pellagra*).

DRIED MILK

Our very favorable experience with buttermilk (3) during 1922 naturally emphasized the desirability of improving the availability of milk as a measure looking to the eradication of the disease from institutions and localities affected by it. Climatic and economic considerations suggested that this purpose might most satisfactorily be served by dry skim milk. While in the light of our previous experience with milk it seemed entirely permissible to assume that dry skim milk would be effective in pellagra prevention, it nevertheless seemed worth while to demonstrate by trial that such was actually the case. With this in view we began a trial of dry skim milk as a pellagra preventive in July, 1923, and carried on the study until September, 1924.

In order to make the study at least roughly comparable to that of buttermilk, the daily allowance of the milk [7] was fixed at 105 grams in order to supply approximately the same amount of protein (approximately 36 grams) as was supplied by the supplement of 1,200 grams of buttermilk. During the first three months it was stirred into the food, but after that it was found more convenient to dissolve it in water and give this in equal portions at each of the three meals (Table III).

Of some 22 pellagrins taking this milk supplemented diet, one developed mild but definite symptoms of a recurrence including a superficial but distinctively marked dermatitis, one a mild, intermittently relapsing dermatitis and two others some dermal lesions very suggestive, but not certainly those of pellagra. None of the others, 12 of whom were under observation for fully one year, showed any recognizable indications of the disease unless some loss in weight in a few instances is to be so regarded.

It would appear indicated, therefore, that the dry skim milk, in the quantity offered, had some, but not fully adequate, pellagra-preventive action, and since the quantity of dried milk consumed was approximately equal (on the basis of protein content) to that of the buttermilk offered during the study of the latter and found fully adequate for all of a group of 25 patients, we would seem to have here a suggestive indication of a difference in pellagra-preventive power in favor of the fresh buttermilk. In this connection it may be noted that, as compared with casein, the dried milk may, perhaps, have been less efficient in preventing the recurrence or relapse of the distinctive dermatitis but more efficient in preventing the other symptoms and signs of the disease. The difference as relates to the dermatitis was slight, probably too slight and based on too small a number of observations to be significant. As relates to the symptoms other than the dermatitis, the difference was very marked and unmistakable.

The results of this study would seem to warrant the conclusion that dried skim milk may have some pellagra-preventive action.

BREWERS' YEAST.

Certain observations in connection with an experimental study of black tongue in dogs having afforded highly suggestive indications that yeast possessed valuable therapeutic and preventive action in this condition (5), and being impressed with the possibility that this canine disease might be the analogue of pellagra in man (6) it seemed desirable to try yeast in the treatment and prevention of the human disease.

[7] The dry skim milk used was a "Merrel-Soule" commercial product secured from time to time in convenient quantities.

A beginning was made on May 26, 1923, with two patients. The effect of the yeast in these appeared so favorable that gradually more and more patients were taken under treatment, so that by May 10, 1924, 26 in all had come under observation. The results of this study up to December, 1924, are summarized in the following:

The study of yeast has been carried on along the same lines as was that of casein, of which, indeed, the former may be regarded as a continuation.

The yeast employed has throughout been a commercial preparation of brewers' yeast (Harris laboratories, Tuckahoe, N. Y.) in the form of a dry powder.

The therapeutic dose was arbitrarily fixed at approximately 1 gram per kilo of body weight. As the majority of our patients weighed in the neighborhood of 50 kilos, we found it convenient to adopt 50 grams as the daily dose of yeast to be given all patients with marked active symptoms. As soon as convalescence appeared established, a matter of 1 or 2 to 3 or 4 weeks, depending on the severity of the case, the dose was reduced to 15 grams. This smaller allowance was also that given the milder active cases and those without active symptoms. On February 27, 1924, the daily allowance was raised to 30 grams (Table IV). This increase was made because of a suspicion that 15 grams might not be a fully adequate allowance in all cases, since two or three patients who had been eating well for periods of four to six months had for some weeks before that date shown some diminution of appetite. Although no very significant effect on the appetite of these patients followed this increase, the dose was not again reduced.

The yeast was given in the food in equal portions at each of the three meals until December 1, 1923. After this date it was found convenient to give the daily dose at one time, generally in the cane sirup served at the supper meal.

As has been already mentioned, 26 patients in all were taken under treatment with yeast between May 26, 1923, and May 10, 1924. Nearly all presented more or less pronounced symptoms of pellagra or *pellagra sine pellagra*. The majority were patients with mild recurrent attacks that had developed, as already described, while taking the casein supplemented diet. With one exception all made prompt recoveries from the immediate attack. The exception was a case in a recently admitted patient with symptoms of central neuritis who died within 96 hours after admission and within 72 hours after coming under our observation.

The patients remained under observation on the yeast for varying periods. In one, this was for barely one month, at the end of which time she went home on furlough. In another, a complicating condition arose at the end of about four months, necessitating a transfer

to another ward and withdrawal from yeast for about eight weeks, at the end of which time she returned and resumed the yeast supplemented diet. In the third, the development of active pulmonary tuberculosis made permanent withdrawal necessary by reason of transfer to another section of the institution. Two others went home on furlough in good physical condition at the end of five and six months, respectively. Of the remaining 20 patients, 1 has been under observation for about 7, and 19 for from 12 to 18 months. None has shown any recognizable evidence of a relapse or recurrence of the disease.

Since experience has convinced us that without the yeast supplement fully 40 or 50 per cent of our patients would have developed a relapse or recurrence of pellagra (with the distinctive dermatitis) within the period of observation, this result would appear very clearly to indicate that the brewers' yeast supplied an essential or the essential preventive factor or factors.[8]

PREVENTIVE FACTORS

Having presented the results of our studies, we may now consider the significance of their indications with respect to the dietary essentials concerned in the prevention and, incidentally, in the causation of pellagra.

The results of previously published studies (3) have indicated that vitamin A, vitamin B, vitamin C, the antirachitic factor, and the mineral mixture could, with a very high degree of probability, be excluded from consideration in relation to the prevention of the disease. We need not at this time, therefore, concern ourselves further with these, but may pass on to a consideration of the other dietary essentials at present recognized, namely, the antisterility factor X of Evans and Bishop and the protein or, more specifically, the biological quality of the protein, since previous studies have already indicated that the quantity of protein is not necessarily involved.

With respect to the factor X, it may be said that since fresh green leaves and whole cereals are reported by Evans and Bishop (7) to be rich in this factor, our experience would tend to warrant its elimination from the relationship under present consideration, for the occurrence of the disease has been repeatedly observed by us in association with diets containing sifted whole cornmeal and such leafy vegetables as cabbage, collards, and turnip greens. (See, for example, diet shown in Table I.) That factor X may be excluded

[8] In this connection it may be stated that the results of a test of the Osborne and Wakeman (8) yeast fraction in the form of "yeast vitamin (Harris) powder" of the Harris laboratories, Tuckahoe, N. Y., in a number of cases with active symptoms have been so favorable as to encourage the expectation that this fraction also will prove to be rich in the pellagra-preventive factor or factors. The dose employed has been 15 grams a day in solution in ordinary tap water. The study of this preparation is still in progress.

would seem even more strongly indicated by the results of our study with yeast. Reported by Evans and Bishop (7) to be devoid of their antisterility factor, dried yeast[9] has in our experience clearly shown itself to possess pronounced pellagra-preventive action.

Turning to the protein factor, we may consider in relation thereto the significance, first of all, of the preventive failure of the soy-bean supplemented diet (Table I). From the best estimate that we have been able to make, it appears that the basic institution diet of 1918 probably furnished our patients with not over about 50 grams of protein. If to this is added the protein of the soy-bean supplement, estimated at approximately 20 grams (soy beans 56 grams × 36.5 per cent protein), the total gross protein supply of this diet amounted to some 70 grams. Of this protein mixture, very nearly one-half was a combination from meat and soy beans. Since there is reason to believe that both of these (when taken in sufficient quantity) yield protein of adequate quality, it is possible that the protein mixture of this diet was adequate for the nutritive needs of our patients, and thus it is possible that the preventive failure of the diet under consideration was not due to an amino acid defect but to some heretofore unrecognized complex. Whether this protein mixture was actually nutritively adequate can not be decided on the basis of available data, so that the result of the soy-bean study does not in itself afford a sound basis for judging of the preventive rôle of the protein factor.

Passing next to the outcome of the casein study, we find that a supplement of 69 grams appeared in considerable measure to prevent or notably to delay the distinctive dermatitis, but failed to prevent, though it may have delayed, the relapse or recurrence of some of the other symptoms of the disease. Since the quality (and quantity) of the protein mixture resulting from the large casein addition may reasonably be assumed to have been adequate for normal nutrition in our patients, it would seem permissible to conclude that the protein of the diet, if it be concerned in the prevention (or causation) of pellagra, is not the sole preventive (or causative) factor, and thus that some other heretofore unrecognized or unappreciated dietary complex also plays an essential part.

This interpretation would appear to receive support from the results of the dried-milk study. As has already been stated, the dried skim milk appeared decidedly more efficient than the casein in the prevention of symptoms other than the distinctive dermatitis. This would tend to suggest that the milk supplied something other than protein having this beneficial action of which the casein supplied little or none at all. This suggestion gains some weight from the indication of inferior preventive potency of dried skim milk as compared (on the basis of

[9] The yeast used by us was secured from the same source (Harris laboratories) as that used by Evans and Bishop (7).

protein content) with fresh buttermilk. It gains very much more weight, however, from the evidence of a pronounced pellagra-preventive action of dried yeast. In a daily dose of between 15 and 30 grams, representing less than 15 grams of protein, this has, as we have already seen, shown itself very efficient in preventing the disease. In view of the failure of the casein to prevent the *pellagra sine pellagra* syndrome, it is difficult to attribute the very favorable action of the yeast to its protein content, which, at best, was not over one-fourth that supplied by the casein. It seems warranted to conclude, therefore, that in the prevention of pellagra there is concerned a heretofore unrecognized or unappreciated dietary factor that was contained abundantly in our dried yeast, slightly in our dried skim milk, and inappreciably in our casein.

Considering the relatively small amount of protein furnished by the effective dose of yeast, it would seem as if the heretofore unrecognized pellagra-preventive factor, to which we shall hereafter refer as factor P-P, were capable of preventing the disease with little if any cooperation from the protein factor of the diet. On the other hand, in the light of the outcome of our casein study, it would seem as if a liberal supply of a presumably good protein mixture may in itself be capable of modifying the clinical picture of the disease by notably delaying or preventing the appearance of the distinctive dermatitis. This, it may here be recalled, is in harmony with Goldberger and Wheeler's suggestion (9) that pellagra, clinically, possibly includes at least two commonly associated but etiologically essentially distinct though closely related syndromes, namely, (*a*) the syndrome that is comprehended by the phrase "*pellagra sine pellagra*," and (*b*) the dermatitis or pellagra without or with only slight subjective manifestations. But since the action of the protein mixture of the diet in the casein study may conceivably have been due not to the protein *per se* but to factor P–P carried as an impurity in the casein or since this action, on the more reasonable assumption that it was due entirely to the protein, may be conceived to have been of an indirect or sparing nature, it is possible that factor P–P plays the sole essential rôle in the prevention (and thus in the causation) of pellagra.

The foregoing discussion and the results presented would seem to warrant the following conclusions:

(*a*) A liberal supply of protein presumably of good biological quality does not completely prevent, though it may modify, the clinical picture of pellagra by notably delaying or preventing the development of the distinctive dermatitis. This modifying action may be of an indirect, sparing nature.

(*b*) In the prevention (and presumably causation) of pellagra there is concer ed a heretofore unrecognized or unappreciated dietary

factor which we designate as factor P–P. This may be effective with but little, possibly without any, cooperation from the protein factor.

(*c*) Factor P–P may possibly play the sole essential rôle in the prevention (and causation) of pellagra.

(*d*) Factor P–P is present in brewers' yeast, in milk and (on the basis of our experience with fresh meat) in lean beef; it is very low or lacking in dry soy beans, dry cowpeas, butter, cod-liver oil, and canned tomatoes. (See diet table II).

ACKNOWLEDGMENTS

We wish again to acknowledge our great indebtedness to the board of trustees, the superintendent, the clinical director, staff and other officers of the Georgia State Sanitarium for their continued cooperation in facilitating our studies.

TABLE I.—*Estimated average composition of soy-bean-supplemented institution diet furnished the colored female inmates of the Georgia State Sanitarium, 1918*

[Calories, 2,263]

Diet		Nutrients		
Articles of diet	Quantity (grams)	Protein (grams)	Fat (grams)	Carbohydrate (grams)
Wheat flour	100	11.4	1.0	75.1
Corn meal [1]	140	11.8	6.6	103.6
Corn grits	60	5.5	1.1	45.7
Rice	28	2.2	.1	22.1
Cowpeas [2]	14	3.0	.2	8.5
Meat [3]	56	13.0	1.4	
Fat	42		42.0	
Sugar [4]	50			50.0
Sweet potatoes [5]	120	2.1	.8	32.9
Soy beans [6]	56	20.0	9.8	17.2
Total nutrients		69.0	63.0	355.1
Nutrients per 1,000 calories		30.5	27.8	157.1

[1] A whole meal, sifted in the kitchen, used in making corn bread, for which a small amount of buttermilk was frequently used.

[2] The cowpeas were from time to time replaced by Lima beans or navy beans.

[3] The "meat" was principally beef and most commonly thoroughly "roasted" in a steam-jacketed cooker. Some of the beef so prepared was ground up, baked in an oven, and mixed with grits or grits and potatoes to make a "hash." The quantity stated is an estimate of the total served in terms of lean muscle.

[4] Includes sugar for coffee and cane sirup served at supper.

[5] This represents the fresh vegetable component, which actually varied considerably as to kind and quantity and was markedly seasonal. Irish potatoes, turnips, cabbage, collards, or turnip greens, singly or in various combinations, were the most common substitutes.

[6] Quantity ingested, after deducting waste and allowing for reduced digestibility.

TABLE II.—*Approximate composition of the casein-supplemented diet offered daily to each of a group of colored female pellagrins during 1922*

[Calories, 2,356]

Diet		Nutrients		
Articles of diet	Quantity (grams)	Protein (grams)	Fat (grams)	Carbohydrate (grams)
Basic:				
Corn meal [1]	130	10.9	6.1	96.2
Corn grits	66	6.1	1.3	49.8
Wheat flour	100	11.4	1.0	75.1
Rice	28	2.2	.1	22.1
Cowpeas [2]	14	3.0	.2	8.5
Lard	56		56.0	
Sirup	90			63.9
Supplemental:				
Casein [3]	69	60.5		
Cod-liver oil	15		15.0	
Tomato juice [4]	130			
Dilute hydrochloric acid (U. S. P.), 90 drops [5]				
Calcium carbonate [6]	3			
Sirup iodid iron (U. S. P.), 2 drops.[6]				
Total nutrients		94.1	79.7	315.6
Nutrients per 1,000 calories		39.9	33.8	133.7

[1] Whole maize meal, sifted in the kitchen.
[2] Served in place of the dry legume ration of the institution diet.
[3] This was 46 grams up to June 22.
[4] From canned tomatoes. Served in place of the variable institution ration of fresh vegetables.
[5] Given with a view of correcting a possible gastric anacidity so very common in pellagrins.
[6] Given to improve mineral composition of the diet.

TABLE III.—*Approximate composition of dried skim milk supplemented diet offered daily to each of a group of white female pellagrins during 1923–24*

[Calories: 2,121]

Diet		Nutrients		
Articles of diet	Quantity (grams)	Protein (grams)	Fat (grams)	Carbohydrate (grams)
Basic:				
Corn meal [1]	130	10.9	6.1	96.2
Corn grits	40			
Wheat flour	80	9.1	.8	60.0
Rice	14	.7	.0	11.1
Cowpeas [2]	28	6.0	.4	17.0
Lard	20		20.0	
Vegetable cooking oil	30		30.0	
Sirup	90			63.9
Supplemental:				
Dried skim milk	105	36.6	.3	55.5
Tomato juice [3]	130			
Cod-liver oil	15		15.0	
Dilute hydrochloric acid (U. S. P.), 90 drops [4]				
Total nutrients		63.3	72.6	303.7
Nutrients per 1,000 calories		29.8	34.2	143.2

[1] Whole maize meal, sifted in the kitchen.
[2] Served in place of the variable dry legume ration of the institution.
[3] From canned tomatoes. Served in place of variable institution ration of fresh vegetables.
[4] Given with a view of correcting possible gastric anacidity so very common in pellagrins.

TABLE IV.—*Approximate composition of dried yeast supplemented diet offered daily to each of a group of colored female pellagrins during 1923–24*

[Calories: 2,224]

Diet		Nutrients		
Articles of diet	Quantity (grams)	Protein (grams)	Fat (grams)	Carbohydrate (grams)
Basic:				
Corn meal [1]	140	11.8	6.3	103.6
Grits	48	4.4	.9	36.2
Wheat flour	70	8.0	.7	52.5
Rice	28	2.2	.1	22.1
Cowpeas [2]	14	3.0	.2	8.5
Lard	56		56.0	
Vegetable cooking oil	15		15.0	
Sirup	90			63.9
Supplemental:				
Dried brewers' yeast	30	12.5	.5	14.2
Cod-liver oil	15		15.0	
Tomato juice [3]	130			
Dilute hydrochloric acid (U. S. P.), 90 drops [4]				
Calcium carbonate [5]	3			
Sirup iodid of iron (U. S. P.), 2 drops [5]				
Total nutrients		41.9	94.7	301.0
Nutrients per 1,000 calories		18.9	42.7	130.6

[1] Whole maize meal sifted in the kitchen.
[2] Served in place of the variable dry legume ration of the institution.
[3] From canned tomatoes: Served in place of the variable institution ration of fresh vegetables.
[4] Given with a view of correcting a possible gastric anacidity so very common in pellagrins.
[5] Given to improve the mineral composition of the diet.

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DEATH RATES OF MOTHERS FROM CHILDBIRTH, 1923

The Department of Commerce announces slightly higher death rates of mothers from childbirth or puerperal causes in 1923 than in 1922.

For the 10 States and the District of Columbia (constituting the "Birth Registration Area" of 1915) the death rate from puerperal causes in 1923 was 6.4 per 1,000 live births as compared with 6.2 in 1922, 6.5 in 1921, and 6.1 in 1915.

Of the 30 States for which figures are available for 1923 and 1922, 14 show higher rates from puerperal causes in 1923. South Carolina has the highest 1923 death rate from puerperal causes (9.7 per 1,000 live births), and Utah the lowest (5). Separate rates for the white and colored are shown for only 6 States—Kentucky, Maryland, Mississippi, North Carolina, South Carolina, and Virginia. For 1923 the highest rate for white persons appears for South Carolina (7.4), and the lowest (5.4) for both Kentucky and Maryland; whereas for the colored the highest rate (15.4) is for Kentucky, and the lowest (8.3) for Maryland.

Death rates from puerperal causes per 1,000 live births in the birth registration area and each registration State

Area	Death rates per 1,000 live births											
	All puerperal causes				Puerperal septicemia				Other puerperal causes			
	1923	1922	1921	1915	1923	1922	1921	1915	1923	1922	1921	1915
Birth registration area	6.7	6.6	6.8	6.1	2.5	2.4	2.7	2.4	4.1	4.2	4.1	3.7
1915 birth registration area [1]	6.4	6.2	6.5	6.1	2.4	2.2	2.6	2.4	3.9	4.0	3.9	3.7
Registration States:												
California	6.7	7.2	6.8	(2)	2.6	2.6	3.0	(2)	4.1	4.6	3.9	(2)
Connecticut	5.7	5.7	5.3	5.6	2.1	2.0	2.2	1.9	3.6	3.7	3.1	3.7
Delaware	8.4	6.6	6.3	(2)	4.4	3.0	3.0	(2)	4.0	3.6	3.4	(2)
Illinois	6.4	6.3	(2)	(2)	2.7	2.4	(2)	(2)	3.8	3.9	(2)	(2)
Indiana	6.5	6.6	6.9	(2)	3.1	3.1	3.4	(2)	3.3	3.5	3.5	(2)
Kansas	6.8	7.6	6.4	(2)	3.2	3.3	2.9	(2)	3.7	4.3	3.6	(2)
Kentucky (total)	6.0	6.1	6.3	(2)	2.5	2.8	2.9	(2)	3.5	3.3	3.3	(2)
White	5.4	5.4	5.7	(2)	2.2	2.4	2.6	(2)	3.3	3.0	3.0	(2)
Colored	15.4	18.5	14.8	(2)	7.7	9.4	7.0	(2)	7.7	9.1	7.7	(2)
Maine	8.7	7.6	7.4	6.8	1.8	2.1	1.9	2.1	6.9	5.5	5.5	4.7
Maryland (total)	6.0	5.9	6.7	(2)	2.2	2.0	2.4	(2)	3.8	3.9	4.3	(2)
White	5.4	5.3	6.0	(2)	2.0	1.6	2.0	(2)	3.4	3.7	3.9	(2)
Colored	8.3	8.4	9.6	(2)	2.9	3.6	3.7	(2)	5.4	4.8	5.9	(2)
Massachusetts	6.3	6.8	6.5	5.7	2.0	2.1	2.2	1.7	4.3	4.6	4.3	4.1
Michigan	7.0	6.9	6.9	6.7	3.0	2.5	3.1	2.5	4.1	4.3	3.8	4.1
Minnesota	6.0	4.9	5.7	5.2	2.8	1.8	2.6	1.8	3.3	3.1	3.1	3.4
Mississippi (total)	8.8	8.3	9.5	(2)	3.0	2.7	3.1	(2)	5.8	5.6	6.4	(2)
White	6.6	6.5	7.1	(2)	2.1	1.8	2.2	(2)	4.4	4.6	4.9	(2)
Colored	10.9	10.0	12.0	(2)	3.8	3.6	4.0	(2)	7.1	6.5	8.0	(2)
Montana	7.5	7.9	(2)	(2)	3.8	3.8	(2)	(2)	3.7	4.1	(2)	(2)
Nebraska	5.8	5.8	6.6	(2)	2.3	2.3	2.7	(2)	3.5	3.5	3.9	(2)
New Hampshire	7.4	6.5	6.2	6.1	1.6	0.9	1.7	1.9	5.8	5.5	4.5	4.2
New Jersey	5.7	6.4	5.9	(2)	2.3	2.6	2.4	(2)	3.4	3.8	3.4	(2)
New York	5.7	6.0	6.3	5.9	2.1	2.2	2.5	2.6	3.6	3.8	3.8	3.3
North Carolina (total)	8.0	8.0	7.3	(2)	1.8	2.0	1.9	(2)	6.2	6.0	5.5	(2)
White	6.7	7.0	6.1	(2)	1.4	1.6	1.4	(2)	5.3	5.5	4.7	(2)
Colored	10.7	9.9	10.2	(2)	2.6	2.8	3.0	(2)	8.1	7.2	7.2	(2)
Ohio	7.2	6.6	7.2	(2)	2.9	2.5	3.4	(2)	4.3	4.2	3.8	(2)
Oregon	6.9	8.3	7.4	(2)	2.5	2.7	3.0	(2)	4.4	5.5	4.5	(2)
Pennsylvania	6.6	6.2	6.8	6.4	2.8	2.4	2.9	2.7	3.8	3.8	3.9	3.7
Rhode Island	6.3	5.5	7.1	6.6	2.4	1.5	3.2	1.9	3.9	4.0	3.9	4.7
South Carolina (total)	9.7	10.7	9.8	(2)	2.1	3.1	2.6	(2)	7.6	7.6	7.2	(2)
White	7.4	8.5	7.8	(2)	1.4	1.8	1.7	(2)	6.0	6.8	6.0	(2)
Colored	12.2	12.8	11.8	(2)	2.9	4.5	3.4	(2)	9.3	8.3	8.4	(2)
Utah	5.0	5.5	7.3	(2)	1.7	1.5	2.9	(2)	3.3	4.0	4.3	(2)
Vermont	7.0	7.4	7.3	6.1	1.5	1.5	2.5	1.5	5.5	6.0	4.8	4.6
Virginia (total)	7.4	7.2	7.0	(2)	2.3	2.2	2.3	(2)	5.1	5.0	4.7	(2)
White	6.0	5.8	5.7	(2)	2.0	1.6	1.8	(2)	4.0	4.3	3.9	(2)
Colored	10.8	10.2	9.9	(2)	3.1	3.6	3.5	(2)	7.7	6.5	6.4	(2)
Washington	6.7	7.9	7.8	(2)	3.1	3.0	3.6	(2)	3.5	4.9	4.2	(2)
Wisconsion	5.8	5.6	5.8	(2)	2.3	1.9	2.2	(2)	3.5	3.7	3.6	(2)
Wyoming	7.3	7.1	(2)	(2)	1.2	2.1	(2)	(2)	6.1	5.0	(2)	(2)

[1] Includes the 6 New England States, Michigan, Minnesota, New York, Pennsylvania, and the District of Columbia.
[2] Not added to the registration area until a later date.

DEATHS DURING WEEK ENDED DECEMBER 27, 1924

Summary of information received by telegraph from industrial insurance companies for week ended December 27, 1924, and corresponding week of 1923. (From the Weekly Health Index, December 30, 1924, issued by the Bureau of the Census, Department of Commerce)

	Week ended Dec. 27, 1924	Corresponding week, 1923
Policies in force	57, 840, 977	54, 424, 373
Number of death claims	8, 858	8, 785
Death claims per 1,000 policies in force, annual rate	8. 0	8. 4

Deaths from all causes in certain large cities of the United States during the week ended December 27, 1924, infant mortality, annual death rate, and comparison with corresponding week of 1923. (From the Weekly Health Index, December 30, 1924, issued by the Bureau of the Census, Department of Commerce)

City	Week ended Dec. 27, 1924		Annual death rate per 1,000 corresponding week, 1923	Deaths under 1 year		Infant mortality rate, week ended Dec. 27, 1924 [2]
	Total deaths	Death rate [1]		Week ended Dec. 27, 1924	Corresponding week, 1923	
Total (63 cities)	6, 564	12. 8	[3] 12. 4	781	[3] 698	
Akron	37			10	5	106
Albany	39	17. 2	18. 2	2	3	46
Atlanta	73	16. 7	17. 8	13	9	
Baltimore [4]	204	13. 6	12. 5	27	21	80
Birmingham	50	13. 0	16. 0	6	14	
Boston	237	15. 9	14. 2	29	24	80
Bridgeport	33			4	5	64
Buffalo	147	14. 1	12. 3	19	19	80
Cambridge	21	9. 8	11. 2	2	4	35
Camden	24	9. 9	10. 5	3	5	49
Chicago [4]	627	11. 1	11. 1	79	71	74
Cincinnati	150	19. 2	15. 4	18	11	113
Cleveland	173	9. 9	8. 7	29	18	74
Columbus	79	15. 4	13. 8	13	7	123
Dallas	45	12. 5	12. 6	5	7	
Dayton	37	11. 4	10. 4	4	6	67
Denver	98			7	9	
Des Moines	27	9. 7	14. 8	1	2	
Detroit	234			48	48	89
Duluth	19	9. 1	8. 3	2	2	43
Erie	29			3	3	62
Fall River [4]	33	14. 2	12. 1	9	6	127
Flint	14			4	2	69
Fort Worth	32	11. 3	11. 6	4	8	
Grand Rapids	30	10. 5	8. 9	4	2	62
Houston	51			7	7	
Indianapolis	82	12. 2	17. 2	7	13	51
Jacksonville, Fla	36	18. 3	14. 6	3	3	
Kansas City, Kans	26	11. 5	14. 4	4	4	77
Kansas City, Mo	90	13. 0	11. 9	8	14	
Los Angeles	244			25	25	78
Louisville	46	9. 3	12. 3	6	3	56
Lowell	31	14. 0	12. 2	4	3	71
Lynn	33	16. 6	7. 1	4	1	101
Memphis	64	19. 4	16. 2	6	6	
Milwaukee	107	11. 3	8. 3	18	10	85
Minneapolis	91	11. 4	12. 5	8	13	43
Nashville [4]	31	13. 1	16. 2	3	5	
New Bedford	27	10. 6	6. 0	4	6	62
New Haven	37	11. 0	12. 7	7	8	92
New Orleans	178	22. 7	17. 1	20	8	
New York	1, 422	12. 3	11. 5	158	151	64
Bronx Borough	163	9. 8	9. 4	14	9	49
Brooklyn Borough	468	11. 1	11. 0	55	57	59
Manhattan Borough	649	15. 0	13. 2	76	71	77
Queens Borough	113	10. 6	8. 2	13	10	65
Richmond Borough	29	11. 6	18. 8	0	4	0

[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 1923. Cities left blank are not in the registration area for births.
[3] Data for 61 cities.
[4] Deaths for week ended Friday, December 26, 1924.

Deaths from all causes in certain large cities of the United States during the week ended December 27, 1924, infant mortality, annual death rate, and comparison with corresponding week of 1923. (From the Weekly Health Index, December 30, 1924, issued by the Bureau of the Census, Department of Commerce)—Continued.

City	Week ended Dec. 27, 1924		Annual death rate per 1,000 corresponding week, 1923	Deaths under 1 year		Infant mortality rate, week ended Dec. 27, 1924 [2]
	Total deaths	Death rate [1]		Week ended Dec. 27, 1924	Corresponding week, 1923	
Newark, N. J	90	10.5	10.0	9	11	42
Norfolk	36	11.4	6.6	2	2	36
Oakland	60	12.7	10.4	4	3	50
Oklahoma City	20	10.0		2		
Omaha	48	12.0	11.5	5	5	54
Paterson	37	13.7	15.3	8	6	136
Philadelphia	489	13.1	12.8	61	50	78
Pittsburgh	166	13.8	15.1	23	32	78
Portland, Oreg	74	13.9	10.9	11	5	114
Providence	60	12.8	12.5	7	5	57
Richmond	55	15.6	18.1	4	9	49
Rochester	63	10.1		6		47
St. Louis	211	13.5	14.5	17	15	
St. Paul	59	12.6	9.7	0	6	0
San Antonio	73	19.9	10.7	11	3	
San Francisco	165	15.7	16.0	9	5	54
Schenectady	17	8.8	9.5	2	2	59
Seattle	67			3	1	29
Somerville	21	10.9	13.7	1	1	27
Spokane	25			3	1	66
Springfield, Mass	27	9.5	11.9	4	3	68
Syracuse	37	10.3	12.2	6	6	75
Tacoma	21	10.6	10.8	2	1	48
Toledo	59	11.1	13.6	6	11	56
Trenton	34	13.7	18.4	5	7	83
Utica	26	12.9	14.1	5	0	109
Washington, D. C	148	15.8	15.6	25	8	145
Waterbury	18			3	3	70
Wilmington, Del	30	13.0	14.6	5	2	112
Worcester	46	12.3	14.9	5	4	60
Yonkers	17	8.1	9.7	2	3	44
Youngstown	27	9.1	10.4	5	4	69

[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 1923. Cities left blank are not in the registration area for births.

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 January 3, 1925

ALABAMA

	Cases
Cerebrospinal meningitis	1
Chicken pox	64
Diphtheria	30
Dysentery	53
Influenza	166
Lethargic encephalitis	1
Malaria	10
Measles	8
Mumps	75
Pellagra	8
Pneumonia	113
Scarlet fever	23
Smallpox	98
Tuberculosis	23
Typhoid fever	16
Whooping cough	27

ARIZONA

Diphtheria	1
Measles	11
Mumps	24
Ophthalmia neonatorum	1
Scarlet fever	1
Whooping cough	9

ARKANSAS

Cerebrospinal meningitis	1
Chicken pox	21
Diphtheria	5
Hookworm disease	1
Influenza	146
Malaria	30
Measles	13
Mumps	4
Pellagra	2
Scarlet fever	7
Smallpox	5
Tuberculosis	11
Typhoid fever	19
Whooping cough	21

CALIFORNIA

	Cases
Cerebrospinal meningitis—San Francisco	1
Diphtheria	138
Influenza	16
Lethargic encephalitis:	
Pomona	1
Santa Ana	1
Measles	31
Poliomyelitis:	
Berkeley	1
San Diego	1
San Francisco	1
Oakland	1
Scarlet fever	119
Smallpox:	
Los Angeles	24
Los Angeles County	9
Oakland	16
Scattering	36
Typhoid fever	14

COLORADO

(Exclusive of Denver)

Chicken pox	41
Diphtheria	10
Impetigo contagiosa	3
Influenza	1
Measles	1
Mumps	23
Ophthalmia neonatorum	1
Pneumonia	4
Scarlet fever	34
Septic sore throat	2
Tuberculosis	51
Typhoid fever	1
Whooping cough	5

CONNECTICUT

Chicken pox	65
Diphtheria	100
Dysentery (bacillary)	1

CONNECTICUT—continued

	Cases
German measles	17
Influenza	7
Measles	14
Mumps	15
Pneumonia (all forms)	31
Poliomyelitis	2
Scarlet fever	199
Septic sore throat	2
Tuberculosis (all forms)	27
Typhoid fever	4
Whooping cough	47

DELAWARE [1]

Chicken pox	1
Diphtheria	8
Mumps	2
Pneumonia	5
Scarlet fever	8
Tuberculosis	5
Whooping cough	3

FLORIDA

Cerebrospinal meningitis	1
Diphtheria	19
Influenza	2
Malaria	11
Scarlet fever	2
Typhoid fever	9

GEORGIA

Chicken pox	9
Diphtheria	11
Hookworm disease	2
Influenza	36
Malaria	3
Mumps	5
Pellagra	1
Pneumonia	31
Scarlet fever	5
Smallpox	3
Tuberculosis (pulmonary)	13
Typhoid fever	5
Whooping cough	7

ILLINOIS

Diphtheria:	
Cook County	83
Scattering	40
Influenza	13
Lethargic encephalitis:	
Cook County	3
Randolph County	1
Measles	234
Pneumonia	386
Poliomyelitis:	
Hiatt County	1
Jo Daviess County	1
Schuyler County	1
Scarlet fever:	
Cook County	176
Kane County	9
St. Clair County	14
Will County	9
Scattering	102

ILLINOIS—continued

	Cases
Smallpox	16
Tuberculosis	171
Typhoid fever	47
Whooping cough	164

INDIANA

Cerebrospinal meningitis	1
Chicken pox	123
Diphtheria	62
Influenza	82
Measles	155
Mumps	12
Pneumonia	22
Scarlet fever:	
Allen County	9
Elkhart County	22
Huntington County	9
La Porte County	10
St. Joseph County	19
Vigo County	13
Scattering	67
Smallpox:	
Kosciusko County	11
Vigo County	9
Scattering	34
Tuberculosis	26
Typhoid fever	9
Whooping cough	19

IOWA

Diphtheria	20
Scarlet fever	44
Smallpox	47

KANSAS

Cerebrospinal meningitis	3
Chicken pox	139
Diphtheria	30
Dysentery	1
Influenza	18
Lethargic encephalitis	1
Measles	3
Mumps	153
Pneumonia	38
Poliomyelitis	1
Scarlet fever	91
Smallpox	3
Tuberculosis	56
Typhoid fever	1
Whooping cough	9

LOUISIANA

Diphtheria	25
Influenza	16
Lethargic encephalitis	1
Measles	3
Pneumonia	43
Scarlet fever	5
Smallpox	16
Tuberculosis	29
Typhoid fever	19

[1] For two weeks ended January 3, 1925.

MAINE

	Cases
Chicken pox	60
Diphtheria	6
Influenza	9
Measles	31
Mumps	82
Pneumonia	18
Scarlet fever	25
Septic sore throat	7
Tuberculosis	4
Typhoid fever	4
Vincent's angina	1
Whooping cough	4

MARYLAND [1]

Cerebrospinal meningitis	1
Chicken pox	53
Diphtheria	37
Influenza	149
Lethargic encephalitis	3
Measles	19
Mumps	14
Ophthalmia neonatorum	2
Paratyphoid fever	1
Pneumonia (all forms)	136
Scarlet fever	106
Septic sore throat	4
Tetanus	1
Trachoma	1
Tuberculosis	52
Typhoid fever	19
Whooping cough	46

MASSACHUSETTS

Anthrax	2
Cerebrospinal meningitis	2
Chicken pox	257
Conjunctivitis (suppurative)	20
Diphtheria	148
German measles	63
Influenza	14
Lethargic encephalitis	3
Measles	192
Mumps	77
Ophthalmia neonatorum	14
Pneumonia (lobar)	120
Scarlet fever	399
Septic sore throat	5
Tuberculosis (all forms)	98
Typhoid fever	12
Whooping cough	83

MICHIGAN

Diphtheria	90
Measles	124
Pneumonia	82
Scarlet fever	251
Smallpox	14
Tuberculosis	188
Typhoid fever	19
Whooping cough	62

MINNESOTA

Chicken pox	97
Diphtheria	42
Influenza	2

MINNESOTA—continued

	Cases
Lethargic encephalitis	1
Measles	12
Pneumonia	8
Poliomyelitis	1
Scarlet fever	219
Smallpox	83
Trachoma	5
Tuberculosis	99
Typhoid fever	4
Whooping cough	19

MISSISSIPPI

Diphtheria	14
Scarlet fever	2
Smallpox:	
Amite County	40
Scattering	15
Typhoid fever	1

MISSOURI

Cerebrospinal meningitis	1
Chicken pox	31
Diphtheria	41
Influenza	2
Measles	4
Mumps	5
Pneumonia	6
Poliomyelitis	1
Scarlet fever	157
Septic sore throat	2
Smallpox	5
Tuberculosis	16
Whooping cough	4

MONTANA

Diphtheria	13
Poliomyelitis—Kalispell R. F. D	1
Smallpox	19

NEW JERSEY

Cerebrospinal meningitis	2
Chicken pox	167
Diphtheria	115
Influenza	28
Measles	89
Pneumonia	210
Scarlet fever	173
Smallpox	4
Trachoma	1
Trichinosis	1
Typhoid fever	21
Whooping cough	204

NEW MEXICO

Chicken pox	27
Diphtheria	1
Influenza	4
Measles	21
Pneumonia	4
Scarlet fever	3
Smallpox	2
Tuberculosis	3
Whooping cough	2

[1] Week ended Friday.

NEW YORK

(Exclusive of New York City)

	Cases
Cerebrospinal meningitis	1
Diphtheria	110
Influenza	35
Lethargic encephalitis	7
Measles	174
Pneumonia	289
Poliomyelitis	6
Scarlet fever	390
Smallpox	10
Typhoid fever	55
Whooping cough	213

NORTH CAROLINA

Chicken pox	126
Diphtheria	76
German measles	1
Measles	34
Scarlet fever	59
Septic sore throat	15
Smallpox	40
Typhoid fever	11
Whooping cough	100

OKLAHOMA

(Exclusive of Oklahoma City and Tulsa)

Diphtheria	18
Smallpox	13
Typhoid fever	31

OREGON

Chicken pox	23
Diphtheria:	
Portland	9
Scattering	3
Influenza	4
Lethargic encephalitis	2
Measles	3
Mumps	1
Pneumonia	[1] 12
Scarlet fever:	
Hood River County	14
Scattering	25
Smallpox:	
Portland	13
Scattering	4
Tuberculosis	19
Typhoid fever	1
Whooping cough	6

SOUTH DAKOTA

Chicken pox	1
Measles	2
Pneumonia	2
Scarlet fever	46
Smallpox	21
Typhoid fever	2

TEXAS

Cerebrospinal meningitis	3
Chicken pox	168
Dengue	9
Diphtheria	71
Dysentery (epidemic)	3

TEXAS—continued

	Cases
Influenza	972
Lethargic encephalitis	2
Malta fever	12
Measles	103
Mumps	142
Paratyphoid fever	3
Pellagra	25
Pneumonia	123
Poliomyelitis	1
Rabies (human)	1
Scarlet fever	55
Smallpox	73
Tetanus	2
Trachoma	8
Tuberculosis	62
Typhoid fever	29
Whooping cough	72

VERMONT

Chicken pox	46
Diphtheria	5
Measles	3
Mumps	31
Scarlet fever	14
Typhoid fever	1
Whooping cough	26

WASHINGTON

Chicken pox	83
Diphtheria	32
Measles	28
Mumps	44
Pneumonia	1
Poliomyelitis:	
Kitsap County	1
Thurston County	1
Scarlet fever	44
Smallpox	27
Tuberculosis	25
Typhoid fever	8
Whooping cough	9

WEST VIRGINIA

Diphtheria	8
Scarlet fever	6
Smallpox	6
Typhoid fever	3

WISCONSIN

Milwaukee:	
Cerebrospinal meningitis	1
Chicken pox	21
Diphtheria	8
German measles	25
Influenza	1
Lethargic encephalitis	2
Measles	172
Mumps	10
Pneumonia	2
Scarlet fever	11
Smallpox	1
Tuberculosis	21
Whooping cough	14

[1] Deaths.

WISCONSIN—continued

Scattering:	Cases
Chicken pox	204
Diphtheria	42
German measles	4
Influenza	35
Lethargic encephalitis	1
Measles	28
Mumps	42
Pneumonia	18
Scarlet fever	90
Smallpox	42

WISCONSIN—continued

Scattering—Continued.	Cases
Tuberculosis	13
Typhoid fever	3
Whooping cough	64

WYOMING

	Cases
Chicken pox	9
Pneumonia	1
Scarlet fever	3
Typhoid fever	2

Reports for Week Ended December 27, 1924

DISTRICT OF COLUMBIA

	Cases
Chicken pox	21
Diphtheria	7
Influenza	4
Measles	4
Pneumonia	20
Scarlet fever	28
Tuberculosis	18
Typhoid fever	5
Whooping cough	7

NEBRASKA

Chicken pox	11
Diphtheria	7

NEBRASKA—continued

	Cases
Measles	1
Mumps	1
Scarlet fever	8
Smallpox	14

NORTH DAKOTA

Chicken pox	40
Diphtheria	4
Measles	18
Mumps	10
Pneumonia	2
Poliomyelitis	1
Scarlet fever	36
Smallpox	22

SUMMARY OF MONTHLY REPORTS FROM STATES

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

State	Cerebrospinal meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
November, 1924										
Idaho	1	10					1	28		3
Kansas	5	139	11	1	16			439	7	48
Maine		133	31		29		17	178		35
Montana	1	54	3		24		9	105	75	7
North Carolina	1	555			154		1	278		56
Ohio	4	684	21	1	125		24	1,466	360	107
South Dakota	1	53			6		11	187	49	16
Utah	1	108	59		134			60	17	22
Virginia	8	674	2,028	84	207	14	9	331	3	79
Washington	1	148			39		62	159	97	22

RECIPROCAL NOTIFICATION, NOVEMBER, 1924

Notifications regarding communicable diseases sent during the month of November, 1924, to other State health departments by departments of health of certain States

Referred by—	Actinomycosis	Diphtheria	Meningitis [1]	Poliomyelitis	Scarlet fever	Smallpox	Tuberculosis	Typhoid fever
Connecticut					25		1	
Illinois	1						20	
Massachusetts								1
Minnesota				1		1	70	1
New Jersey					1			1
New York		1	1		3	2		3

[1] Meningococcus meningitis.

RODENT PLAGUE IN LOS ANGELES, CALIF.

The following items are taken from the report of plague-eradicative measures at Los Angeles, Calif., for the week ended December 20, 1924:

Rodents examined to Dec. 20, 1924:	
Rats	15,607
Squirrels	513
Rodents examined during week ended Dec. 20, 1924:	
Rats	4,208
Squirrels	158
Plague-infected rats found to Dec. 20, 1924	61
Plague-infected rats week ended Dec. 20, 1924	9

RODENT PLAGUE IN NEW ORLEANS, LA.

The following items are taken from the report of plague-eradicative measures at New Orleans, La., for the week ended December 20, 1924:

Number of vessels inspected for rat guards	755
Number of vessels fumigated with cyanide gas	42
Rodents examined for plague Dec. 4 to 20, 1924	3,746
Rodents found positive for plague week ended Dec. 20, 1924	1

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

Diphtheria.—For the week ended December 20, 1924, 34 States reported 2,003 cases of diphtheria. For the week ended December 22, 1923, the same States reported 2,668 cases of this disease. One hundred and four cities, situated in all parts of the country and having an aggregate population of more than 28,800,000 reported 1,102 cases of diphtheria for the week ended December 20, 1924. Last year, for the corresponding week, they reported 1,429 cases. The estimated expectancy for these cities was 1,426 cases of diphtheria. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Measles.—Twenty-nine States reported 1,398 cases of measles for the week ended December 20, 1924, and 8,571 cases of this disease for the week ended December 22, 1923. One hundred and four cities reported 778 cases of measles for the week this year, and 2,434 cases last year.

Scarlet fever.—Scarlet fever was reported for the week as follows: Thirty-four States—this year, 3,290 cases; last year, 3,498 cases. One hundred and four cities—this year, 1,722, last year, 1,603 cases; estimated expectancy, 1,003 cases.

Smallpox.—For the week ended December 20, 1924, 34 States reported 650 cases of smallpox. Last year, for the corresponding week, they reported 647 cases. One hundred and four cities reported smallpox for the week as follows: 1924, 248 cases; 1923, 194 cases; estimated expectancy, 88 cases. These cities reported 26 deaths

from smallpox for the week this year, 25 of which occurred at Minneapolis.

Typhoid fever.—Five hundred and fifty-eight cases of typhoid fever were reported for the week ended December 20, 1924, by 33 States. For the corresponding week of 1923 the same States reported 262 cases. One hundred and four cities reported 307 cases of typhoid fever for the week this year and 102 cases for the week last year. The estimated expectancy for these cities was 59 cases.

Influenza and pneumonia.—Deaths from influenza and pneumonia (combined) were reported for the week by 104 cities as follows: 1924, 997 deaths; 1923, 795 deaths.

City reports for week ended December 20, 1924

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 1915 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviations from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported	Scarlet fever	
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported				Cases, estimated expectancy	Cases reported
NEW ENGLAND										
Maine:										
Lewiston	8	2	0	0	0	0	1	2	1	1
Portland	9	1	0	2	0	0	20	0	2	1
New Hampshire:										
Concord	0	1	0	0	0	0	0	1	0	0
Vermont:										
Barre	0	0	0	0	0	0	6	0	1	5
Burlington	6	1	0	0	0	0	2	0	2	1
Massachusetts:										
Boston	35	68	45	3	1	36	12	28	42	104
Fall River	4	5	5	0	0	0	3	2	2	0
Springfield	5	5	1	1	2	30	28	0	7	40
Worcester	23	5	10	0	0	1	1	1	10	10
Rhode Island:										
Pawtucket	0	3	0	0	0	0	0	7	1	7
Providence	0	15	11	1	1	0	0	10	9	6
Connecticut:										
Bridgeport	2	9	7	1	1	0	0	0	5	16
Hartford	1	9	10	0	0	0	0	1	7	7
New Haven	18	8	0	0	1	11	1	4	6	26
MIDDLE ATLANTIC										
New York:										
Buffalo	23	36	6	3	2	46	7	12	23	29
New York	183	224	224	30	18	50	27	234	153	201
Rochester	14	15	0	0	0	2	20	6	11	51
Syracuse	14	11	5	0	0	3	11	3	14	4
New Jersey:										
Camden	9	5	6	0	0	8	1	5	2	8
Newark	44	23	14	9	0	33	3	11	17	37
Trenton	1	10	4	2	0	0	0	2	2	4
Pennsylvania:										
Philadelphia	158	80	91	-------	9	32	24	78	53	128
Pittsburgh	84	31	15	-------	4	53	24	26	26	66
Reading	12	6	5	0	0	0	3	0	1	1
Scranton	0	5	2	0	1	0	0	6	3	0

City reports for week ended December 20, 1924—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported	Scarlet fever	
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported				Cases, estimated expectancy	Cases reported
E. NORTH CENTRAL										
Ohio:										
Cincinnati	12	19	16	1	2	1	0	16	12	15
Cleveland	153	45	60	4	3	3	33	27	35	33
Columbus	15	9	2	0	2	0	0	11	9	13
Toledo	34	15	4	0	0	6	0	3	15	21
Indiana:										
Fort Wayne		5							2	
Indianapolis	104	21	6	0	0	1	7	13	10	8
South Bend	8	1	1	0	0	1	0	4	3	7
Terre Haute	6	3	1	0	0	0	0	3	2	4
Illinois:										
Chicago	175	174	90	12	2	150	32	75	124	191
Cicero	1	3	0	0	0	1	0	0	1	6
Springfield	5	2	7	2	1	1	2	2	2	0
Michigan:										
Detroit	83	84	39	3	2	3	3	27	73	99
Flint	14	13	0	0	0	0	1	1	8	11
Grand Rapids	6	7	3	0	0	5	0	2	7	14
Wisconsin:										
Madison	20	2	2	0		1	129		3	5
Milwaukee	67	25	15	0	0	261	66	11	34	13
Racine	7	3	1	0	0	0	1	1	5	2
Superior	2	1	1	0	0	0	0	2	2	2
W. NORTH CENTRAL										
Minnesota:										
Duluth	30	2	0	0	0	0	0	2	5	13
Minneapolis	86	22	52		2	0	6	7	27	61
St. Paul	37	19	24	0	0	4	15	11	16	27
Iowa:										
Davenport	4	2	0	0		0	0		1	1
Des Moines	0	5	11	0		0	0		9	6
Sioux City	5	3	0	0		1	0		3	1
Waterloo	8	1	0	0		0	1		4	1
Missouri:										
Kansas City	15	14	4	3	2	3	4	3	11	69
St. Joseph	2	4	3	0	0	0	3	2	3	1
St. Louis	24	87	49	0	0	0	3		30	121
North Dakota:										
Fargo	12	1	1	0	0	0	9	1	1	1
Grand Forks	0	0	2	0		0	0		1	0
South Dakota:										
Aberdeen	3		0	0		0	0			1
Sioux Falls	2	1	1	0	0	0	0	0	2	1
Nebraska:										
Lincoln	9	2	3	0	0	0	0	1	2	3
Omaha	19	7	3	0	0	1	0	2	6	2
Kansas:										
Topeka		3							1	
Wichita	28	8	3	0	0	0	0	1	3	0
SOUTH ATLANTIC										
Delaware:										
Wilmington	6	3	1	0	0	0	2	2	4	1
Maryland:										
Baltimore	70	36	28	58	7	4	1	55	23	35
Cumberland		2	3	0	0	0		0	1	1
Frederick	0	1	0	0	0	0	0	1	0	0
District of Columbia:										
Washington	39	19	11	1	1	3		16	18	50
Virginia:										
Lynchburg	4	2	1	0	0	0	6	0	0	0
Norfolk	33	3	5	0	0	1	83	2	2	3
Richmond	3	10	4	0	1	1	1	6	5	3
Roanoke	5	3	1	0	1	0	0	0	1	0
West Virginia:										
Charleston	19	3	3	0	0	0	3	4	2	1
Huntington	0	2	3	0		0	0		1	2
Wheeling	15	2	1	0	0	1	0	0	1	2
North Carolina:										
Raleigh		2							1	
Wilmington	2	1	0	0	1	1	3	3	0	0
Winston-Salem		1							1	

City reports for week ended December 20, 1924—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported	Scarlet fever	
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported				Cases, estimated expectancy	Cases reported
SOUTH ATLANTIC—continued										
South Carolina:										
Charleston	1	2	0	0	0	0	0	2	1	1
Columbia	0	1	3	0	0	0	5	3	0	0
Greenville	0	1	0	0	0	0	0	3	0	0
Georgia:										
Atlanta	1	5	7	2	0	0	0	15	5	5
Brunswick	10	0	0	0	0	0	0	1	0	0
Savannah	1	2	0	0	0	0	0	3	1	0
Florida:										
St. Petersburg	1	0	0	0	0	0	0	1	0	1
Tampa	1	2	3	0	0	0	3	1	0	1
EAST SOUTH CENTRAL										
Kentucky:										
Covington	1	2	4	0	0	0	0	2	2	4
Lexington	4	1	1	0	0	0	0	2	0	3
Louisville	2	13	8	0	0	1	0	9	5	8
Tennessee:										
Memphis	8	9	3	0	2	0	3	12	4	6
Nashville	2	4	1	0	0	0	0	6	3	4
Alabama:										
Birmingham	21	4	7	6	2	1	2	23	4	17
Mobile	1	1	0	2	0	0	0	0	1	0
Montgomery	0	1	3	1	0	0	0	0	0	3
WEST SOUTH CENTRAL										
Arkansas:										
Fort Smith	8	2	0	0	----	0	0	----	1	3
Little Rock	0	2	1	0	0	2	1	1	2	2
Louisiana:										
New Orleans	1	13	19	7	4	1	0	13	4	20
Shreveport	3	----	2	0	0	0	0	1	----	0
Oklahoma:										
Oklahoma	1	2	1	0	0	0	0	4	3	1
Texas:										
Dallas	12	11	12	0	1	0	0	5	3	7
Galveston	0	2	1	0	0	0	0	3	1	1
Houston	2	4	1	0	3	0	0	5	2	4
San Antonio	1	2	6	0	0	1	1	4	1	3
MOUNTAIN										
Montana:										
Billings	5	0	0	0	0	0	0	2	1	2
Great Falls	6	1	7	0	0	1	1	0	1	2
Helena	----	1	0	0	0	0	----	0	1	1
Missoula	----	0	4	0	0	0	----	0	0	0
Idaho:										
Boise	3	1	0	0	0	0	0	0	1	2
Colorado:										
Denver	40	11	12	----	4	2	25	18	10	14
Pueblo	16	6	1	0	1	0	0	4	3	0
New Mexico:										
Albuquerque	7	1	0	0	0	0	0	0	0	0
Utah:										
Salt Lake City	41	2	2	0	0	3	18	5	4	2
Nevada:										
Reno	0	0	0	0	0	0	0	0	1	2
PACIFIC										
Washington:										
Seattle	32	6	7	0	----	0	8	----	6	6
Spokane	12	4	21	0	----	2	0	----	6	2
Tacoma	11	3	3	0	----	0	0	----	4	3
Oregon:										
Portland	16	7	13	0	0	2	0	11	7	9
California:										
Los Angeles	----	33	----	----	----	----	----	----	14	----
Sacramento	----	2	----	----	----	----	----	----	2	----
San Francisco	16	27	12	9	1	5	24	6	11	17

City reports for week ended December 20, 1924—Continued

Division, State, and city	Population July 1, 1923, estimated	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND										
Maine:										
Lewiston	33,790	0	0	0	0	0	1	0	0	13
Portland	73,129	0	0	0	1	0	3	1	0	15
New Hampshire:										
Concord	22,408	0	0	0	0	0	0	0	0	12
Vermont:										
Barre	[1] 10,008	0	0	0	0	0	0	0	0	2
Burlington	23,613	0	0	0	0	0	0	0	0	6
Massachusetts:										
Boston	770,400	0	0	0	13	1	1	0	6	215
Fall River	120,912	0	0	0	3	1	0	0	10	31
Springfield	144,227	0	0	0	1	0	0	0	1	30
Worcester	191,927	0	0	0	0	1	0	0	7	36
Rhode Island:										
Pawtucket	68,799	0	0	0	0	0	0	0	0	
Providence	242,378	0	0	0	2	0	4	0	0	78
Connecticut:										
Bridgeport	[1] 143,555	0	0	0	1	0	2	0	1	33
Hartford	[1] 138,036	0	0	0	0	0	0	0	0	35
New Haven	172,967	0	0	0	2	1	2	0	6	43
MIDDLE ATLANTIC										
New York:										
Buffalo	536,718	0	1	0	9	1	2	0	13	139
New York	5,927,625	0	0	0	[2] 88	12	168	10	104	1,481
Rochester	317,867	0	0	0	5	1	9	0	3	71
Syracuse	184,511	0	0	0	1	1	1	0	0	38
New Jersey:										
Camden	124,157	0	2	1	0	0	1	0	2	27
Newark	438,699	0	0	0	5	1	4	0	93	93
Trenton	127,390	0	0	0	3	1	0	0	5	47
Pennsylvania:										
Philadelphia	1,922,788	0	0	0	25	3	8	3	68	533
Pittsburgh	613,442	1	0	0	10	1	6	1	4	149
Reading	110,917	0	0	0	0	0	0	0	5	22
Scranton	140,636	0	0	0	1	0	6	1	0	
EAST NORTH CENTRAL										
Ohio:										
Cincinnati	406,312	1	1	0	7	1	1	0	4	122
Cleveland	888,519	2	1	0	20	1	0	1	26	222
Columbus	261,082	0	6	0	3	0	0	1	3	73
Toledo	268,338	1	0	0	5	1	3	1	9	55
Indiana:										
Fort Wayne	93,573	1				0				
Indianapolis	342,718	3	5	0	9	0	0	0	6	99
South Bend	76,709	1	0	0	0	0	0	0	0	13
Terre Haute	68,939	0	5	0	0	0	0	0	0	19
Illinois:										
Chicago	2,886,121	2	0	0	50	4	31	1	104	723
Cicero	55,968	0	0	0	0	0	0	0	3	6
Springfield	61,833	1	0	0	1	0	2	0	0	16
Michigan:										
Detroit	995,668	3	0	0	12	2	6	1	19	217
Flint	117,968	1	0	0	0	1	0	0	0	14
Grand Rapids	145,947	1	0	0	2	0	2	1	7	41
Wisconsin:										
Madison	42,519	1	0			0	0		9	5
Milwaukee	484,595	2	0	0	9	0	1	0	21	96
Racine	64,393	1	1	0	0	0	1	0	0	7
Superior	[1] 39,671	1	0	0	0	0	0	0	0	5
WEST NORTH CENTRAL										
Minnesota:										
Duluth	106,289	1	0	0	0	1	1	0	0	16
Minneapolis	409,125	7	65	25	7	1	0	0	0	99
St. Paul	241,891	13	10	0	2	0	1	0	21	57

[1] Population Jan. 1, 1920.

[2] Pulmonary only.

City reports for week ended December 20, 1924—Continued

Division, State, and city	Population July 1, 1923, estimated	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—contd.										
Iowa:										
Davenport	61,262	1	1			0	0		4	
Des Moines	140,923	1	3			0	0		0	
Sioux City	79,662	1	0			0	0		0	
Waterloo	39,667	0	5			0	0			
Missouri:										
Kansas City	351,819	2	0	0	1	0	2	0	0	93
St. Joseph	78,232	1	0	0	1	0	0	0	0	25
St. Louis	803,853	1	11	0	9	2	3	0	1	195
North Dakota:										
Fargo	24,841	0	0	0	0	0	0	0	0	4
Grand Forks	14,547	0	0			0	0		0	
South Dakota:										
Aberdeen	15,829		0				0		0	
Sioux Falls	29,206	1	0	0	0	0	0	0	0	5
Nebraska:										
Lincoln	58,671	1	0	0	0	0	0	0	1	8
Omaha	204,382	3	10	0	3	0	0	0	0	40
Kansas:										
Topeka	52,555	0				0				
Wichita	79,261	1	0	0	0	0	0	0	3	17
SOUTH ATLANTIC										
Delaware:										
Wilmington	117,728	0	0	0	0	1	0	0	0	20
Maryland:										
Baltimore	773,580	0	0	0	14	3	3	1	57	247
Cumberland	32,361	0	0	0	0	0	0	0		9
Frederick	11,391	0	0	0	0	0	0	0	0	4
District of Columbia:										
Washington	[1] 437,571	1	0	0	11	2	6	0	17	138
Virginia:										
Lynchburg	30,277	0	0	0	1	0	0	0	1	7
Norfolk	159,089	1	0	0	1	0	0	0	8	
Richmond	181,044	0	0	0	4	1	2	0	1	53
Roanoke	55,502	0	0	0	2	0	1	1	0	14
West Virginia:										
Charleston	45,597	0	7	0	0	0	0	0	1	14
Huntington	57,918	1	4			1	0		0	
Wheeling	[1] 56,208	0	0	0	1	0	1	0	1	19
North Carolina:										
Raleigh	29,171	0				0				
Wilmington	35,719	0	0	0	1	1	0	0	1	8
Winston-Salem	56,230	1				0				
South Carolina:										
Charleston	71,245	1	0	0	3	0	0	0	0	18
Columbia	39,688	0	0	0	1	0	0	0	1	28
Greenville	25,789	1	0	0	0	0	0	0	0	7
Georgia:										
Atlanta	222,963	2	0	0	2	1	0	0	1	70
Brunswick	15,937	0	0	0	0	0	0	0	0	7
Savannah	89,448	1	0	0	2	1	1	1	0	32
Florida:										
St. Petersburg	24,403	0	0	0	0	1	0	0	0	13
Tampa	56,050	0	0	0	0	0	1	0	0	15
EAST SOUTH CENTRAL										
Kentucky:										
Covington	57,877	0	0	0	0	0	0	0	0	17
Lexington	43,673	0	0	0	1	1	0	0	0	12
Louisville	257,671	1	0	0	3	0	1	0	0	61
Tennessee:										
Memphis	170,067	0	0	0	7	0	6	2	5	93
Nashville	121,128	0	0	0	1	0	0	0	0	44
Alabama:										
Birmingham	195,901	0	51	0	5	1	1	0	1	87
Mobile	63,858	1	0	0	5	0	1	0	0	25
Montgomery	45,383	0	4	0	0	0	0	0	0	5

[1] Population Jan. 1, 1920.

City reports for week ended December 20, 1924—Continued

Division, State, and city	Population July 1, 1923, estimated	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL										
Arkansas:										
Fort Smith	30,635	0	1			0	0		0	
Little Rock	70,916	0	2	0	1	0	0	2	0	
Louisiana:										
New Orleans	404,575	1	0	0	14	1	11	1	4	141
Shreveport	54,590		0	0	2		0	0	0	38
Oklahoma:										
Oklahoma	101,150	2	0	0	0	0	0	0	0	26
Texas:										
Dallas	177,274	0	1	0	6	1	0	0	0	53
Galveston	46,877	0	0	0	0	0	1	0	0	12
Houston	154,970	1	7	0	5	1	0	0	0	52
San Antonio	184,727	0	0	0	12	0	0	0	0	64
MOUNTAIN										
Montana:										
Billings	16,927	0	0	0	0	0	0	0	6	4
Great Falls	27,787	0	0	0	0	1	0	0	0	11
Helena	[1] 12,037	0	0	0	0	0	0	0		10
Missoula	[1] 12,668	1	0	0	0	1	0	0		4
Idaho:										
Boise	22,806	1	3	0	0	0	0	0	0	6
Colorado:										
Denver	272,031	5	0	0	7	0	0	0	8	73
Pueblo	43,519	0	0	0	0	0	0	0	0	15
New Mexico:										
Albuquerque	16,648	0	0	0	2	0	1	1	0	4
Utah:										
Salt Lake City	126,241	3	0	0	3	0	1	0	1	29
Nevada:										
Reno	12,429	0	0	0	0	0	0	0	0	1
PACIFIC										
Washington:										
Seattle	[1] 315,685	1	16			0	0		5	
Spokane	104,573	9	0			0	2		1	
Tacoma	101,731	1	1	0	0	0	0	0	0	20
Oregon:										
Portland	273,621	7	8	0	3	0	1	0	4	
California:										
Los Angeles	666,853	1				2				
Sacramento	69,950	0				0				
San Francisco	539,038	1	2	0	13	1	1	0	19	155

[1] Population Jan. 1, 1920.

City reports for week ended December 20, 1924—Continued.

Division, State, and city	Cerebro-spinal meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)			Typhus fever	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, est. expectancy	Cases	Deaths	Cases	Deaths
NEW ENGLAND											
Massachusetts:											
Boston	0	0	1	0	0	0	0	0	0	0	0
Springfield	0	0	1	0	0	0	0	0	0	0	0
Connecticut:											
New Haven	0	1	0	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC											
New York:											
New York	2	4	18	8	0	0	1	1	2	1	0
Pennsylvania:											
Philadelphia	2	1	1	1	0	0	0	0	0	0	0
EAST SOUTH CENTRAL											
Ohio:											
Cincinnati	0	1	0	1	0	0	0	0	0	0	0
Toledo	0	0	0	1	0	0	0	0	0	0	0
Illinois:											
Chicago	0	0	5	0	0	0	0	0	0	0	0
Cicero	1	0	0	0	0	0	0	0	0	0	0
Michigan:											
Detroit	0	1	3	0	0	0	0	0	0	0	0
Wisconsin:											
Milwaukee	0	0	3	2	0	0	0	0	0	0	0
WEST NORTH CENTRAL											
Minnesota:											
Duluth	0	0	0	1	0	0	0	0	0	0	0
Missouri:											
Kansas City	0	1	2	1	0	0	0	0	0	0	0
St. Louis	1	0	0	0	0	0	0	0	0	0	0
SOUTH ATLANTIC											
Virginia:											
Richmond	0	0	0	1	1	0	0	0	0	0	0
South Carolina:											
Columbia	0	0	0	0	0	1	0	0	0	0	0
EAST SOUTH CENTRAL											
Alabama:											
Birmingham	0	0	0	1	1	0	0	0	0	0	0
Mobile	0	0	0	0	0	1	0	0	0	0	0
WEST SOUTH CENTRAL											
Arkansas:											
Little Rock	0	1	0	0	0	0	0	0	0	0	0
Texas:											
Galveston	0	0	0	0	0	1	0	0	0	0	0
MOUNTAIN											
Montana:											
Helena	0	1	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington:											
Tacoma	0	0	0	0	0	0	0	1	1	0	0
Oregon:											
Portland	1	0	0	0	0	0	0	0	0	0	0
California:											
San Francisco	0	0	0	0	0	0	0	1	0	0	0

The following table gives a summary of the reports from 105 cities for the 10-week period ended December 20, 1924. The cities included in this table are those whose reports have been published for all 10 weeks in the Public Health Reports. Eight of these cities did not report deaths. The aggregate population of the cities reporting cases was estimated at nearly 29,000,000 on July 1, 1923, which is the latest date for which estimates are available. The cities reporting deaths had more than 28,000,000 population on that date. The number of cities included in each group and the aggregate population are shown in a separate table below.

Summary of weekly reports from cities, October 12 to December 20, 1924

DIPHTHERIA CASES

	1924, week ended—									
	Oct. 18	Oct. 25	Nov. 1	Nov. 8	Nov. 15	Nov. 22	Nov. 29	Dec. 6	Dec. 13	Dec. 20
Total	936	988	965	1,128	1,112	1,115	970	1,058	1,063	1,102
New England	82	89	88	78	82	84	67	104	[1] 77	89
Middle Atlantic	259	228	235	304	312	314	284	336	345	370
East North Central	176	176	211	279	247	227	234	223	225	[2] 248
West North Central	136	149	127	128	147	160	148	149	128	[3] 143
South Atlantic	121	172	131	148	109	129	128	[4] 89	99	[5] 72
East South Central	42	41	27	35	26	32	21	[6] 21	17	26
West South Central	28	36	40	46	59	45	27	31	45	42
Mountain	18	23	28	38	36	27	17	[7] 18	33	26
Pacific	74	74	78	72	94	97	44	87	94	[8] 86

MEASLES CASES

Total	193	197	241	310	322	400	364	613	706	779
New England	25	28	32	36	41	49	59	66	[1] 104	78
Middle Atlantic	97	92	112	144	135	154	156	207	238	227
East North Central	42	55	70	91	102	131	114	269	279	[2] 428
West North Central	7	3	7	7	10	14	5	12	17	[3] 9
South Atlantic	4	2	6	13	4	11	7	[4] 10	19	[5] 11
East South Central	1	0	0	2	2	2	0	[6] 0	1	2
West South Central	2	1	0	1	1	1	2	0	0	4
Mountain	5	2	3	2	4	4	3	[7] 2	5	6
Pacific	10	14	11	14	23	34	18	47	43	[8] 14

SCARLET FEVER CASES

Total	795	938	1,021	1,153	1,097	1,238	1,283	1,488	1,735	1,722
New England	99	121	96	114	135	155	176	219	[1] 235	222
Middle Atlantic	168	213	298	354	330	365	389	389	513	529
East North Central	176	214	256	270	262	303	307	346	415	[2] 415
West North Central	227	253	216	225	220	228	245	297	302	[3] 290
South Atlantic	48	57	57	67	58	72	63	[4] 83	124	[5] 106
East South Central	11	14	24	29	14	17	10	[6] 28	19	42
West South Central	16	17	15	25	18	14	20	27	35	40
Mountain	19	13	19	19	20	24	15	[7] 31	17	25
Pacific	31	36	40	50	40	60	58	68	75	[8] 53

[1] Figures for Worcester, Mass., estimated. Reports not received at time of going to press.
[2] Figures for Fort Wayne, Ind., estimated.
[3] Figures for Topeka, Kans., estimated.
[4] Figures for Norfolk, Va., estimated.
[5] Figures for Raleigh and Winston-Salem, N. C., estimated.
[6] Figures for Memphis, Tenn., estimated.
[7] Figures for Reno, Nev., estimated.
[8] Figures for Los Angeles and Sacramento, Calif., estimated.

Summary of weekly reports from cities, October 12 to December 20, 1124—Con.

SMALLPOX CASES

	1924, week ended—									
	Oct. 18	Oct. 25	Nov. 1	Nov. 8	Nov. 15	Nov. 22	Nov. 29	Dec. 6	Dec. 13	Dec. 20
Total	99	134	134	138	192	188	213	319	236	248
New England	0	0	0	0	0	0	0	0	[1] 0	0
Middle Atlantic	0	5	2	4	0	5	9	9	1	3
East North Central	30	19	16	6	11	14	19	13	18	[2] 20
West North Central	27	64	70	82	100	85	114	201	123	[3] 101
South Atlantic	0	3	1	3	7	6	3	[4] 22	19	[5] 8
East South Central	15	11	9	8	12	21	13	[6] 29	31	55
West South Central	3	2	2	2	8	6	7	4	3	11
Mountain	2	3	0	1	7	2	1	[7] 2	2	3
Pacific	22	27	34	32	47	49	47	39	39	[8] 47

TYPHOID FEVER CASES

Total	159	136	106	124	107	133	161	255	237	307
New England	8	6	5	7	5	5	9	12	[1] 6	12
Middle Atlantic	47	40	35	23	33	46	90	140	134	199
East North Central	17	14	11	14	11	15	10	30	43	[2] 45
West North Central	11	5	9	9	3	8	2	4	8	[3] 7
South Atlantic	20	22	13	21	10	14	15	[4] 27	17	[5] 15
East South Central	12	21	12	14	20	14	19	[6] 18	10	9
West South Central	12	12	6	18	11	13	8	13	11	12
Mountain	23	10	5	9	8	2	2	[7] 1	2	1
Pacific	9	6	10	9	6	16	6	10	6	[8] 7

INFLUENZA DEATHS

Total	20	18	35	38	43	41	56	63	91	84
New England	1	1	1	5	0	2	2	7	[1] 2	6
Middle Atlantic	11	9	21	23	17	17	15	21	43	33
East North Central	3	5	5	5	5	7	15	13	18	[2] 12
West North Central	2	0	0	0	0	0	3	2	2	[3] 4
South Atlantic	1	2	3	3	4	6	7	[4] 5	11	[5] 11
East South Central	1	0	1	1	4	2	5	[6] 4	4	4
West South Central	1	0	3	1	7	3	5	6	7	8
Mountain	0	0	0	0	1	4	2	[7] 3	3	5
Pacific	0	1	1	0	5	0	2	2	1	[8] 1

PNEUMONIA DEATHS

Total	497	479	593	636	676	646	701	832	863	917
New England	28	27	42	33	35	38	58	51	[1] 45	54
Middle Atlantic	221	227	270	305	294	301	300	371	397	377
East North Central	90	77	95	109	116	122	126	155	168	[2] 195
West North Central	23	20	28	29	32	36	34	29	40	[3] 29
South Atlantic	50	65	87	75	83	57	83	[4] 91	86	[5] 120
East South Central	19	13	21	24	46	36	43	[6] 39	38	52
West South Central	16	17	21	22	34	20	21	32	35	32
Mountain	22	16	6	8	10	15	13	[7] 23	21	29
Pacific	28	17	23	31	26	21	23	41	33	[8] 29

[1] Figures for Worcester, Mass., estimated. Reports not received at time of going to press.
[2] Figures for Fort Wayne, Ind., estimated.
[3] Figures for Topeka, Kans., estimated.
[4] Figures for Norfolk, Va., estimated.
[5] Figures for Raleigh and Winston-Salem, N. C., estimated.
[6] Figures for Memphis, Tenn., estimated.
[7] Figures for Reno, Nev., estimated.
[8] Figures for Los Angeles and Sacramento, Calif., estimated.

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

Group of cities	Number of cities reporting cases	Number of cities reporting deaths	Aggregate population of cities reporting cases	Aggregate population of cities reporting deaths
Total	105	97	28, 898, 350	28, 140, 934
New England	12	12	2, 098, 746	2, 098, 746
Middle Atlantic	10	10	10, 304, 114	10, 304, 114
East North Central	17	17	7, 032, 535	7, 032, 535
West North Central	14	11	2, 515, 330	2, 381, 454
South Atlantic	22	22	2, 566, 901	2, 566, 901
East South Central	7	7	911, 885	911, 885
West South Central	8	6	1, 124, 564	1, 023, 013
Mountain	9	9	546, 445	546, 445
Pacific	6	3	1, 797, 830	1, 275, 841

23310°—25†——4

FOREIGN AND INSULAR

BOLIVIA

Smallpox—Typhus Fever—La Paz—November, 1924

During the month of November, 1924, 12 cases of smallpox with 7 deaths, and 2 cases of typhus fever were reported at La Paz, Bolivia. Total mortality from all causes, 241. Population, estimated, 100,000.

ECUADOR

Mortality—Communicable Diseases—Quito—November, 1924

During the month of November, 1924, 121 deaths from all causes were reported at Quito, Ecuador, including dysentery, 9 deaths; malaria, 1 death; typhoid fever, 1; tuberculosis, 8; whooping cough, 5. Deaths of infants under 1 year of age, 34.

Plague, Smallpox—Guayaquil—November 16–30, 1924

During the period November 16 to 30, 1924, 2 cases of smallpox and 6 cases of plague were reported at Guayaquil, Ecuador. During the same period 8,802 rats were reported taken at Guayaquil, and 19 rats were found infected.

ESTHONIA

Communicable Diseases—October, 1924

During the month of October, 1924, 43 cases of diphtheria, 23 of scarlet fever, 125 cases of typhoid fever, and 22 of paratyphoid fever were reported in the Republic of Esthonia. Estimated population, 1,107,059.

FINLAND

Communicable Diseases—November 16–30, 1924

During the period November 16 to 30, 1924, 72 cases of diphtheria, 2 of lethargic encephalitis, 86 of paratyphoid fever, and 20 of typhoid fever were reported in Finland. Estimated population, 3,402,593.

MADAGASCAR

Plague—October 16–31, 1924

During the period October 16 to 31, 1924, 36 cases of plague with 33 deaths were reported in the Province of Tananarive, Island of Madagascar.

CHOLERA, PLAGUE, SMALLPOX, AND TYPHUS FEVER

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

Reports Received During Week Ended January 9, 1925[1]

CHOLERA

Place	Date	Cases	Deaths	Remarks
Ceylon:				
Colombo	Nov. 16–22	1		
India				Oct. 26–Nov. 1, 1924: Cases, 2,653; deaths, 1,623.
Siam:				
Bangkok	Nov. 19–25	2		

PLAGUE

Ceylon:				
Colombo	Nov. 16–22	2	1	One plague rodent.
Ecuador:				
Guayaquil	Nov. 16–30	6	2	Rats taken: 8,802; found infected, 19.
Egypt				Jan. 1–Dec. 2, 1924: Cases, 361. Corresponding period, year 1923—cases, 1,448.
City—				
Alexandria	Dec. 4	1	1	Bubonic.
Port Said	Dec. 1	1	1	
Suez	Dec. 3	1	1	
India				Oct. 26–Nov. 1, 1924: Cases, 2,667; deaths, 1,990.
Rangoon	Oct. 26–Nov. 1	2	3	
Java:				
Cheribon	Oct. 14–20		10	
Pekalongan	do		5	
Tegal	do		3	
Madagascar				Oct. 16–31, 1924: Cases, 36; deaths, 33.
Tananarive Province	Oct. 16–31	36	33	
Tananarive Town	do	2	2	Bubonic.
Other localities	do	34	31	Bubonic, 15; pneumonic, 7; septicemic, 9.
Straits Settlements:				
Singapore	Nov. 9–15	1	1	

SMALLPOX

Bolivia:				
La Paz	Nov. 1–30	12	7	
Canada:				
British Columbia—				
Vancouver	Dec. 14–20	11		
China:				
Amoy	Nov. 16–22			Present.
Antung	Nov. 17–23	1		
Ecuador:				
Guayaquil	Nov. 16–30	2		
Egypt:				
Alexandria	Nov. 12–18	1		
Gibraltar	Dec. 8–14	1		
India				Oct. 26–Nov. 1, 1924: Cases, 587 deaths, 173.
Bombay	Dec. 19–25	10	3	
Rangoon	Oct. 26–Nov. 1	12	2	
Java:				
East Java—				
Soerabaya	Oct. 26–Nov. 1	93	39	
West Java—				
Province—				
Bantam	Oct. 14–20	2		One locality.
Batavia	Nov. 8–14	1		
Cheribon	Oct. 14–20	2		Do.
Pekalongan	Oct. 14–20	12		Two localities.
Mexico:				
Mexico City	Nov. 23–29	1		
Vera Cruz	Dec. 6–13	2		
Spain:				
Cadiz	Nov. 1–30		34	
Malaga	Oct. 31–Nov. 13		40	
Tunis:				
Tunis	Dec. 2–15	19	15	

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

CHOLERA, PLAGUE, SMALLPOX, AND TYPHUS FEVER—Continued

Reports Received During Week Ended January 9, 1925—Continued

TYPHUS FEVER

Place	Date	Cases	Deaths	Remarks
Bolivia:				
La Paz	Nov. 1-30	2		
Chile:				
Talcahuano	Nov. 16-29		4	10 cases (estimated) present Nov. 22.
Valparaiso	Nov. 25		1	
Mexico:				
Mexico City	Nov. 9-29	29		
Poland				Sept. 28-Oct. 4, 1924; Cases, 28; deaths, 1. Recurrent fever, cases, 4.
Turkey:				
Constantinople	Nov. 15-21	3		
Union of South Africa:				
East London	Nov. 16-22	1		

Reports Received from December 27, 1924, to January 2, 1925 [1]

CHOLERA

Place	Date	Cases	Deaths	Remarks
India				October 19-25, 1924: Cases, 2,647; deaths, 1,596.
Calcutta	Oct. 26-Nov. 15	27	21	
Madras	Nov. 16-22	14	11	

PLAGUE

Place	Date	Cases	Deaths	Remarks
Azores:				
Ponta Delgada	Dec. 6-12	9	5	
Ceylon:				
Colombo	Nov. 9-15	2	2	
India				Oct. 19-25, 1924: Cases, 2,593; deaths, 1,952.
Rangoon	Nov. 2-8	1	1	

SMALLPOX

Place	Date	Cases	Deaths	Remarks
British South Africa:				
Northern Rhodesia	Oct. 28-Nov. 3	24	2	In natives.
Canada:				
Manitoba—				
Winnipeg	Dec. 7-13	4	0	
China:				
Amoy	Nov. 9-15			Present.
Foochow	Nov. 2-8			Do.
Great Britain:				
England and Wales	Nov. 23-Dec. 6	184	0	
India				Oct. 19-25, 1924: Cases, 838; deaths, 153.
Bombay	Nov. 2-8	4	3	
Calcutta	Oct. 26-Nov. 15	53	34	
Karachi	Nov. 16-22	2	1	
Madras	do	10	4	
Rangoon	Nov. 2-8	5	2	
Iraq:				
Bagdad	Nov. 9-15	1	1	

[1] From medical officers of the Public Health Service, American consuls, and other sources. For reports received from June 28 to Dec. 26, 1924, see Public Health Reports for Dec. 26, 1924. The tables of epidemic diseases are terminated semiannually and new tables begun.

CHOLERA, PLAGUE, SMALLPOX, AND TYPHUS FEVER—Continued

Reports Received from December 27, 1924, to January 2, 1925—Continued

SMALLPOX—Continued.

Place	Date	Cases	Deaths	Remarks
Java:				
East Java—				
Soerabaya	Oct. 19–25	119	32	
West Java				Oct. 26–Nov. 7, 1924: Cases 2.
Mexico:				
Vera Cruz	Dec. 1–14	0	6	
Spain:				
Valencia	Nov. 30–Dec. 6	2	0	
Syria:				
Aleppo	Nov. 23–29	1	0	
Tunis:				
Tunis	Nov. 25–Dec. 1	14	8	
Union of South Africa:				
Orange Free State	Nov. 2–8			Outbreaks.

TYPHUS FEVER

Egypt:				
Cairo	Oct. 1–14	3	2	
Palestine	Nov. 12–24	3		

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