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## DRINKING WATER COOLERS ON COMMON CARRIERS

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The danger connected with the human consumption of polluted drinking water has long been recognized, and for many years water has ranked of first importance as a carrier of disease. Water in frozen form has similar possibilities as a disease spreader and, therefore, it should also be the given consideration commensurate with the inherent danger. Much sickness has been attributed to the failure to control properly the quality of ice, but this is not surprising when it is considered that ice is frequently taken into the stomach either in its natural state or after melting and being mixed with some other food or drink. Even though the quality of ice may be beyond reproach directly after it is manufactured or harvested, the manner in which it is handled during transportation from the warehouse to the ultimate point of consumption may nullify all of the effort put forth to produce a good and pure product.

The importance of pure ice and its proper and sanitary handling and their relationship to pure drinking waters on cars and vessels operating in interstate traffic was first taken under official consideration when the 1894 issue of the interstate quarantine regulations was revised. This finished revision was published in 1916 and contained the following paragraph on this subject:

Section 13: (b) Ice used for cooling such water shall be clear natural ice or ice made from distilled water or water certified as aforesaid, and before the ice is placed in the water it shall be first carefully washed with water of known safety, and handled in such manner as to prevent its becoming contaminated by the organisms of infectious or contagious diseases: *Provided*, That the foregoing shall not apply to ice which does not come in contact with the water which is to be cooled.

This provision represented a step forward, but it was insufficient. It was obvious that under this regulation many efficient and understanding common carriers would exercise the utmost precaution to keep their ice, and consequently, the drinking water, on their conveyances, pure, but that also many would fail to do so. Even though the strictest orders concerning handling and cleansing ice might be issued from the headquarters of a carrier, still there would always be the possibility that careless or shiftless employees might fail to carry out such orders either intentionally or by mistake. Such action unquestionably would result in the contamination of the ice, and,

after it had been placed in the cooler, of the water also. Under this provision there always existed that weak link in the chain of furnishing pure water in the form of a partially uncontrollable personal factor; and, therefore, when the regulations next were revised, this section again was changed.

In May, 1921, the next revision of the interstate quarantine regulations appeared and the matter of contaminating drinking water by inserting in it impure or dirty ice was covered in the last sentence of paragraph d, section 19, reading as follows:

Water cooled for drinking purposes shall be cooled in such manner that ice can not come into contact with such water.

This was a positive statement and left no recourse to the carriers except to replace or rebuild such water coolers as were of a design which would permit an intermingling of the water and the ice used for cooling it. The Public Health Service is charged with the duty of preventing the interstate spread of disease, and this regulation was considered a suitable means of contributing to the execution of this duty and of guaranteeing the adequate protection of the health of the traveling public so far as water-borne diseases are concerned.

Enforcement of this provision of the 1921 regulations did not begin until November 16, 1922, at which time the following letter was sent by the Surgeon General to all railroads then falling within the scope of these regulations:

*To Railroad Officials:*

Your attention is invited to the fact that the requirement of the revised Interstate Quarantine Regulations of the United States, that water used by common carriers for drinking and culinary purposes on cars shall be cooled in such manner that ice can not come in contact with the water, will be strictly enforced in the case of all new equipment placed in use by common carriers. In regard to present equipment this requirement, however, will not be strictly enforced until July 1, 1924, by which time the carriers will be expected to have made the necessary improvements on all equipment now in use.

In order that proper records may be kept of the installation of separate ice and water-compartment coolers on all cars having coolers, it is requested that the following information be furnished the Surgeon General of the United States Public Health Service at the earliest possible date:

Cars in use	Total number	Number with old type coolers	Number with separate compartment ice and water coolers
Coaches.....			
Caboose and other freight.....			
All others <sup>1</sup> .....			

<sup>1</sup> In this group should be included dining, café, club, passenger-baggage, passenger-baggage-mail, baggage, baggage-mail, officers, lunch, parlor, passenger-mail, express, express refrigerator, chair, kitchen, business, sleeping, milk, tourist, and colonist, etc., except cars used only for mail. INSERT THE WORD "NONE" IN EACH SPACE WHERE NECESSARY.

Have separate compartment ice and water coolers been ordered to replace old type coolers?

Similar information will be requested on July 1, 1924, and July 1, 1925.

This step was not taken until its effect on the country's railroad system was considered carefully and only after advice had been requested from such organizations as the American Railway Association, which is vitally interested in all matters affecting its membership. It is to be noted that this first circular letter stressed the point that this provision in the regulations would be enforced at once in the case of all new equipment, but that the work of changing old equipment would not have to be completed until July 1, 1924.

After the circular letter of November 16, 1922, had been sent out, there was seen to be a lack of exact knowledge among the railroads as to what types of cars were affected by this provision. To explain several of these details another circular letter was sent on March 12, 1923. This letter read as follows:

*To Railroad Officials:*

With reference to the attached Bureau Circular Letter of November 16, 1922, regarding water coolers on cars, your attention is invited to the following points:

(1) The Interstate Quarantine Regulations of the United States do not require that any or all rolling equipment shall be provided with drinking water containers; that is left to the railroads as a matter of operation.

(2) The Regulations, furthermore, do not require that water be cooled; that, also, is left to the railroads as a matter of operation.

(3) The Regulations do provide, however, that where water containers are supplied on cars by the railroad management as standard equipment, they should be in accordance with the requirements; in other words, the containers should be so arranged that ice can not come in contact with the water.

(4) When cars are used for camp cars, or for construction units, such cars are considered from an administrative viewpoint as being on the same status as homes and, accordingly, not subject to the cooler requirements. Locomotives are placed in the same class.

(5) In order that definite and complete information may be available to the Bureau, either a number or the word "None" should be inserted in the table on the attached circular letter opposite each class of car and in each column.

(6) PLEASE RETURN ONE COPY OF THE CIRCULAR LETTER OF NOVEMBER 16, 1922, PROPERLY FILLED OUT IN EVERY RESPECT.

The two letters reproduced above brought from railroad companies a large number of plans which were carefully reviewed, and in each case an attempt was made to point out to the submitting carrier the defects of the design, or, if the design was satisfactory, so to advise the carrier submitting it.

To maintain an interest in this work and to obtain advice as to its progress, there was forwarded to all railroads, on September 15, 1923, another circular letter, which was of the same form as that sent to them on November 16, 1922. The inquiries and plans received up to that time from the carriers suggested that a clear outline of some of

the more desirable features of proper cooler design was needed. Therefore a circular letter, printed below, was prepared on this subject and transmitted to them with the circular letter of September 15, 1923:

### WATER COOLERS ON TRAINS

#### *To Railroad Officials:*

For your information in considering designs for new, or changes in present, drinking-water cooler equipment for railroad cars, to comply with the Interstate Quarantine Regulations of the United States, I wish to invite your attention to the following paragraphs:

**WATER SYSTEMS FOR RAILROAD CARS.**—From a careful study of the various water systems for railroad cars, it would seem that both from the standpoint of public health and from that of railroad safety and economy, the gravity system and the pressure system having closed storage tanks which are filled from outside and underneath the cars afford the best protection against contamination of the water. It is preferable that the drinking-water storage tanks be separate from all other water tanks on the car; but if water from certified sources of supply can be obtained at convenient intervals, there is no objection to a common storage tank for the entire water supply system aboard. The outside underneath connection on the car through which water is supplied to the storage tank should be on the opposite side of the car from the toilet outlet, so that when the hose connections are made the danger of polluting the hose or pipe ends by toilet discharges may be eliminated. It is realized that on old equipment it may not be practicable to install gravity or pressure storage tanks, but it is desirable that all new cars should be so equipped.

**DRINKING WATER COOLERS.**—With the gravity or pressure system, the water compartment of a cooler should be entirely closed except for the inlet, the drain, and the spigot connections. Coolers watered by a pail or a hose from inside the car should have as small an opening to the water compartment as will accommodate the discharge nozzle of the filling device. To prevent insertion of the hose or the container nozzle into the water compartment, the opening to same should be obstructed by a coarse wire or a perforated plate. The cover to the funnel or filling attachment at the opening to the water compartment should be tight fitting, self-closing, and difficult for unauthorized persons to open. Covers to water compartments should be fixed so that they can not be removed except for repair purposes.

The coolers should have separate inlets to the ice and water compartments. Where a common entrance is provided, as on many of the old type two-compartment coolers, ice is frequently put in both compartments, either through intent or by mistake. A door in the front for icing and a small opening at the top for watering are simple and convenient arrangements for coolers supplied by pail or hose from inside the car. Icing from overhead is dangerous and expensive.

Both the water and ice compartments of coolers should be equipped with drains of sufficient size to insure rapid draining when the compartments are flushed and rinsed weekly. Obviously drains should be at the bottom of the compartments, and valves to same should be conveniently accessible. The spigot in the front of a cooler is not adequate for draining purposes. A siphon in the ice compartment may prove practicable, especially on trains operated in cold climates. With intermittent discharging of melted ice water instead of the continuous drip, the opportunity for the formation of icicles on the discharge line under the car, which may clog it, is lessened.

It is believed that some sort of false bottom should be provided for the ice compartment to take up the impact when chunks of ice are dropped in and to prevent straining of the joint between the water and ice compartments. The shaving of ice instead of cutting in chunks is said to be a more convenient method of handling as well as more economical.

In drawing up specifications for coolers, much attention should be given to the material used and to the quality of workmanship. As much of the ice purchased by railroads is made from distilled water which has solvent properties, careful consideration should be given to the materials of which the coolers are constructed. It is believed that, as far as possible, the joints should be overlapping and well soldered. At places subject to strain, reinforcement by rivets, together with soldering, is desirable.

It is recommended that, before contracts are let for coolers, blue prints showing the proposed design of same be submitted to the Public Health Service for review.

That the issuance of this last letter of explanation was successful was immediately demonstrated by the railroads; for, during the last few months of 1925, a large number of plans were forwarded to the Public Health Service for review and approval. These plans showed that the carriers were glad to follow out the suggestions given them and that they were willing to cooperate in rebuilding old coolers for the sake of the public health. Incidentally, the appeal of increased operating economy through ice saving should not be overlooked in this connection. Reviewing the plans submitted by the companies wishing constructive criticism was a task of some magnitude for the personnel available, because there were received approximately 500 different plans of water coolers. These plans are now all carefully filed and indexed and can be referred to at any time.

The expense of remodeling old coolers had to be considered carefully by many companies whose income at that time was barely equal to operating expenses, and hence it was thought to be highly advisable to avoid the necessity of changing coolers in the future. To reach this end, the assistance and cooperation of all car and cooler building companies were sought. In the case of the car-building companies, the entire program as planned by the Public Health Service was placed before them and their cooperation was enlisted in installing only water coolers of satisfactory design on all cars then being built and those to be built in the future. These companies agreed with the principles given to them and changed their plans so that they would be in accord with the specifications suggested.

Manufacturers of water coolers were even more generous in their proffer of cooperation. They transmitted their revised plans for approval before offering for sale the products of their factories. In that way corrections were made in the plans before the coolers were built, which procedure unquestionably reacted favorably toward the objective of the Public Health Service and was without doubt instrumental in increasing the sales of these companies, because they

were able to offer to railroads designs of coolers which already had been drawn to meet the necessary specifications. Several companies engaged in this kind of manufacturing not only revised their plans but went so far as to assist in explaining the value of the new style cooler to the railroads, pointing out the advantages from the standpoint of public health and also from that of economy.

Before this program was long under way the question of jurisdiction over cars used exclusively for mail purposes arose. The Public Health Service collaborated with the Railway Mail Service in revising its specifications so that the cooler requirements would be practically the same for all cars, and set forth the policy that such cars were entirely under the control of the latter service.

In the circular letters sent out on November 16, 1922, and September 15, 1923, data were requested which would indicate the progress being made in the remodeling of existing unsatisfactory coolers. The information obtained in response to these letters was far from complete and was not of such character as to permit a complete analysis of it. Of the 621 letters sent out on November 16, 1922, replies were received from 399, or 64 per cent. These replies showed, in accordance with the classification given in that letter, that there were still 46,985 single-compartment coolers of the old style being used, and that 28,698 coolers conformed to the requirements of the Interstate Quarantine Regulations. In other words, out of a total of 75,685 coolers reported upon, 38 per cent were of satisfactory construction. On September 15, 1923, letters were sent to 620 railroads, and of that number, 325, or 52 per cent, replied. This time the carriers reported on 49,182 coolers and the replies indicated that of these, 24,581, or 50 per cent, were of an approved design. Although the number of companies heard from in the second report was less than that in the first, and the total number of coolers reported upon was smaller, the increase in the percentage of coolers of satisfactory design was from 38 to 50 per cent. This indicated that the railroads were making considerable progress toward compliance with the regulations.

The expiration of the time for completing the remodeling of old coolers had been set for July 1, 1924. Before that date a number of companies had made representations to the Public Health Service to the effect that it would be impossible for them to complete the work by that time. The Public Health Service realized that this work had to be done as cars were shopped for major repairs or routine overhauling, and that to change this accepted plan of work would bring about a hardship on the railroads by disorganizing their regular traffic plans. Therefore, on June 30, 1924, an extension of time until January 1, 1925, was granted. This was done with a full and complete understanding that no additional time would be allowed.

Two months before the expiration of the time, or on November 1, 1924, another brief letter was sent to the railroad companies stating that the time limit would expire on the first of the year 1925.

From November 1, 1924, until October 1, 1925, no further action was taken relative to obtaining progress reports; but on the latter date a circular letter, with a table attached, was forwarded to each railroad then falling within the scope of the Interstate Quarantine Regulations. This letter asked for a report on the completeness with which cars had been provided with satisfactory types of coolers and transmitted with it were blank forms on which the report was to be made. The form classified the conveyances as coaches, cabooses, other passenger equipment, and other freight equipment, and for each of these classes the following data were requested:

- (1) Number of class reportable.
- (2) Total number of coolers regardless of style of construction on cars of class.
- (3) Number of coolers on cars of class satisfactorily constructed.
- (4) Number of coolers on cars of class yet to be constructed satisfactorily.

This letter was intended to be the last request for data on the completeness of this work, and at the time of this writing it has been proved to be all that was necessary. A few carriers have not as yet furnished their statement, but each of these will be handled as an individual case.

Analyzing a tabulation of the final reports on this work, it is found that a total of 563 railroads were circularized, and that of this number, 32, or less than 6 per cent, failed to submit any report whatsoever. However, an examination into these nonreporting railroads shows that each of them has but a very short mileage and, consequently, can have but few reportable cars. It is possible also that some of these companies have ceased to operate since the inception of this work, although the Public Health Service has not as yet been able definitely to ascertain that such is the case. Of the companies reporting, 112 were found to be without the province of the work and consequently can be disregarded. This status for these companies was determined by noting the following on their reports: Forty-six stated that no drinking or culinary water was placed on their cars, and hence no coolers were needed; 43 advised that no ice was used for cooling and that the necessity for remodeling coolers therefore did not exist; and the remaining 23 reported that their lines had been abandoned or that their cars were leased and that reports on them would be covered by the parent company, or gave some similar but valid reason for furnishing no data.

A consolidation of all the data given by the railroads reporting shows the following:

Number of cars reportable.....	69, 414
Total number of coolers regardless of style of construction on cars.....	101, 684
Number of coolers on cars satisfactorily constructed.....	97, 670
Number of coolers on cars yet to be constructed satisfactorily.....	4, 014

The incompleted work represented by the total, 4,014, was distributed over 56 railroads in the following manner:

Nine companies, each of which reported over 100 coolers, stated that on their equipment 22,694 coolers were carried, and of these there remained 3,533, or 16 per cent, to be remodeled.

Forty-seven companies, each reporting less than 100 coolers, carried on equipment 5,491 coolers, of which 481, or 9 per cent, still had to be rebuilt. Varying percentages of incompleteness in this work were found up to the maximum, in the case of one company, of 44; but it is obvious that the largest amount of incomplete work can be traced to the group of nine companies mentioned above.

From the above tabulation it would appear that the coolers still to be satisfactorily constructed comprise 3.9 per cent of all those reportable. An analysis of this figure, however, shows that this is not exactly the case. Of the number reported, 2,684 can be disregarded, since they were on cars which had been retired from active service and which, if ever used again, would need extensive reconditioning, or which since have been reported as having been remodeled. This leaves but 1,330 coolers which, at the date of this writing, have not been reported as having been rebuilt to conform with the provisions of Interstate Quarantine Regulations. This low figure represents 1.3 per cent of the total number of coolers reported as existing on cars operating in interstate traffic. It is believed that inquiry at the present time into the status of the few coolers reported during this survey as not being usable under the Interstate Quarantine Regulations will now show them to have been rebuilt.

Field personnel of the Public Health Service have been making inspections from time to time of coolers on cars in transit or in coach yards, and, with a few exceptions, those found in use were designed satisfactorily. Field work of this character will be continued. In addition, this entire program will be carried on until assurance is had that all common carriers have completed their individual quota of work.



## THE AGE CURVE OF ILLNESS<sup>1</sup>

### Hagerstown Morbidity Studies No. IV

By EDGAR SYDENSTRICKER, *Statistician, United States Public Health Service*

Records of sickness collected in the United States since the interest of sanitarians and actuaries in this development of vital statistics was aroused some 10 years or more ago are confined almost entirely to special groups of individuals or to special types and causes of illness. This limitation is a natural and justifiable one for the reason that sickness data were needed for specific purposes. Thus, a large volume of disability experience for persons employed in industrial establishments has been made available from records of sick-benefit organizations and industrial medical service and in the course of studies of industrial hazards; a beginning has been made in recording the illnesses from various causes among children at school as an aid to better school hygiene administration, as well as for purposes of research; the notification of communicable diseases has been considerably improved; and comprehensive and illuminating sickness surveys have been made by various agencies and organizations. With the exception of certain surveys, notably those made by the Metropolitan Life Insurance Co., the records of sickness do not extend to the entire range of age nor to persons not at school or not employed. Moreover, these surveys recorded only the *prevalence* of sickness due to various causes at a given date and throw little light on the frequency or *incidence* of sickness among persons of different ages and sexes who constitute the general population. Some of these limitations may be said to apply to the well-known sickness experience of the Leipzig Local Sick Fund and of the other European insurance systems.

One of the principal purposes of the morbidity study conducted in Hagerstown, Md., was to determine the frequency of sickness among persons in a fairly typical population of different sexes and ages, and thus to make a small contribution of the kind the desirability of which is indicated by the considerations mentioned above. The scope and method of this study have been set forth rather fully in the general report already published (1); but, since we are dealing with groups of persons of different sexes and ages, Table 1 is intro-

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<sup>1</sup> From the Office of Statistical Investigations, U. S. Public Health Service. Other Hagerstown morbidity studies published are—

- I. A Study of Illness in a General Population Group: Method of Study and General Results. Pub. Health Rep., vol. 41, No. 39, Sept. 24, 1926. (Reprint No. 1113.)
- II. The Reporting of Notifiable Diseases in a Typical Small City. Pub. Health Rep., vol. 41, No. 41, Oct. 8, 1926. (Reprint No. 1116.)
- III. The Extent of Medical and Hospital Service in a Typical Small City. Pub. Health Rep., vol. 42, No. 2, Jan. 14, 1927. (Reprint No. 1134.)

duced to show the size of the experience in each sex and age group upon which the results presented in this particular communication are based.

TABLE 1.—*Number of white persons observed for the incidence of illness in Hagerstown, Md., December 1, 1921–March 31, 1924, expressed in terms of "years of life observed," and classified by sex and age*

Age, in years	Number of years of life observed		
	Both sexes	Males	Females
All ages <sup>1</sup> .....	16, 517	8, 001	8, 516
0-4.....	1, 777	942	835
5-9.....	2, 105	1, 063	1, 012
10-14.....	1, 713	846	867
15-19.....	1, 389	677	712
20-24.....	1, 136	523	613
25-29.....	1, 236	545	691
30-34.....	1, 235	581	654
35-44.....	2, 171	1, 038 <sup>1</sup>	1, 133
45-54.....	1, 676	822	854
55-64.....	900	428	472
65 and over.....	810	346	464

<sup>1</sup> Includes population of unknown age.

Although the majority of the population was observed throughout the period of the study, certain portions were observed for less than the entire period. The period of the study itself was 28 months, or approximately two and one-third years. In order, therefore, to state the results in terms of annual incidence rates it was necessary to resort to the familiar device of expressing the population as the number of "year-persons," or the number of "years of exposure," or, to state it more precisely, perhaps, the number of "years of life observed" within each sex-age category. The age groups are those commonly employed and include not less than 346 years of observation in any instance.

For the individuals comprising the various sex-age groups, records of illnesses were obtained during the period from December 1, 1921, through March 31, 1924. The definition of "illness" has already been discussed in a previous report, so that it is not necessary to elaborate upon it here. Briefly, the "illness" recorded was nothing more than that which is commonly understood by the word; the informants in the households regularly canvassed were questioned as to the illnesses which they had suffered and had observed in the members of their families during the preceding period of six to eight weeks. A considerable number of these illnesses were of short duration, but the great majority lasted more than two days; about 40 per cent of them not only caused disability, but resulted in confinement in bed.

Definitions of the terms "illness," "sickness," "morbidity," etc., obviously vary so much that it is very difficult to render comparable the results of different surveys and records, and perhaps the main

value of the data presented in this article lies in the fact that the records cover the entire span of life instead of being restricted to certain periods, as has been the case in other morbidity records. It is fair, also, to claim another distinctive merit for the data here presented, namely, that the individuals composed a general population group of persons not only at work and at school but also at home; it included invalids as well as those who were actively engaged in their occupations, and babies and children of preschool age as well as persons too old to engage in ordinary occupations. So far as the present investigators are aware, this is the first time that a morbidity age curve for the entire span of life in an ordinary population has been rendered available. The extensive sickness surveys made some years ago by the Metropolitan Life Insurance Co. were on a general population group, it is true; but it should be kept in mind that those studies were on the *prevalence* of sickness rather than on the *incidence* of sickness, and that some selection as to the class of population observed was probably made by virtue of the fact that industrial policyholders and their families were canvassed. Furthermore, the experience is not published in detail for the age period under 15 years of age. It is believed that the present study will supplement those excellent surveys in certain important respects.

In Table 2 the morbidity rate per 1,000 years of life observed is shown for each age group, and the rates have been plotted in Figure 1.

TABLE 2.—Incidence of illness from all causes among a group of white persons observed in Hagerstown, Md., December 1, 1921–March 31, 1924

Age, in years	Annual rate per 1,000	Number of illnesses	Age, in years	Annual rate per 1,000	Number of illnesses
0-4.....	1,588	2,822	30-34.....	920	1,136
5-9.....	1,554	3,270	35-44.....	924	2,606
10-14.....	1,187	2,034	45-54.....	1,009	1,691
15-19.....	764	1,062	55-64.....	959	863
20-24.....	712	809	65 and over.....	1,080	875
25-29.....	825	1,020			

Certain sections of the curve are already familiar. Thus, the records of disabling sickness among industrial workers have shown the gradual rise of morbidity from the ages 15–19 to about 60 years, and records of absenteeism from school on account of sickness have shown the drop in the morbidity rate during the age period 6–16. These variations are reflected in the curve plotted in Figure 1. But, although it was known that among children of school age the frequency of sickness decreased as age advanced, the extraordinarily high incidence of sickness shown in early childhood was a rather surprising result of this study. Illness was far more frequent under 10 years of age than at any other period of life. The sharp drop in

morbidity in the early adult ages was another striking indication, and the interesting suggestion is afforded that the average individual is most free from illness between the ages of 15-24. Thereafter, sickness becomes more frequent as age advances and, it may be added, upon the basis of other studies as well as of our own, sickness becomes

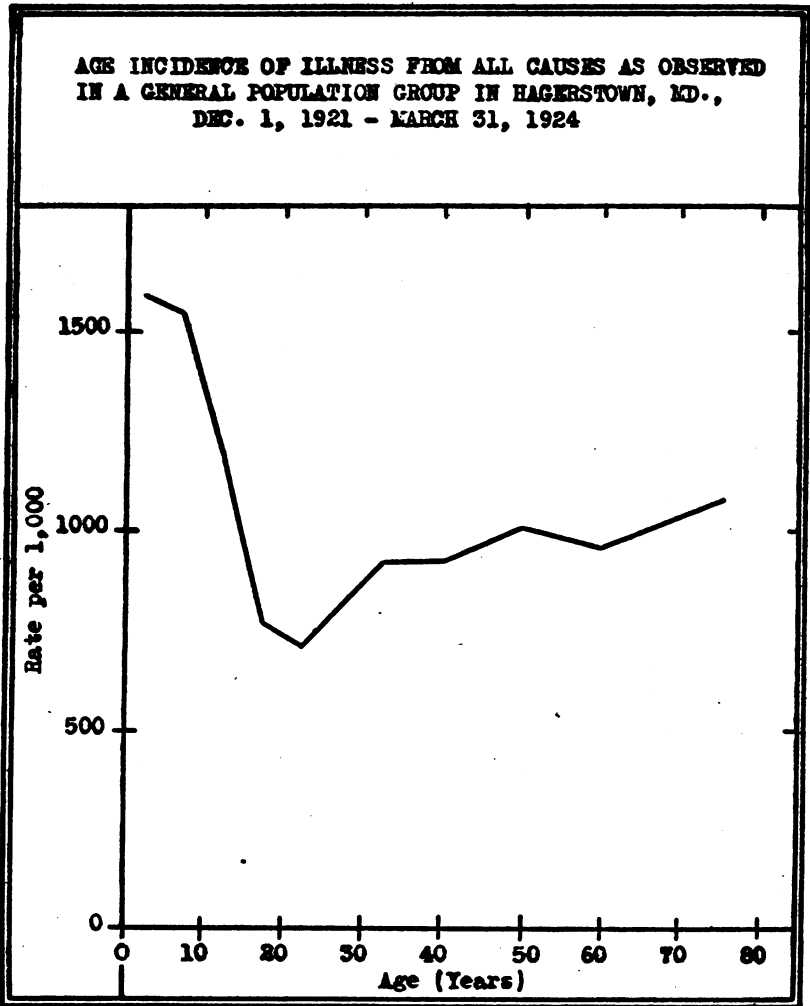


Fig. 1.

more severe and more frequently fatal. The classification of illnesses according to diseases and conditions at different ages, as well as a discussion of the prevalence of defects and diseases and the incidence of death, will be presented in a later paper.

For purposes of comparison, reference may be made to the age incidence of illness as shown by other experience. In Table 3 five series of rates are introduced.

**TABLE 3.—Sickness experience of several European and American societies and studies**

Age, in years	Annual rate per 1,000				
	Leipzig Local Sick Fund, 1887-1905	Manchester Unity Friendly Society, 1893-1897	Three steel manufacturing plants in the United States, 1916-1920	Workmen's Sick and Death Benefit Fund in United States, 1912-1916	Hagerstown, Md., illness study (white persons) Dec. 1, 1921-Mar. 31, 1924
0-4.....					1,588
5-9.....					1,554
10-14.....					1,187
15-19.....	367	286	162	313	764
20-24.....	371	245		248	712
25-29.....	375	235	160	234	825
30-34.....	400	236		222	920
35-39.....	420	241	167	225	924
40-44.....	450	255		231	
45-49.....	477	271	184	226	1,009
50-54.....	509	296		237	
55-59.....	530	337	236	257	959
60-64.....	587	399		278	
65-69.....	675	492	238	302	1,080
70-74.....	755	606		235	
75+.....	805	732			

<sup>1</sup> For the age period 75-79.    <sup>2</sup> For the age period 65 and over.    <sup>3</sup> For the age period 70 and over.

The first is the classic experience of the Leipzig Local Sick Fund for the years 1887-1905 (2). This experience differs considerably in essential respects from the Hagerstown experience (*a*) in that a selection by the Leipzig Fund was made of individuals who ordinarily were able to engage in wage-earning occupations,<sup>2</sup> and (*b*) in that a selection was made by the Leipzig Fund of sicknesses that were severe enough to disable the affected persons temporarily. In general, therefore, it is not surprising to note that the Leipzig rates are about one-half the Hagerstown rates. Furthermore, the Leipzig rates show a more rapid increase with age than do the Hagerstown rates, since the disabling sicknesses only are included. Since a larger proportion of sicknesses is disabling as age advances, the total illness rate tends to be similar to the disabling sickness rate in the older ages.<sup>3</sup>

The second experience shown is that of the equally well known Manchester Unity Friendly Society, covering the years 1893-1897 (3). This experience is limited to an even greater degree to severe illnesses than is the Hagerstown study or the Leipzig Fund, and the

<sup>1</sup> The proportion of the total insured who were "voluntary members" and not occupied was small.

<sup>2</sup> It must be kept in mind, however, that we are indulging in some very crude comparisons, since differences in sex, time, and other factors in the two experiences are not taken into account.

curve exhibits a slower rise during the ages 25-54, but a much more rapid rise after 55. The third series of rates is that for sicknesses causing a minimal absence of eight days in three large steel-manufacturing plants in the United States (4). The curve based on these rates

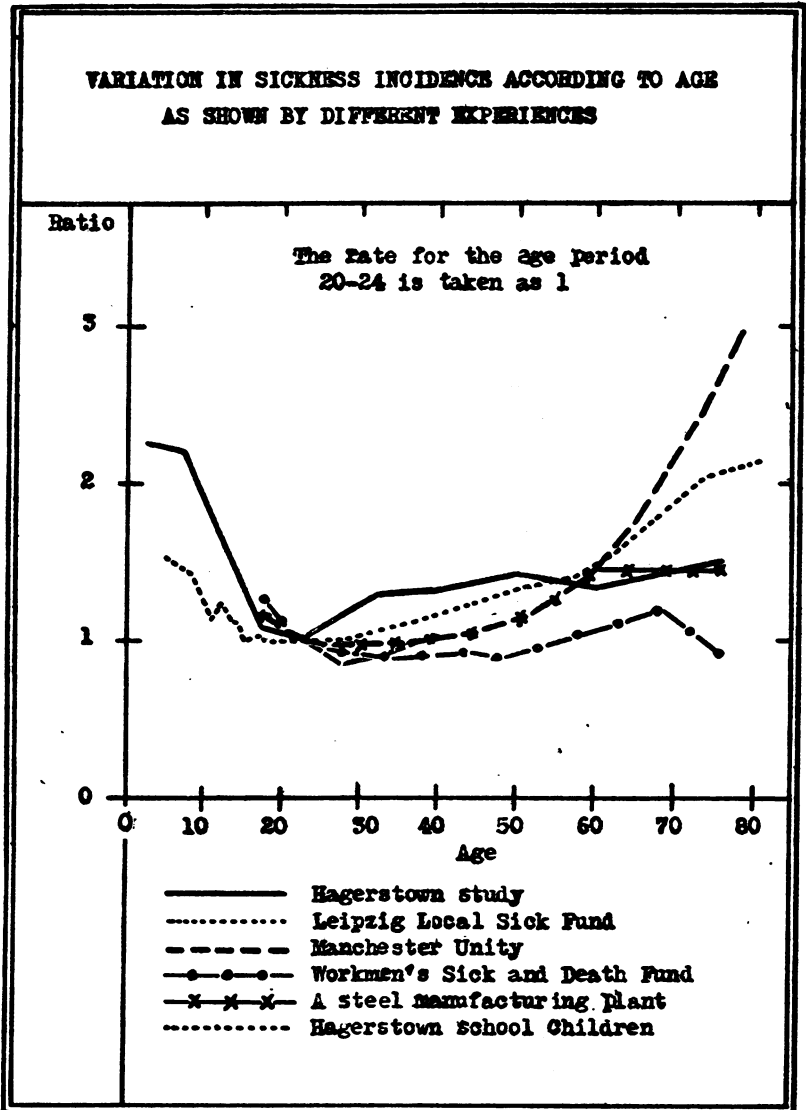


Fig. 2.

follows the Manchester Unity curve very closely except in the older ages; it does not show any considerable acceleration of increase in these ages for the reason that only those able to continue at work retain membership in the sick-benefit fund. Against these may be plotted a fourth curve, that of the sickness rates of the Workmen's

Sick and Death Benefit Fund of the United States of America (5); these apparently include sicknesses of fairly short duration and exhibit the usual rise in the older ages, but the rates in the young adult ages are *relatively* higher than those shown by the other experiences referred to.

Considering the age curves rather than the actual rates, it will be noted that the Hagerstown curve exhibits an earlier rise in the adult

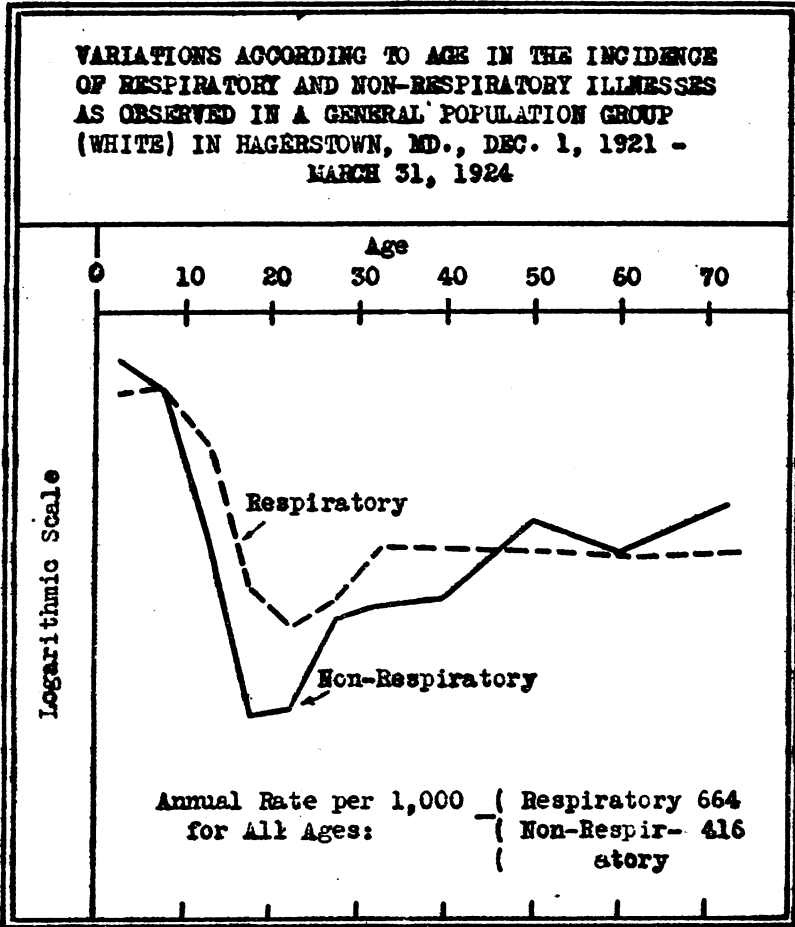


Fig. 3.

ages than do any of the others. This is due chiefly to the inclusion of illnesses of short duration, as will be shown later, among women and among persons not at work.

The high incidence of illness in childhood which is shown by the Hagerstown study is corroborated by the larger experience of the total white school population of Hagerstown which has been presented by Collins (6). It is summarized here in Table 4. Using the rate

for 20 to 24 years as a base, the relative variations have been plotted in Figure 2 along with the other age curves.

TABLE 4.—Sickness<sup>1</sup> rate among white school children of Hagerstown, Md., December, 1921, to May, 1923, inclusive

Age, in years	Rate per 1,000 per school year of 180 school days	Age, in years	Rate per 1,000 per school year of 180 school days
5-6.....	2,848	12.....	2,300
7.....	2,779	13.....	2,106
8.....	2,721	14.....	2,073
9.....	2,541	15.....	1,887
10.....	2,297	16 and over.....	1,995
11.....	2,134		

<sup>1</sup> Sickness resulting in absence from school. Data from Morbidity Among School Children in Hagerstown, Md. By Selwyn D. Collins. Pub. Health Rep., Sept. 19, 1924, Reprint No. 957, p. 5. Based on 17,847 school years of exposure.

Although it is not intended in this paper to deal with the specific causes and conditions which were responsible for illness at different ages, yet, in view of the fact which has already been set forth in this series that 60 per cent of the illnesses were respiratory, the age curve might be taken as reflecting chiefly the incidence of respiratory diseases and disorders rather than other and perhaps more important causes of morbidity. Hence, it is proper at this point to separate the illnesses into at least two groups—those due to respiratory diseases and conditions and those due to nonrespiratory diseases and conditions. The rates for each of these groups are given in Table 5 and are shown graphically in Figure 3, in which a logarithmic ordinate scale is employed.

TABLE 5.—Incidence of illness from respiratory and nonrespiratory causes among a group of white persons of different ages observed in Hagerstown, Md., December 1, 1921–March 31, 1924

Age, in years	Annual rate per 1,000		Number of illnesses	
	Respiratory	Non-respiratory	Respiratory	Non-respiratory
All ages <sup>1</sup> .....	664	416	10,972	6,875
0-4.....	921	668	1,636	1,186
5-9.....	935	619	1,967	1,303
10-14.....	786	402	1,346	688
15-19.....	525	239	730	332
20-24.....	467	245	531	278
25-29.....	507	318	627	393
30-34.....	589	330	728	408
35-44.....	587	337	1,275	731
45-54.....	588	421	986	706
55-64.....	576	384	518	345
65+.....	585	495	474	401

<sup>1</sup> Includes "unknown" age.



It will be observed that, in general, variations in the nonrespiratory curve are similar to those of respiratory illnesses; in fact, the variations in the nonrespiratory curve are more pronounced. The age period 15-24 is relatively more free from illnesses due to causes other than respiratory than from respiratory illnesses. The respiratory rate after 35 years of age is practically the same, but the nonrespiratory rate very definitely increases with age after the period 15-24.

The following question naturally suggests itself: Just what does this variation according to age in the morbidity rate mean? Does it mean that a greater proportion of persons in one age group were sick than in another age group, or does it signify that a certain proportion of one age group were sick more frequently than of another age group? Or do both conditions prevail?

Such questions as these will be answered more satisfactorily when the details of the causes and conditions of the illnesses recorded are before us, but a broad interpretation of one meaning of the morbidity curve is suggested by the distribution of the individuals within each age group according to frequency of illness during the period of observation. Hence, we have selected those individuals who were under observation for 26 months or longer, excluding children under 2 years of age, and have classified them into four groups—(a) those suffering no illness during the entire 26 months' period, (b) those ill only once, (c) those ill twice, and (d) those ill four or more times. The tabulation was made in greater detail, but this classification seems sufficient to indicate the general results, which are plotted in Figure 4.

TABLE 6.—Number and proportion of white individuals in Hagerstown, Md., observed for 26-28 months, who were free from illness or who suffered specified number of attacks, by age groups

Age, in years	Individuals suffering specified number of illnesses during 26 months							
	Per cent of total in each age group				Number in each age group			
	Not ill	Ill once	Ill twice	Ill 4 or more times	Not ill	Ill once	Ill twice	Ill 4 or more times
2-4	4.7	13.6	18.1	44.4	23	66	88	216
5-9	7.4	12.5	20.0	45.5	54	91	145	330
10-14	14.8	19.0	18.5	27.1	84	108	105	154
15-19	25.7	28.3	18.6	14.3	108	119	78	60
20-24	29.6	29.3	22.4	10.5	90	89	68	32
25-29	23.9	25.7	17.9	16.4	92	99	69	63
30-34	22.8	26.5	18.6	18.4	87	101	71	70
35-44	25.0	24.9	18.4	21.2	177	176	130	150
45-54	21.5	25.0	18.2	22.6	123	143	104	129
55-64	21.2	26.8	19.2	21.9	64	81	58	66
65+	15.7	28.7	22.0	20.0	47	86	66	60

Several interesting indications are afforded by the curves in Figure 4. The proportion of individuals who were not affected by illnesses for a period of 26 months, which included two and one-half winter

seasons, vary quite markedly according to age. Less than 5 per cent of children of 3 and 4 years of age were entirely free from illness of the kind that we are concerned with, and considerably less than 10 per cent of the children under 10 years of age suffered no illnesses during this period. The proportion of well persons increased rapidly from early childhood until the age period 20-24, where 30 per cent of the individuals did not suffer any illness of the

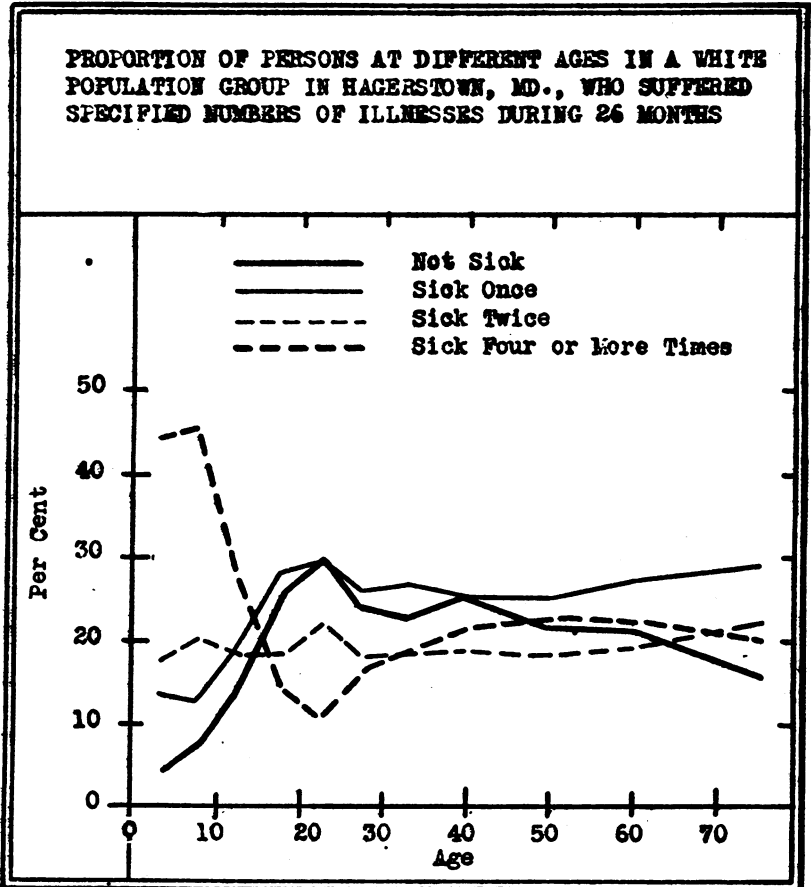


Fig. 4.

93.5.

kind we recorded; thereafter, the proportion decreased gradually until after the age group 55-64, the proportion of well persons was about 20 per cent and in the old-age period (65 and over) it dropped to 15 per cent.

This curve may be regarded as a rather unusual one, not only because we heretofore have not had the material upon which to base it, but also because of its implications which may be summed up in a general way by describing it as the "age curve of good health." It

is realized fully that this is a very broad statement, for some of the individuals who did not suffer from any illness or marked indisposition may have been affected by conditions actually causing serious impairment of health and which shortly after resulted in serious illness and perhaps death. But a record of over two years without an illness is not a poor indication of freedom from disease in so far as disease manifests itself in morbid effects. The curve at least describes the variation in the ability of the individual at different ages to resist the "attacks," whether these attacks be of disease or natural reactions to environment.

The curve representing the proportion of individuals who were sick only once during the 26 months' period follows rather closely the curve for those who were not sick at all, except in the older ages when, instead of decreasing, it tends to advance.

The converse of the "curve of good health" is found in the curve for the proportion of individuals who were sick four or more times in this period, or, roughly, twice a year. These individuals may be said to constitute a "sickly" group and contribute tremendously to the incidence of morbidity at certain ages. It will be observed that the proportion ill twice a year is nearly 45 per cent in childhood, drops rapidly until the age period 20-24 when it is only 10 per cent, then gradually rises until it reaches a level of approximately 25 per cent at the age period 35 years and over. It is perfectly obvious, of course, that the high incidence of morbidity among children, as shown in the curve in Figure 1, is due chiefly to the frequency of illness among a certain group of "sickly" children.

Curiously enough, when we plot the proportion of individuals in the various age groups who are sick twice during the 26 months' period, we obtain a graph which is almost without significant variation throughout the entire span of life; that is to say, about 20 per cent of the population in every age group is sick once a year.

The greatest variation, therefore, in the distribution of individuals according to the frequency with which they are attacked by illness is in the age of childhood, and in the ages 20-24. In the later adult years the number of "sickly" individuals does not appear to increase to a very marked extent, although the number of persons entirely free from illness decreases slightly.

#### ACKNOWLEDGMENTS

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#### WHOLE-TIME COUNTY HEALTH OFFICERS, 1927

The following directory has been compiled from data furnished as of January 1, 1927, by State health officers. Similar directories for 1922, 1923, 1924, 1925, and 1926 have been published in the PUBLIC HEALTH REPORTS. The directory for 1926 was issued as Reprint No. 1074.

In the questionnaire sent for the purpose of obtaining the necessary information, a "whole-time" county health officer was defined as "one who does not engage in the practice of medicine or any other business, but devotes his whole time to official duties."

Directories of State health departments have been published annually by the Public Health Service for the years 1912 to 1926, inclusive. The directory for 1926 was issued as Reprint No. 1106 from the PUBLIC HEALTH REPORTS.

Directories of city health officers have been published annually for the years 1916 to 1926, inclusive, the directory for 1926 being Reprint No. 1103.

Directories of State and city health officers for 1927 will be published later.

State and county	Name of health officer	Post-office address	Official title
<b>Alabama:</b>			
Baldwin	G. C. Marlette, M. D.	Bay Minette	County health officer.
Barbour	E. M. Moore, M. D.	Clayton	Do.
Calhoun	G. A. Cryer, M. D.	Anniston	Do.
Chambers	C. W. McDonald, M. D.	Lafayette	Do.
Coffee	H. P. Rankin, M. D.	Elba	Do.
Colbert	W. T. Burkett, M. D.	Tuscumbia	Do.
Covington	A. E. Keller, M. D.	Andalusia	Do.
Dallas	L. T. Lee, M. D.	Selma	Do.
Escambia	R. D. Neal, M. D.	Brewton	Do.
Etowah	W. H. Harper, M. D.	Gadsden	Do.
Franklin	L. J. Graves, M. D.	Russellville	Do.
Houston	L. R. Poole, M. D.	Dothan	Do.
Jackson	T. E. Tucker, M. D.	Scottsboro	Do.
Jefferson	J. D. Dowling, M. D.	Birmingham	Do.
Lauderdale	W. D. Hubbard, M. D.	Florence	Do.
Lawrence	R. E. Harper, M. D.	Moulton	Do.
Lee	J. E. Brodie, M. D.	Opelika	Do.
Limestone	L. R. Murphree, M. D.	Athens	Do.
Madison	W. C. Hatchett, M. D.	Huntsville	Do.
Marengo	J. R. Long, M. D.	Linden	Do.
Marshall	D. C. Jordan, M. D.	Guntersville	Do.
Mobile	C. A. Mohr, M. D.	Mobile	Do.
Montgomery	J. L. Bowman, M. D.	Montgomery	Do.
Morgan	H. C. McRee, M. D.	Albany	Do.
Pike	W. H. Abernethy, M. D.	Troy	Do.
Sumter	J. S. Hough, M. D.	Livingston	Do.
Talladega	J. H. Hill, M. D.	Talladega	Do.
Tallapoosa	W. Ross Cameron, M. D.	Dadeville	Do.
Tuscaloosa	A. A. Kirk, M. D.	Tuscaloosa	Do.
Walker	A. M. Waldrop, M. D.	Jasper	Do.
<b>Arizona:</b>			
Cochise	R. B. Durfee, M. D.	Bisbee	Do.
Yuma	Harry A. Reese, M. D.	Yuma	Do.
<b>Arkansas:</b>			
Garland	Austin F. Barr, M. D.	Hot Springs	Director.
Jefferson	F. Michael Smith, M. D.	Pine Bluff	Do.
Pulaski	V. T. Webb, M. D.	Little Rock	Do.
<b>California:</b>			
Los Angeles	J. L. Pomeroy, M. D.	Los Angeles	County health officer.
Monterey	R. C. Main, M. D.	Salinas	Do.
Orange	V. G. Presson, M. D.	Santa Ana	Do.
Riverside	W. B. Wells, M. D.	Riverside	Do.
San Diego	A. M. Lesem, M. D.	San Diego	Do.
San Joaquin	J. J. Sippy, M. D.	Stockton	Do.
San Luis Obispo	K. H. Sutherland, M. D.	San Luis Obispo	Do.
Santa Barbara			Do.
Yolo	A. N. Crain, M. D.	Woodland	Do.
<b>Colorado:</b>			
Otero	Guy A. Ashbaugh, M. D.	Rocky Ford	Do.
<b>Florida:</b>			
Polk	W. M. Bevis, M. D.	Bartow	Do.
Manatee	J. R. Scully, D. V. M.	Sarasota	Do.
Sarasota	do	do	Do.
<b>Georgia:</b>			
Baker	M. A. Fort, M. D.	Bainbridge	Health officer.
Baldwin	Sam A. Anderson, M. D.	Milledgeville	Commissioner of health.
Bartow	D. H. Monroe, M. D.	Cartersville	Do.
Bibb	J. D. Applewhite, M. D.	Macon	Do.
Brooks	R. E. McClure, M. D.	Quitman	Do.
Clarke	B. B. Bagby, M. D.	Athens	Do.
Cobb	J. E. Lester, M. D.	Marietta	Do.
Decatur	M. A. Fort, M. D.	Bainbridge	Health officer.
De Kalb	J. R. Evans, M. D.	Decatur	Commissioner of health.
Dougherty	Hugo Robinson, M. D.	Albany	Do.
Floyd	B. V. Elmore, M. D.	Rome	Do.
Glynn	H. L. Akridge, M. D.	Brunswick	Do.
Grady	M. A. Fort, M. D.	Decatur	Health officer.
Hall	D. J. Wellborn, M. D.	Gainesville	Commissioner of health.
Laurens	O. H. Cheek, M. D.	Dublin	Do.
Lowndes	G. T. Crozier, M. D.	Valdosta	Do.
Mitchell	C. O. Rainey, M. D.	Camilla	Do.
Richmond			Do.
Spalding	W. C. Humphries, M. D.	Griffin	Do.
Sumter	W. H. Houston, M. D.	Americus	Do.
Thomas	J. W. Wallace, M. D.	Thomasville	Do.
Troup	S. C. Rutland, M. D.	La Grange	Do.
Walker	J. H. Hammond, M. D.	La Fayette	Do.
Ware	G. E. Atwood, M. D.	Waycross	Do.

State and county	Name of health officer	Post-office address	Official title
<b>Illinois:</b>			
Cook	Herbert L. Wright, M. D., Dr. F. H.	Chicago, 737 So. Lincoln	County health director.
Morgan	W. H. Newcomb, M. D.	Jacksonville	County health officer.
Sangamon	R. V. Brokaw, M. D.	Springfield	Do.
<b>Iowa:</b>			
Dubuque	D. C. Steelsmith, M. D., C. P. H.	Dubuque	Director of health.
<b>Kansas:</b>			
Butler	R. J. Cabeen, M. D.	Eldorado	County health officer.
Coffey	V. McMullen, M. D.	Burlington	Do.
Ellis	F. C. Cave, M. D.	Hays	Do.
Geary	R. B. Stafford, M. D.	Junction City	Do.
Jefferson	D. M. Stevens, M. D.	Oskaloosa	Do.
Lyon	J. S. Fulton, M. D.	Emporia	Do.
Marion	J. H. Saylor, M. D.	Marion	Do.
Ottawa	C. R. Hepier, M. D.	Minneapolis	Do.
Phillips	G. D. M. Lambdin, M. D.	Phillipsburg	Do.
<b>Kentucky:</b>			
Boyd	R. D. Higgins, M. D.	Ashland	Director of health.
Daviess	R. M. Hathaway, M. D.	Owensboro	Do.
Fayette	F. P. Allen, M. D.	Lexington	Do.
Fulton	J. C. Morrison, M. D.	Hickman	Do.
Jefferson	E. F. Whistler, M. D.	Louisville	Health officer.
Johnson	C. F. Holtegel, M. D.	Paintsville	Director of health.
Knott	J. W. Duke, M. D.	Hindman	Do.
Mason	J. H. Hutchings, M. D.	Maysville	Do.
Scott	A. Stewart, M. D.	Georgetown	Do.
<b>Louisiana:<sup>1</sup></b>			
Caddo	W. J. Sandidge, M. D.	Shreveport	Director parish health unit.
Claiborne	John R. Turner, M. D.	Homer	Do.
De Soto	R. A. Tharp, M. D.	Mansfield	Do.
La Fourche	H. S. Smith, M. D.	Thibodaux	Parish health officer.
Natchitoches	W. W. Knipmeyer, M. D.	Natchitoches	Director parish health unit.
Ouachita	Paul R. Neal, M. D.	Monroe	Do.
Plaquemines	Terry Bird, M. D.	Pointe a la Hache	Parish health officer.
St. Mary	Thomas B. Wilson, M. D.	Franklin	Director parish health unit.
Washington	John Schrefler, M. D.	Franklinton	Parish health officer.
Webster	E. B. Godfrey, M. D.	Minden	Director parish health unit.
<b>Maryland:</b>			
Allegany	C. C. McCulloch, M. D.	Cumberland	County health officer.
Baltimore	J. S. Bowen, M. D.	Towson	Do.
Calvert	I. N. King, M. D.	Prince Frederick	Do.
Carroll	W. C. Stone, M. D.	Westminster	Do.
Frederick	E. C. Kefauver, M. D.	Frederick	Do.
Montgomery	W. T. Pratt, M. D.	Rockville	Do.
<b>Massachusetts:</b>			
Barnstable	A. P. Goff, M. D.	Hyannis	Health officer.
<b>Minnesota:</b>			
St. Louis	H. G. Lampson, M. D.	Duluth	County health officer.
<b>Mississippi:</b>			
Bolivar	R. D. Dedwylder, M. D.	Cleveland	Director of health.
Clarke	J. T. Googe, M. D.	Quitman	Do.
Coahoma	R. R. Kirkpatrick, M. D.	Clarksdale	Do.
Forrest	W. D. Beacham, M. D.	Hattiesburg	Do.
Hancock	C. M. Shipp, M. D.	Bay St. Louis	Do.
Harrison	D. J. Williams, M. D.	Gulfport	County health officer.
Hinds	J. B. Black, M. D., C. P. H.	Jackson	Director of health.
Holmes	B. D. Blackwelder, M. D.	Lexington	Do.
Jackson	John M. Putrell, M. D.	Pascagoula	Do.
Jones	W. B. Harrison, M. D.	Laurel	Do.
Lamar	R. G. Lander, M. D.	Purvis	Do.
Lee	C. S. Guild, M. D.	Tupelo	Do.
Leflore	C. P. Coogle, M. D.	Greenwood	Do.
Pearl River	J. W. Shackelford, M. D.	Poplarville	Do.
Perry	B. T. Robinson, M. D.	New Augusta	Do.
Sharkey	A. K. Barrier, M. D.	Rolling Fork	Do.
Union	C. M. Roberts, M. D.	New Albany	Do.
Washington	A. J. Ware, M. D.	Greenville	County health officer.
<b>Missouri:</b>			
Boone	Finis Suggett, M. D.	Columbia	Do.
Dunklin	E. L. Spence, M. D.	Keennett	Do.
Greene	J. W. Williams, M. D.	Springfield	Do.
Holt	R. R. Miller, M. D.	Oregon	Do.
Jackson	F. G. Crandall, M. D.	Independence	Do.
Marion	E. M. Lucke, M. D.	Hannibal	Do.
New Madrid	Wm. N. O'Bannon, M. D.	New Madrid	Do.
Nodaway	C. P. Fryer, M. D., C. P. H.	Maryville	Do.
Pemiscot	W. S. Petty, M. D.	Caruthersville	Do.

<sup>1</sup> Parishes.

State and county	Name of health officer	Post-office address	Official title
Missouri—Continued.			
Pettis	H. F. Turner, M. D.	Sedalia	County health officer.
St. Francois	W. W. Johnston, M. D.	Flat River	Do.
St. Louis	A. E. Walters, M. D.	Clayton	Do.
Montana:			
Cascade	Thos. F. Walker, M. D.	Great Falls	Do.
Lewis and Clark	Arthur Jordan, M. D.	Helena	Do.
Missoula	F. D. Pease, M. D.	Missoula	Do.
New Mexico:			
Bernalillo	G. W. Luckey, M. D.	Albuquerque	Do.
Chaves	J. A. Smith, M. D.	Roswell	Do.
Dona Ana	C. W. Gerber, M. D.	Las Cruces	Do.
Eddy	O. E. Puckett, M. D.	Carlsbad	Do.
McKinley	A. M. Washburn, M. D.	Gallup	Do.
San Miguel			Do.
Santa Fe	H. P. Mera, M. D.	Santa Fe	Do.
Union	C. H. Douthirt, M. D.	Clayton	Do.
Valencia	P. H. McNellis, M. D.	Los Lunas	Do.
New York:			
Cattaraugus	S. A. Douglass, M. D.	Olean	Do.
North Carolina:			
Beaufort	John W. Williams, M. D.	Washington	Do.
Bertie	J. E. Smith, M. D.	Windsor	Do.
Bladen	R. S. Cromartie, M. D.	Elizabethtown	Do.
Brunswick	R. E. Broadway, M. D.	Southport	Do.
Buncombe	G. A. Morgan, M. D.	Asheville	Do.
Cabarrus	D. G. Caldwell, M. D.	Concord	Do.
Carteret	T. C. Britt, M. D.	Beaufort	Do.
Columbus	Floyd Johnson, M. D.	Whiteville	Do.
Craven	D. E. Ford, M. D.	New Bern	Do.
Cumberland	J. W. McNeill, M. D.	Fayetteville	Do.
Davidson	G. C. Gambrell, M. D.	Lexington	Do.
Durham	J. H. Epperson, Ph. D.	Durham	Do.
Edgecombe	A. C. Norfleet, M. D.	Tarboro	Do.
Forsyth	J. R. Hege, M. D.	Winston-Salem	Do.
Granville	J. A. Morris, M. D.	Oxford	Do.
Guilford	R. M. Buie, M. D.	Greensboro	Do.
Halifax	Z. P. Mitchell, M. D.	Weldon	Do.
Henderson	J. H. Woodcock, M. D.	Hendersonville	Do.
Johnston	C. C. Massey, M. D.	Smithfield	Do.
Lenoir	R. S. McGeachy, M. D.	Kinston	Do.
Mecklenburg	W. A. McPhaul, M. D.	Charlotte	Do.
Nash	G. F. Reeves, M. D.	Nashville	Do.
New Hanover	John H. Hamilton, M. D.	Wilmington	Do.
Northampton	M. H. Seawell, M. D.	Jackson	Do.
Pamlico	D. A. Dees, M. D.	Bayboro	Do.
Pitt	W. E. Futrell, M. D.	Greenville	Do.
Richmond	A. B. McCreary, M. D.	Rockingham	Do.
Robeson	E. R. Hardin, M. D.	Lumberton	Do.
Rowan	C. W. Armstrong, M. D.	Salisbury	Do.
Rutherford	J. C. Twitty, M. D.	Rutherfordton	Do.
Sampson	John D. Kerr, M. D.	Clinton	Do.
Surry	G. H. Sumner, M. D.	Mount Airy	Do.
Vance	F. R. Harris, M. D.	Henderson	Do.
Wake	A. C. Bulla, M. D.	Raleigh	Do.
Wayne	L. W. Corbett, M. D.	Goldsboro	Do.
Wilkes	J. W. White, M. D.	Wilkesboro	Do.
Wilson	L. J. Smith, M. D.	Wilson	Do.
Ohio:			
Allen	J. J. Sutter, M. D.	Lima	Health commissioner.
Ashtabula	W. S. Weiss, M. D.	Jefferson	Do.
Belmont	F. R. Dew, M. D.	St. Clairsville	Do.
Butler	C. J. Baldrige, M. D.	Hamilton	Do.
Clermont	F. A. Ireton, M. D.	Batavia	Do.
Clinton	W. K. Ruble, M. D.	Wilmington	Do.
Columbiana	T. T. Church, M. D.	Lisbon	Do.
Coshocton	D. M. Criswell, M. D.	Coshocton	Do.
Crawford	G. T. Wasson, M. D.	Bucyrus	Do.
Cuyahoga	Robert Lockhart, M. D.	Cleveland	Do.
Darke	Milford E. Barnes, M. D.	Greenville	Do.
Delaware	Albert J. Pounds, M. D.	Delaware	Do.
Erie	F. M. Houghtaling, M. D.	Sandusky	Do.
Fayette	James F. Wilson, M. D.	Washington Court House	Do.
Geauga	Walter Corey, M. D.	Chardon	Do.
Hamilton	C. A. Neal, M. D.	Cincinnati	Do.
Hancock	S. F. Whisler, M. D.	Findlay	Do.
Hocking	B. S. Stephenson, M. D.	Logan	Do.
Huron	B. C. Pilkey, M. D.	Norwalk	Do.
Jefferson	J. P. Young, M. D.	Steubenville	Do.
Lake	Walter Corey, M. D.	Painesville	Do.
Lorain	I. C. Riggan, M. D.	Oberlin	Do.
Lucas	F. F. DeVore, M. D.	Toledo	Do.
Mahoning	J. F. Elder, M. D.	Youngstown	Do.
Marion	N. Sifrit, M. D.	Marion	Do.
Meigs	Jane Nye Gilliford, M. D.	Pomeroy	Do.
Mercer	F. E. Ayers, M. D.	Celina	Do.

State and county	Name of health officer	Post-office address	Official title
<b>Ohio—Continued.</b>			
Miami	P. J. Crawford, M. D.	Troy	Health commissioner.
Montgomery	H. H. Pansing, M. D.	Dayton	Do.
Merrow	R. L. Pierce, M. D.	Mount Gilead	Do.
Muskingum	J. M. O'Neal, M. D.	Zanesville	Do.
Perry	F. J. Crosbie, M. D.	New Lexington	Do.
Preble	H. Z. Silver, M. D.	Eaton	Do.
Richland	C. D. Barrett, M. D.	Mansfield	Do.
Ross	G. E. Robbins, M. D.	Chillicothe	Do.
Sandusky	O. H. Thomas, M. D.	Fremont	Do.
Scioto	R. W. DeCrow, M. D.	Wheelersburg	Do.
Seneca	J. J. Heaton, M. D.	Tiffin	Do.
Shelby	M. D. Aftis, M. D.	Sidney	Do.
Stark	C. M. Peters, M. D.	Canton	Do.
Summit	R. H. Markwith, M. D.	Akron	Do.
Trumbull	L. A. Connell, M. D.	Warren	Do.
Tuscarawas	J. Blickensderfer, M. D.	New Philadelphia	Do.
Union	H. G. Southard, M. D.	Marysville	Do.
Washington	Alfred G. Sturgiss, M. D.	Marietta	Do.
Wayne	W. G. Rhoten, M. D.	Wooster	Do.
Wood	H. J. Powell, M. D.	Bowling Green	Do.
<b>Oklahoma:</b>			
Carter			County superintendent of health.
Kay	D. M. Cowgill, M. D.	Newkirk	Do.
Le Flore	W. F. Lunsford, M. D.	Poteau	Do.
McCurtain	R. D. Williams, M. D.	Idabel	Do.
Muskogee	J. D. Leonard, M. D.	Muskogee	Do.
Oklahoma	Geo. Hunter, M. D.	Oklahoma City	Do.
Oklmulgee	J. O. Walls, M. D.	Oklmulgee	Do.
Ottawa	F. P. Helm, M. D.	Miami	Do.
Pittsburg	C. M. Pearce, M. D.	McAlester	Do.
<b>Oregon:</b>			
Clackamas	F. W. Wallace, M. D.	Oregon City	County health officer.
Coos	P. M. Drake, M. D.	Coquille	Do.
Douglas	R. Thompson, M. D.	Roseburg	Do.
Jackson	L. D. Inskip, M. D.	Jacksonville	Do.
<b>South Carolina:</b>			
Aiken	W. G. Bodie, M. D.	Aiken	Do.
Anderson	E. E. Epting, M. D.	Anderson	Do.
Beaufort	H. B. Senn, M. D.	Beaufort	Do.
Charleston	Leon Banov, M. D.	Charleston	Do.
Cherokee	P. H. Smith, M. D.	Gaffney	Do.
Darlington	A. B. Hooton, M. D.	Darlington	Do.
Dillon	C. C. Freed, M. D.	Dillon	Do.
Fairfield	H. T. Kennedy, M. D.	Winnsboro	Do.
Georgetown	Clem Ham, M. D.	Georgetown	Do.
Greenville	Bayliss Earle, M. D.	Greenville	Do.
Greenwood	Robert D. Hill, M. D.	Greenwood	Do.
Horry	G. S. T. Peoples, M. D.	Conway	Do.
Marion	R. L. Martin, M. D.	Marion	Do.
Newberry	H. G. Callison, M. D.	Newberry	Do.
Orangeburg	G. C. Boffin, M. D.	Orangeburg	Do.
Spartanburg	L. L. Williams, M. D.	Spartanburg	Do.
<b>South Dakota:</b>			
Brown	P. V. McCarthy, M. D.	Aberdeen	Do.
Pennington	M. W. Fangburn, M. D.	Rapid City	Do.
<b>Tennessee:</b>			
Blount	K. A. Bryant, M. D.	Maryville	Field director.
Davidson	J. J. Lentz, M. D.	Nashville	County health officer.
Dyer	C. A. Collins, M. D.	Dyersburg	Acting health officer.
Gibson	F. L. Roberts, M. D.	Trenton	County health officer.
Hamilton	J. W. Dennis, M. D.	Chattanooga	Do.
Landerdale	B. M. Primer, M. D.	Ripley	Field director.
Montgomery	F. J. Malone, M. D.	Clarksville	County health officer.
Obion	C. B. A. Turner, M. D.	Union City	Do.
Roane	J. C. Fly, M. D.	Kingston	Do.
Rutherford	H. S. Mustard, M. D.	Murfreesboro	Do.
Sevier	C. S. Kinzer, M. D.	Sevierville	Acting health officer.
Shelby	L. M. Graves, M. D.	Memphis	County health officer.
Weakley	S. S. Moody, M. D.	Dresden	Do.
Williamson	W. C. Williams, M. D.	Franklin	Do.
<b>Texas:</b>			
Cameron	Ernest W. Prothro, M. D.	San Benito	Do.
Hidalgo	J. R. Mahone, M. D.	Edinburg	Do.
Jefferson	James D. Blevins, M. D.	Beaumont	School medical officer.
McLennan	R. McCormick, M. D.	Waco	County health officer.
Tarrant	F. P. Smith, M. D.	Fort Worth	Do.
<b>Utah:</b>			
Box Elder	Wilford Reichman, M. D.	Brigham City	Do.
Davis	Sumner Gleason, M. D.	Kaysville	Do.
Morgan	Q. B. Coray, M. D.	Morgan	Do.
Summit	do	do	Do.
Wasatch	do	do	Do.
Weber	H. Earl Beinap, M. D.	Ogden	Do.



State and county	Name of health officer	Post-office address	Official title
<b>Virginia</b>			
Accomac	Robert P. Cooke, M. D.	Accomac	County health officer.
Albemarle	Geo. B. Young, M. D.	Charlottesville	Do.
Arlington	F. M. Chichester, M. D.	Clarendon	Do.
Augusta	H. M. Wallace, M. D.	Staunton	Do.
Brunswick	John M. Bailey, M. D.	Lawrenceville	Do.
Fairfax	Wm. P. Caton, M. D.	Fairfax	Do.
Halifax	Kolbe Curtice	South Boston	Do.
Henrico	W. R. King, M. D.	Richmond	Do.
Isle of Wight	G. H. Warren, M. D.	Smithfield	Do.
James City	J. H. Crouch, M. D., C. P. H.	Williamsburg	Do.
Nansemond	C. F. Moriarty, M. D.	Suffolk	Do.
Northampton	Anne Owen Hamilton	Eastville	Acting health officer.
Southampton	A. L. McLean, M. D.	Courtland	County health officer.
Sussex	do.	do.	Do.
Wise	W. R. Culbertson, M. D.	Norton	Do.
<b>Washington:</b>			
Chelan	Paul A. West, M. D.	Wenatchee	Do.
King	G. H. T. Sparling, M. D.	Seattle	Do.
Snohomish	F. A. Franke, M. D.	Everett	Do.
Spokane	W. M. Newman, M. D.	Spokane	Do.
Walla Walla	Miles Hopkins, M. D.	Walla Walla	Do.
Yakima	H. H. Smith, M. D.	Yakima	Do.
<b>West Virginia:</b>			
Boone	W. H. Enneis, M. D.	Madison	Do.
Brooke	L. M. Coulter, M. D.	Wellsburg	Do.
Gilmer	A. L. Oilar, M. D.	Glenville	Do.
Hancock	A. E. McClue, M. D.	New Cumberland	Do.
Harrison	V. A. Selby, M. D.	Clarksburg	Do.
Kanawha	John Thames, M. D.	Charleston	Do.
Logan	P. B. Wingfield, M. D.	Logan	Do.
Marion	H. M. Batson, M. D.	Fairmont	Do.
Marshall	D. Berman, M. D.	Moundsville	Do.
Ohio	W. H. McLain, M. D.	Wheeling	Do.
Preston	L. H. Lewis, M. D.	Kingwood	Do.
Roane	F. C. Makepeace, M. D.	Spencer	Do.
Wood	T. R. Meyer, M. D.	Parkersburg	Do.
<b>Wyoming:</b>			
Natrona	H. Garst, M. D.	Casper	Director of health.

## EXPERIMENTAL BACTERIAL AND CHEMICAL POLLUTION OF WELLS VIA GROUND WATER

The United States Public Health Service has recently issued a report (Hygienic Laboratory Bulletin 147) dealing with the extension of pollution to wells by means of the ground water. This interesting subject has been under controversy since about 1860, and the views of sanitarians have been divided. Some authors have doubted whether pollution would travel laterally more than 6 to 10 feet, except through certain geological formations, such as limestone and fissures.

During the World War this subject came prominently to the fore, and a special board was named to study the subject experimentally. This board consisted of Prof. E. O. Jordan, of Chicago University; Prof. G. C. Whipple, of Harvard; Prof. E. B. Phelps, of Columbia University; Col. C. F. Craig, United States Army; State Health Officer W. S. Rankin, of North Carolina; and Surg. L. L. Lumsden and Prof. C. W. Stiles, of the United States Public Health Service.

Extensive experimental studies were conducted at the United States marine hospital at Wilmington, N. C., and at Fort Caswell, N. C., under the direction of Professor Stiles, chairman of the board.

As a result of these studies, which occupied several years, it was found possible to recover chemical pollution in wells up to a distance of 450 feet, and bacterial pollution up to a distance of 232 feet from the trenches in which the pollution was placed.

Pollution sinks vertically downward until it reaches the ground-water table, which represents the water level of wells, and it spreads only in the direction of the ground-water flow. This ground water flows through the ground much in the same way that a river flows through a valley. The water rises after rainfall and sinks during dry weather. As polluted water sinks, the pollution filters out into the ground; if the ground layer remains moist, the pollution may live and is carried farther when the ground water rises again; if it becomes dry, the pollution dies. Thus, these investigations have uncovered a hitherto unknown law of Nature, namely, that it is the rise and fall of the ground water, due to rain and drought, which permits the water to become purified; were it not for this fact, the underground water would contain pollution of considerable age, possibly dating back many years, and it would be difficult to find pure spring water or pure well water except under an impervious layer.

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## PUBLIC HEALTH ENGINEERING ABSTRACTS

**Stream Pollution in the United States.** Prepared by George J. Schulz, Legislative Reference Service, Library of Congress. House of Representatives Document No. 632, 69th Congress, 2d session. 31 pp. (Abstract by J. K. Hoskins.)

This "monograph relating to the pollution and obstruction of navigable streams in the United States by sewage and industrial wastes" is a well-written, running review of many publications on the subject, describing the increasing burden of stream pollution and the various methods of sewage and industrial waste treatment that give promise of relief. The scope of the paper is best gauged by the section headings of the table of contents:

- I. The menace of stream pollution.
- II. The extent of stream pollution.
- III. The composition of sewage.
- IV. The decomposition of sewage.
- V. The problem of sewage disposal.
- VI. Industrial wastes.
- VII. Tomato-canning wastes.
- VIII. Acid-iron wastes.
- IX. Strawboard-industry wastes.
- X. Sulphite pulp waste.
- XI. Distillery wastes.
- XII. Oil pollution.
- XIII. Sewage treatment.
- XIV. The utilization of sewage.
- XV. The recovery and utilization of industrial wastes.
- XVI. Recovery and utilization of sulphite wastes.
- XVII. Recovery and utilization of tannery wastes.
- XVIII. Recovery and utilization of coke-oven wastes.
- XIX. Recovery and utilization of strawboard wastes.
- XX. Recovery and utilization of metal industries wastes.
- XXI. Conclusion.

The references are clearly stated for many of the positive statements made in the text. An index adds to the value of the paper.

**Method of Sewage Treatment Adopted for North Toronto.** Almon L. Fales. *Journal of Boston Society of Civil Engineers*, vol. 14, No. 2. February, 1927, pp. 75-77. (Abstract by E. C. Sullivan.)

This article describes the method of sewage treatment which has been recommended for the sewage disposal of North Toronto, Canada, and gives a description of the various features to be included in the plant, the plans and specifications for which are now in preparation.

The treatment plant, as built at the present time, will be designed for a population of 50,000 and so arranged as to permit of enlargement. The district to be served will be provided with a combined sewerage system, taking both sewage and storm-water run-off, and in addition the flow from certain brooks, the dry-weather flow of which is estimated at a little over 6,000,000 gallons daily. The effluent will be discharged into the River Don.

In view of the local conditions, a high degree of purification is required, including not only the efficient removal of suspended solids, but also fairly complete oxidation of the dissolved organic matter in the sewage. Storm flows up to a rate of twice the dry flow, or 240 gallons per capita per day, are to receive complete treatment. For flows in excess of twice the dry-weather flow and up to thirty-six times the dry-weather flows, sedimentation is to be provided, according to the English practice, in storm-flow stand-by tanks.

The plant recommended, in addition to storm-water stand-by tanks, will consist of racks, grit chambers, preliminary sedimentation tanks, activated sludge aeration and sedimentation tanks, covered separate sludge digestion tanks with provision for controlling the reaction of the sludge, and glass-housed sludge beds. The gases from the sludge digestion tanks will be collected and burned under steam boilers, and the steam utilized for maintaining a favorable temperature for sludge digestion and for other purposes.

**Recent Results from Separate Sludge Digestion Experiments.** Willem Rudolfs. *Public Works*, vol. 58, No. 2, February, 1927, pp. 50-52. (Abstract by E. C. Sullivan.)

At Plainfield, N. J., there were constructed at the sewage disposal plant (as a consequence of considerable experimentation, both in the laboratory and at the plant, to relieve conditions) two 16-sided concrete tanks for separate sludge digestion, supplied with floating covers and facilities for adjusting the fresh solids with lime and for heating the sludge. Five thousand five hundred cubic feet of ripe sludge were first pumped into the tank from the Imhoff tanks for seeding. Fresh solids, obtained from an Imhoff tank which was used as a preliminary settling tank, were added every two or three days for a period of 60 days after the tank had been in operation, and thereafter the laboratory determinations were begun. These fresh solids were adjusted with dry hydrated lime to a pH value of 7.3. Determinations included the amount of gas, the composition of the gas, the pH value, the total acidity, the total alkalinity, the  $\text{NH}_3$  nitrogen, the solids, and the ash. Bacteriological counts were made and an automatic record was kept of the temperature in the tank and of the air.

The conclusions which might be drawn from the experiments are as follows: (1) Since it was possible with 1 pound of soft coal per 1,000 pounds of sludge to raise the temperature of the sludge  $0.4^\circ$  F. per day, it will probably cost less to maintain a higher temperature when heating is begun as soon as the temperature drops; (2) if really fresh solids are added every day, the amount of lime necessary for adjustment will be small, because the material in the tank in a proper biological balance condition will maintain an optimum reaction for digestion; (3) a properly insulated separate digestion tank under good control is at least as efficient as an Imhoff tank; consequently, sludge digestion capacity will be about equal for both types of tanks.

This article is obtained from Paper No. 323 of the Journal Series, New Jersey Agricultural Experiment Station, Department of Sewage Disposal, presented before the American Society for Municipal Improvements.

**Chloro Tastes and Their Eradication at Dallas, Tex.** O. M. Bakke. *Journal American Water Works Association*, vol. 16, No. 6, December, 1926, pp. 730-736. (Abstract by E. C. Sullivan.)

In the occasional use of auxiliary White Rock Lake supply of Dallas, Tex., there was experienced in 1923, after the new filtration plant had been completed, a strong iodoform odor and taste, and at times a grassy and musty taste caused by *Anabaena* and diatoms. By means of superchlorination it has been found possible largely to obviate the iodoform taste. This has been accomplished by chlorination of the raw water to maintain a residual chlorine content of the raw water of about 0.35 p. p. m. and by chlorination of the plant effluent to maintain a residual of 0.08 to 0.10 p. p. m. in the final plant effluent.

It was also found at White Rock that superchlorination had no effect on certain grassy and musty tastes and odors, and that the algal growth must be controlled by copper sulphate. As the plant is used intermittently, there is a considerable growth of algae on the filters when the plant is closed down for any length of time or even for a few days, the effect of which is to give the water a sour, musty taste. This trouble is eliminated by adding a solution of copper sulphate, equivalent to 2 pounds per filter, mixed by letting in some wash water, and allowing to stand for 24 hours, after which the filters are washed.

The Turtle Creek filtration plant of the city of Dallas, which is the main source of supply, is twice chlorinated—as it comes from the filters and as it leaves the clear water basin and enters the mains. This was done on account of considerable growth of bacteria in the clear water reservoir, especially in warm weather, there being a considerable increase in various gas-formers and a slight increase in *B. coli*; the open reservoir is frequented by ducks and other birds and subject to other incidental outside contamination.

After the secondary chlorination of the clear water reservoir had been inaugurated in December, 1923, taste trouble, having some resemblance to the iodoform taste, was experienced intermittently and localized along the mains. After observation it was concluded that when sufficient normal carbonate was present in the filtered water—i. e., when the pH was sufficiently high—the applied chlorine produced hypochlorites and most probably chlor-amines also. These chlorine products held fast to their available chlorine in the high pH medium and in the absence of sufficient half-bound carbon dioxide caused release of the chlorine. Such stabilized chlorine compounds would, therefore, persist for many hours in the mains. These compounds were responsible for the "flat" tastes prevailing at the plant and in the newer sections of the city. In the older sections of the city, iodoform tastes were produced through the action of the stable compounds containing chlorine on the pipe coatings, or perhaps through contact with slime deposits within the older mains.

It has been found possible to correct this trouble through decreased lime dosage and increased ferrous sulphate dosage without changing the primary or secondary chlorine dosages. This procedure would produce a clearer effluent and at the same time one containing sufficient bicarbonate content, not only to prevent the formation of stabilized chlorine products, but at the same time to allow greater rapidity of dissipation of the available chlorine present. Although somewhat more costly during periods of very turbid water, when greater quantities of ferrous sulphate are required in lieu of increased lime dosage, the change of treatment is stated to have unquestionably eliminated the cause of taste troubles.

**The Present Status of the Use of Iodides in the Minneapolis Water Supply.** Arthur F. Mellen. *Journal of the American Water Works Association*, vol. 16, No. 6, December, 1926, pp. 715-729. (Abstract by E. C. Sullivan.)

The writer of this paper states that about five years ago the attention of water-works officials was called to a new problem, namely, that many waters are defi-

cient in iodides and that this is the cause of simple, or endemic goiter. An explanation is given of simple, or endemic goiter, and reference is made to the work of various investigators, which, in some instances, are quoted.

It is stated that any method chosen to make up iodide deficiency should (1) reach at all times those who need it, (2) be simple as to application, (3) be within reasonable cost, (4) not involve complicated problems in public health administration, and (5) be immediately available. The following have been proposed to make up such iodide deficiency: (1) Sea salt, (2) sea foods, (3) iodide tablets, (4) iodized table salt, and (5) the iodization of public water supplies.

The writer discusses each of these methods and the possible difficulties in the use of some of them. In the case of Minneapolis, the city in which the writer is particularly interested, the iodization of the public water supply has been approved of by the board of public welfare. The purpose of the undertaking is stated to be "the placing in the city water supply of a sufficient amount of iodide of soda to make the city water content of iodine the same as that of cities outside the iodine-free belt."

**Typhoid Fever in Relation to Filtration and Chlorination of Municipal Water Supplies in American Cities, 1900 to 1924.** *Statistical Bulletin*, Metropolitan Life Insurance Co., vol. 8, No. 3, March, 1927. (Abstract by W. L. Havens.)

This article includes graphs showing per cent population supplied with filtered and with chlorinated water and also the line of typhoid morbidity for 70 cities, which are divided into three groups, according to size. In each group the death rate has been distinctly responsive to the increased use of purified water, and now stands at 4 per 100,000. The decline is noted as starting in about 1907. This article is a forerunner of a more detailed consideration of typhoid and of control measures in the larger cities.

**Cross Connections in Connecticut.** Warren J. Scott. *State of Connecticut Health Bulletin*, vol. 41, No. 1, January, 1927, pp. 3-6. (Abstract by E. C. Sullivan.)

The public-health council of the State Health Department of Connecticut has adopted regulations which provide that after December 31, 1926, no cross connections shall exist between potable and nonpotable water supplies, except that installations protected by double-check valves of approved type, with adequate facilities for testing, which were in existence on December 31, 1926, may be temporarily permitted with the approval of the State health department. The latter provision was inserted because it was felt that double-check valves of the latest approved types should be given a fair try out. The length of the extension of time granted will depend upon the investigations which the Connecticut State Department of Health is making as to the efficiency of the newest types of check valves.

The article states that the majority of cross connections in Connecticut have been eliminated. The work tending toward their elimination is still in progress. Some cities still have a considerable number of double-check valves, either in existence previous to the passage of the regulations or since installed, but there is a markedly less hazard than with the old neglected connections.

In many cases separate piping has been provided for polluted water; others have installed tanks filled with city water; city water to large tanks supplied by two sources has been made to discharge above water level; priming connections have been replaced by small tanks filled from above with city water; for boiler feed or other industrial use, swing joints with an elbow and unions have been used in the case of small-diameter piping, whereby either of two supplies can be used but both can not be used at once. These represent some of the methods used to bring about complete separation. In some instances piping systems have been found to be literally "sewed together," and much time and effort have been needed to separate them.

**Algae Treatment of Reservoirs, Recent Experience.** Frank E. Hale. *Journal of the American Water Works Association*, vol. 16, No. 6, December, 1926, pp. 765-768. (Abstract by E. C. Sullivan.)

Several experiences in the control of algae in the New York City water supply are cited, and data on the treatment with copper sulphate of the Croton watershed, Central Park Reservoir, and the Jerome Park Reservoir are furnished. As a result of some difficulty with taste and odors after treatment of the Jerome Park Reservoir on August 25, 1925, a new procedure for treatment and putting into service of reservoirs was outlined and distributed.

The main points of this procedure involve care in distributing the copper sulphate rapidly and uniformly, prompt inspection of the water, if possible the third day after the treatment, and laboratory examination of samples to note whether the organisms are dead, etc. Care is likewise taken wherever possible when turning a reservoir into service after treatment to establish the flow gradually, mixing effluent water with by-passed water, and noting turbidity, taste, and odor of both effluent and mixed flow.

Effort should be made to prevent the stirring up of deposits in reservoirs or conduits which have been idle or full of stagnant water. The drawing of water from the extreme bottom of the reservoir following treatment is to be avoided if possible. Mid depth, or at least 10 feet above the bottom, is preferable. Surface draft may sometimes be advisable, but should not be continued, in order to avoid stagnation effects in the reservoir.

**Experiments on the Pasteurization of Milk, with Reference to the Efficiency of Commercial Pasteurization.** H. Jenkins. *Journal of Hygiene*, vol. 25, 1926, pp. 273-284. (Abstract by W. G. Savage in the *Bulletin of Hygiene*, vol. 2, No. 2, February, 1927, pp. 133-134.)

"Commercial Pasteurization is here defined as Pasteurization by heating the milk to 62.8° C. (145° F.) and holding it at that temperature for 30 minutes. (It does not mean Pasteurization as commonly carried out commercially in this country, which is by the flash method and without any holding of the milk for a definite period. In discussing the efficiency of Pasteurization it is of prime importance to define exactly what is meant.)

"The author's experiments showed that this type of Pasteurization, when carried out under laboratory conditions, reduced the number of bacteria by 94 to 97.5 per cent, the percentage varying with the initial bacterial content; and in all cases it reduced *B. coli* so that none are found in 1 c. c. With temperatures lower than 62.8° C., i. e., as low as 59° C., the *B. coli* results were the same, but the total bacterial reduction was less. The results were equally good when anaerobic incubation was used.

"When an actual commercial laboratory plant was used, Pasteurization was rather less efficient. The average reduction in the total bacteria was 91.2 per cent, while coliform organisms were eliminated only from 1 c. c. in 4 out of 8 specimens. Factors suggested to account for the inferior results are: Insufficient mixing of the milk in the holding tank so that all the milk was not heated uniformly to the required temperature, failure of the mechanical filling arrangement to function properly, incompletely sterilized connection tubes, and an uncovered cooler.

"The efficiency of this type of Pasteurization to kill tubercle bacilli was tested with milk artificially inoculated with cultures of *B. tuberculosis* of both human and bovine type and with milk infected naturally and obtained from a cow suffering from udder tuberculosis. Six experiments with culture strains and tested under laboratory conditions at temperatures ranging from 62° C. to 63.8° C. showed killed or avirulent tubercle bacilli, as judged by guinea-pig inoculations. Two experiments with naturally infected milk heated at 60° and 62.8° C., respectively, were equally satisfactory.

"One liter of milk from a tuberculous cow, and containing numerous tubercle bacilli, was added to 50 gallons of milk and subjected to Pasteurization in the commercial plant. Two guinea pigs, inoculated respectively from the cream

and sediment before Pasteurization, developed a generalized tuberculosis, while two other animals, similarly treated but after Pasteurization, showed no evidence of disease when killed after six weeks."

## DEATHS DURING WEEK ENDED MAY 28, 1927

Summary of information received by telegraph from industrial insurance companies for week ended May 28, 1927, and corresponding week of 1926. (From the Weekly Health Index, June 2, 1927, issued by the Bureau of the Census, Department of Commerce)

	Week ended May 28, 1927	Corresponding week, 1926
Policies in force.....	67, 772, 503	64, 584, 020
Number of death claims.....	11, 919	12, 478
Death claims per 1,000 policies in force, annual rate..	9. 2	10. 1

Deaths from all causes in certain large cities of the United States during the week ended May 28, 1927, infant mortality, annual death rate, and comparison with corresponding week of 1926. (From the Weekly Health Index, June 2, 1927, issued by the Bureau of the Census, Department of Commerce)

City	Week ended May 28, 1927		Annual death rate per 1,000 corresponding week, 1926	Deaths under 1 year		Infant mortality rate, week ended May 28, 1927 <sup>1</sup>
	Total deaths	Death rate <sup>1</sup>		Week ended May 28, 1927	Corresponding week, 1926	
Total (66 cities).....	7,037	12. 5	12. 7	724	887	61
Albany <sup>2</sup> .....	26	11. 3	16. 7	4	3	83
Atlanta.....	75			5	12	
White.....	40			1	7	
Colored.....	35	( <sup>3</sup> )		4	5	
Baltimore <sup>2</sup> .....	184	11. 7	12. 5	18	16	56
White.....	135		11. 3	10	12	39
Colored.....	49	( <sup>3</sup> )	19. 3	8	4	124
Birmingham.....	61	14. 8	18. 0	8	8	
White.....	31		14. 7	4	7	
Colored.....	30	( <sup>3</sup> )	23. 2	4	1	
Boston.....	240	15. 8	12. 5	38	18	106
Bridgeport.....	23			2	5	37
Buffalo.....	147	13. 9	15. 5	14	35	59
Cambridge.....	23	9. 7	8. 5	1	4	16
Camden.....	37	14. 5	13. 5	5	8	86
Canton.....	24	11. 1	15. 6	3	9	71
Chicago <sup>1</sup> .....	743	12. 5	11. 6	79	77	68
Cincinnati.....	109	13. 8	15. 7	8	15	50
Cleveland.....	185	9. 8	10. 0	20	34	53
Columbus.....	61	10. 9	13. 2	3	0	28
Dallas.....	55	13. 7	11. 0	10	8	
White.....	43		10. 4	7	7	
Colored.....	12	( <sup>3</sup> )	15. 4	3	1	
Dayton.....	45	13. 0	14. 1	4	7	66
Denver.....	67	12. 0	11. 9	4	4	
Des Moines.....	33	11. 5	13. 9	1	4	17
Detroit.....	320	12. 5	11. 3	52	56	82
Duluth.....	25	11. 3	12. 0	1	1	22
El Paso.....	25	11. 4	17. 7	4	15	
Erie.....	26			3	5	59
Fall River <sup>4</sup> .....	34	13. 3	16. 7	5	8	86
Flint.....	29	10. 6	12. 7	5	8	82
Fort Worth.....	28	8. 9	11. 5	6	10	
White.....	24		11. 2	5	8	
Colored.....	4	( <sup>3</sup> )	13. 7	1	2	
Grand Rapids.....	36	11. 8	8. 7	6	4	89
Houston.....	45			6	1	
White.....	29			3	0	
Colored.....	16	( <sup>3</sup> )		3	1	
Indianapolis.....	91	12. 7	15. 6	4	9	31
White.....	77		15. 0	4	6	36
Colored.....	14	( <sup>3</sup> )	20. 1	0	3	6

<sup>1</sup> Annual rate per 1,000 population.

<sup>2</sup> Deaths under 1 year per 1,000 births. Cities left blank are net in the registration area for births.

<sup>3</sup> Data for 65 cities.

<sup>4</sup> Data for 60 cities.

<sup>5</sup> Deaths for week ended Friday, May 27, 1927.

<sup>6</sup> In the cities for which deaths are shown by color, the colored population in 1920 constituted the following percentages of the total population: Atlanta 31, Baltimore 15, Birmingham 39, Dallas 15, Fort Worth 14, Houston 25, Indianapolis 11, Kansas City, Kans., 14, Knoxville 15, Louisville 17, Memphis 28, Nashville 30, New Orleans 26, Richmond 32, and Washington, D. C., 25.

Deaths from all causes in certain large cities of the United States during the week ended May 28, 1927, infant mortality, annual death rate, and comparison with corresponding week of 1926. (From the Weekly Health Index, June 2, 1927, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended May 28, 1927		Annual death rate per 1,000 corresponding week, 1926	Deaths under 1 year		Infant mortality rate, week ended May 28, 1927
	Total deaths	Death rate		Week ended May 28, 1927	Corresponding week, 1926	
Jersey City.....	64	10.4	13.1	7	20	52
Kansas City, Kans.....	25	11.1	9.8	2	5	39
White.....	20		8.6	1	1	22
Colored.....	5	(*)	15.3	1	4	152
Kansas City, Mo.....	118	16.1	14.9	17	7	
Knoxville.....	30	15.3		5	2	
White.....	18			3		
Colored.....	12	(*)		2		
Los Angeles.....	221			29	20	83
Louisville.....	71	11.6	15.9	2	12	17
White.....	53		14.4	0	10	19
Colored.....	18	(*)	24.4	2	2	0
Lowell.....	26	12.3	15.6	2	0	39
Lynn.....	25	12.4	11.5	1	2	26
Memphis.....	59	17.2	20.3	4	10	
White.....	29		11.9	3	7	
Colored.....	30	(*)	35.6	1	3	
Milwaukee.....	115	11.3	10.2	19	18	89
Minneapolis.....	93	11.0	13.0	7	16	39
Nashville <sup>1</sup> .....	49	18.5	14.8	0	4	
White.....	28		8.0	0	3	
Colored.....	21	(*)	32.1	0	1	
New Bedford.....	20	8.7	14.8	5	7	87
New Haven.....	49	13.8	23.2	3	7	42
New Orleans.....	176	21.6	19.9	18	14	
White.....	108		15.8	11	7	
Colored.....	68	(*)	31.6	7	7	
New York.....	1,342	11.7	12.0	135	163	56
Bronx Borough.....	167	9.4	9.3	14	14	45
Brooklyn Borough.....	468	10.7	10.7	49	63	51
Manhattan Borough.....	551	15.9	16.3	53	63	68
Queens Borough.....	118	7.6	8.0	11	17	47
Richmond Borough.....	35	12.4	16.4	3	6	56
Newark, N. J.....	95	10.6	11.7	13	17	64
Oakland.....	46	9.0	8.4	3	3	35
Oklahoma City.....	27			3	3	
Omaha.....	45	10.7	14.0	2	10	22
Paterson.....	39	14.1	11.3	4	3	71
Philadelphia.....	454	11.6	12.0	36	28	48
Pittsburgh.....	184	14.9	13.3	20	24	70
Portland, Oreg.....	73			10	0	105
Providence.....	68	12.6	13.1	5	8	42
Richmond.....	53	14.4	16.6	3	7	40
White.....	31		10.9	2	3	40
Colored.....	22	(*)	30.3	1	4	38
Rochester.....	87	14.0	12.5	13	7	109
St. Louis.....	218	13.5	14.8	10	26	
St. Paul.....	62	12.9	10.1	8	6	73
Salt Lake City <sup>4</sup> .....	27	10.4	11.8	2	3	30
San Antonio.....	66	16.3	16.3	16	24	
San Diego.....	48	21.8	20.4	1	4	21
San Francisco.....	149	13.5	13.3	11	10	69
Schenectady.....	22	12.3	8.4	4	2	119
Seattle.....	57			4	1	42
Somerville.....	17	8.7	8.3	2	2	72
Springfield, Mass.....	27	9.6	11.1	3	4	46
Syracuse.....	47	12.4	12.4	2	8	26
Tacoma.....	19	9.3	13.8	0	3	0
Toledo.....	89	15.3	12.5	13	9	125
Trenton.....	28	10.7	16.7	2	3	35
Washington, D. C.....	117	11.3	11.9	10	12	58
White.....	77		7.8	5	3	42
Colored.....	40	(*)	23.8	5	9	92
Waterbury.....	18			3	4	71
Wilmington, Del.....	22	9.1	12.6	3	5	74
Worcester.....	67	17.9	17.3	4	7	48
Yonkers.....	19	8.3	8.1	1	1	23
Youngstown.....	32	9.9	13.3	3	5	42

<sup>1</sup>Deaths for week ended Friday, May 27, 1927.

<sup>4</sup>In the cities for which deaths are shown by color, the colored population in 1920 constituted the following percentages of the total population: Atlanta 31, Baltimore 15, Birmingham 39, Dallas 15, Fort Worth 14, Houston 25, Indianapolis 11, Kansas City, Kans., 14, Knoxville 15, Louisville 17, Memphis 38, Nashville 30, New Orleans 26, Richmond 32, and Washington, D. C., 25.





POLIOMYELITIS		SMALLPOX—continued	
	Cases		Cases
Arizona .....	4	Iowa <sup>1</sup> .....	9
Illinois .....	2	Kansas .....	29
Louisiana .....	2	Louisiana .....	3
Massachusetts .....	3	Michigan <sup>1</sup> .....	31
Pennsylvania .....	1	Montana .....	8
Washington .....	1	New York <sup>2</sup> .....	7
		North Carolina .....	27
		Oregon .....	8
		Pennsylvania .....	1
		Texas .....	40
		Utah <sup>1</sup> .....	4
		Virginia .....	1
		Washington .....	36
		West Virginia .....	26
SCARLET FEVER		TYPHOID FEVER	
Arkansas .....	3	Arizona .....	2
Colorado .....	132	Arkansas .....	17
Connecticut .....	68	Colorado .....	5
Illinois .....	194	Idaho .....	1
Iowa <sup>1</sup> .....	32	Illinois .....	9
Kansas .....	43	Iowa <sup>1</sup> .....	1
Louisiana .....	3	Kansas .....	2
Maine .....	15	Louisiana .....	15
Maryland <sup>1</sup> .....	34	Maine .....	2
Massachusetts .....	340	Maryland <sup>1</sup> .....	11
Michigan <sup>1</sup> .....	268	Massachusetts .....	4
Montana .....	43	Michigan <sup>1</sup> .....	6
New Jersey .....	280	Montana .....	1
New York <sup>2</sup> .....	248	New Jersey .....	5
North Carolina .....	10	New York <sup>2</sup> .....	19
Oregon .....	14	North Carolina .....	24
Pennsylvania .....	432	Oregon .....	6
Texas .....	4	Pennsylvania .....	27
Utah <sup>1</sup> .....	13	Texas .....	24
Vermont .....	16	Washington .....	4
Washington .....	51	West Virginia .....	15
West Virginia .....	26		
SMALLPOX			
Arkansas .....	13		
Colorado .....	5		
Idaho .....	10		
Illinois .....	23		

Reports for Week Ended May 28, 1927

DIPHTHERIA		MENINGOCOCCUS MENINGITIS	
	Cases		Cases
District of Columbia .....	26	District of Columbia .....	1
North Dakota .....	5		
INFLUENZA		SCARLET FEVER	
District of Columbia .....	2	District of Columbia .....	15
		North Dakota .....	46
MEASLES		SMALLPOX	
District of Columbia .....	10	District of Columbia .....	1
North Dakota .....	26	North Dakota .....	1
		TYPHOID FEVER	
		District of Columbia .....	1

<sup>1</sup> Week ended Friday.

<sup>2</sup> Exclusive of New York City.

## 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	Cerobrospinal meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Polio-myelitis	Scarlet fever	Small-pox	Typhoid fever
<i>April, 1927</i>										
Mississippi.....	0	48	2,664	3,594	3,023	685	3	38	23	60
Montana.....	24	13	19	-----	169	-----	0	287	34	9
North Carolina.....	1	64	-----	-----	4,754	-----	0	84	183	11
Oregon.....	6	53	313	-----	1,350	-----	2	148	86	15
Pennsylvania.....	7	771	-----	-----	3,233	-----	1	2,387	0	87
Virginia.....	2	96	3,668	48	3,958	24	1	154	143	37
Washington.....	28	78	64	-----	2,141	-----	2	306	204	16

<i>April, 1927</i>		Cases	Ophthalmia neonatorum:	Cases
Anthrax:			Mississippi.....	25
Pennsylvania.....		1	North Carolina.....	2
Chicken pox:			Pennsylvania.....	13
Mississippi.....		705	Paratyphoid fever:	
Montana.....		114	Washington.....	1
North Carolina.....		498	Puerperal septiceamia:	
Oregon.....		113	Mississippi.....	43
Pennsylvania.....		2,224	Pennsylvania.....	12
Virginia.....		727	Rabies in animals:	
Washington.....		493	Mississippi.....	18
Dengue:			Oregon.....	2
Mississippi.....		7	Washington.....	1
Dysentery:			Rocky Mountain spotted or tick fever:	
Mississippi (amoebic).....		58	Montana.....	11
Mississippi (bacillary).....		772	Oregon.....	7
Virginia.....		60	Scabies:	
Washington.....		1	Oregon.....	4
German measles:			Pennsylvania.....	18
Montana.....		2	Septic sore throat:	
North Carolina.....		53	North Carolina.....	4
Pennsylvania.....		570	Oregon.....	9
Washington.....		1,711	Tetanus:	
Hookworm disease:			Pennsylvania.....	1
Mississippi.....		257	Trachoma:	
Virginia.....		3	Mississippi.....	9
Impetigo contagiosa:			Montana.....	1
Oregon.....		13	Oregon.....	1
Pennsylvania.....		25	Pennsylvania.....	2
Washington.....		1	Trichinosis:	
Lethargic encephalitis:			Pennsylvania.....	2
Pennsylvania.....		6	Whooping cough:	
Washington.....		13	Mississippi.....	2,068
Mumps:			Montana.....	26
Mississippi.....		579	North Carolina.....	3,087
Montana.....		20	Oregon.....	67
Oregon.....		82	Pennsylvania.....	944
Pennsylvania.....		2,281	Virginia.....	1,857
Washington.....		517	Washington.....	188

## GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 98 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 30,800,000. The estimated population of the 93 cities reporting deaths is more than 30,200,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended May 21, 1927, and May 22, 1926

	1927	1926	Estimated expectancy
<i>Cases reported</i>			
<b>Diphtheria:</b>			
42 States.....	1,599	1,242	
98 cities.....	1,693	684	832
<b>Measles:</b>			
40 States.....	12,586	23,606	
98 cities.....	4,504	8,181	
<b>Poliomyelitis:</b>			
40 States.....	27	11	
<b>Scarlet fever:</b>			
42 States.....	4,191	3,973	
98 cities.....	1,836	1,791	1,496
<b>Smallpox:</b>			
42 States.....	723	638	
98 cities.....	149	108	126
<b>Typhoid fever:</b>			
42 States.....	207	269	
98 cities.....	59	63	58
<i>Deaths reported</i>			
<b>Influenza and pneumonia:</b>			
93 cities.....	703	868	
<b>Smallpox:</b>			
93 cities.....	0	3	
Chicago.....	0	1	
Los Angeles.....	0	2	

City reports for week ended May 21, 1927

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that 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 non-epidemic 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 1918 is included. In obtaining the estimated expectancy the figures are smoothed when necessary to avoid abrupt deviations from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Population July 1, 1925, estimated	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
			Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
<b>NEW ENGLAND</b>									
<b>Maine:</b>									
Portland.....	75,333	0	1	1	0	0	0	1	1
<b>New Hampshire:</b>									
Concord.....	22,546	0	0	0	0	0	0	0	0
Manchester.....	83,097	0	1	0	0	3	0	0	1
<b>Vermont:</b>									
Berre.....	10,098	0	0	0	0	0	0	0	0
Burlington.....	24,089	0	1	0	0	0	18	1	0
<b>Massachusetts:</b>									
Boston.....	779,620	52	46	32	0	0	166	66	18
Fall River.....	128,908	4	3	0	2	1	2	1	4
Springfield.....	142,885	18	2	10	1	1	2	3	2
Worcester.....	199,757	54	3	1	0	0	1	12	2
<b>Rhode Island:</b>									
Providence.....	69,760	0	0	2	0	0	0	0	0
Pawtucket.....	267,618	0	0	3	0	0	0	0	3
<b>Connecticut:</b>									
Bridgport.....	(1)	1	5	5	1	1	5	1	7
Hartford.....	160,197	3	0	2	0	2	1	10	5
New Haven.....	178,927	23	2	1	0	1	1	5	1

<sup>1</sup>No estimate made.

## City reports for week ended May 31, 1927—Continued.

Division, State, and city	Population July 1, 1925, estimated	Chick- en pox, cases reported	Diphtheria		Influenza		Meas- les, cases reported	Mumps, cases reported	Pneu- monia, deaths re- ported
			Cases, esti- mated expectancy	Cases re- ported	Cases re- ported	Deaths re- ported			
<b>MIDDLE ATLANTIC</b>									
New York:									
Buffalo.....	538, 016	31	9	18	0	0	15	10	13
New York.....	5, 873, 356	336	232	389	17	9	100	304	145
Rochester.....	316, 786	20	10	23	0	0	26	10	5
Syracuse.....	182, 003	32	5	1	0	0	217	10	6
New Jersey:									
Camden.....	128, 642	0	4	13	0	1	4	2	1
Newark.....	452, 513	90	14	6	3	0	22	129	8
Trenton.....	132, 020	0	3	2	0	0	0	2	3
Pennsylvania:									
Philadelphia.....	1, 979, 364	95	64	52	0	6	54	177	38
Pittsburgh.....	631, 563	55	16	33	0	4	118	1	20
Reading.....	112, 707	1	2	1	0	0	100	56	3
<b>EAST NORTH CENTRAL</b>									
Ohio:									
Cincinnati.....	409, 333	14	6	10	0	2	2	12	4
Cleveland.....	936, 485	98	20	72	1	0	7	83	18
Columbus.....	279, 836	12	3	1	0	1	1	1	5
Toledo.....	287, 380	45	4	3	0	0	50	14	4
Indiana:									
Fort Wayne.....	97, 846	1	2	1	0	0	18	0	4
Indianapolis.....	353, 819	16	4	5	0	0	14	41	8
South Bend.....	80, 091	1	1	1	0	0	4	0	2
Terre Haute.....	71, 071	0	1	0	0	0	19	0	1
Illinois:									
Chicago.....	2, 995, 239	88	78	82	13	7	424	106	60
Peoria.....	81, 564	2	1	0	0	0	7	0	5
Springfield.....	63, 923	1	0	3	4	4	6	0	0
Michigan:									
Detroit.....	1, 245, 824	76	45	40	5	4	7	135	32
Flint.....	130, 316	24	3	5	0	0	26	4	3
Grand Rapids.....	153, 698	7	2	0	0	0	11	0	4
Wisconsin:									
Kenosha.....	50, 891	33	1	0	0	0	14	86	1
Madison.....	46, 385	1	1	0	0	0	0	0	0
Milwaukee.....	509, 192	77	11	17	0	0	183	142	13
Racine.....	67, 707	4	1	3	0	0	2	20	0
Superior.....	39, 671	0	0	0	0	0	0	0	1
<b>WEST NORTH CENTRAL</b>									
Minnesota:									
Duluth.....	110, 502	9	1	0	0	0	26	0	2
Minneapolis.....	425, 435	96	15	13	0	1	11	0	6
St. Paul.....	246, 001	41	15	9	0	0	16	1	4
Iowa:									
Davenport.....	52, 469	0	1	0	0	0	2	2	0
Sioux City.....	76, 411	0	0	0	0	0	0	0	0
Waterloo.....	36, 771	0	0	1	0	0	0	0	0
Missouri:									
Kansas City.....	367, 481	5	5	1	0	3	73	16	10
St. Joseph.....	78, 342	1	1	0	0	0	40	0	2
St. Louis.....	821, 543	14	39	26	0	0	35	97	0
North Dakota:									
Fargo.....	26, 403	0	0	0	0	0	4	3	0
Grand Forks.....	14, 811	1	0	0	0	0	0	0	0
South Dakota:									
Sioux Falls.....	30, 126	4	1	0	0	0	55	0	0
Nebraska:									
Lincoln.....	60, 941	10	1	1	0	0	64	7	1
Omaha.....	211, 788	5	2	0	0	0	29	13	2
Kansas:									
Topeka.....	55, 411	4	1	1	0	0	154	1	2
Wichita.....	88, 367	11	1	1	0	0	13	1	0
<b>SOUTH ATLANTIC</b>									
Delaware:									
Wilmington.....	122, 049	2	1	1	0	0	1	0	1
Maryland:									
Baltimore.....	796, 296	71	20	35	3	2	5	21	34
Cumberland.....	33, 741	1	0	0	0	0	2	0	0
Frederick.....	12, 035	2	0	0	0	0	0	0	0

## City reports for week ended May 21, 1927—Continued.

Division, State, and city	Population July 1, 1925, estimated	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
			Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
<b>SOUTH ATLANTIC—con.</b>									
District of Columbia:									
Washington	497, 906	34	12	12	1	1	4	0	7
Virginia:									
Lynchburg	30, 395	19	0	4	0	0	7	1	4
(1)		15	1	0	0	0	206	2	4
Norfolk	186, 403	1	1	6	0	0	413	1	4
Richmond	58, 208	3	1	0	0	0	1	1	1
Roanoke									
West Virginia:									
Charleston	49, 019	0	0	0	0	0	1	2	2
Wheeling	56, 208	2	1	2	0	0	10	1	3
North Carolina:									
Raleigh	30, 371	1	0	0	0	0	101	0	0
Wilmington	37, 081	0	0	0	0	0	56	10	4
Winston-Salem	69, 081	5	0	0	0	0	238	36	7
South Carolina:									
Charleston	73, 125	0	0	0	22	0	22	1	1
Columbia	41, 225	7	1	0	0	0	9	4	3
Greenville	27, 311		0						
Georgia:									
(1)		9	1	1	7	2	17	4	3
Atlanta	16, 809	0	0	0	0	0	0	11	0
Brunswick	93, 184	0	0	0	9	1	5	0	4
Savannah									
Florida:									
Miami	69, 754	8	4	3	0	0	2	7	1
St. Petersburg	26, 947		0	0	0	0			0
Tampa	94, 743	4	0	0	0	0	50	0	0
<b>EAST SOUTH CENTRAL</b>									
Kentucky:									
Covington	58, 309	0	1	0	0	0	0	0	1
Louisville	305, 935	3	3	0	0	0	3	11	7
Tennessee:									
Memphis	174, 533	6	1	1	0	3	27	5	7
Nashville	136, 220	3	0	2	0	1	0	0	0
Alabama:									
Birmingham	205, 670	6	1	2	6	4	16	6	4
Mobile	65, 935	0	0	1	1	0	1	2	2
Montgomery	46, 481	0	0	0	0	0	23	1	0
<b>WEST SOUTH CENTRAL</b>									
Arkansas:									
Fort Smith	31, 643	0	0	0	0	0	5	0	1
Little Rock	74, 216	1	1	0	0	0	9	0	2
Louisiana:									
New Orleans	414, 493	0	6	2	3	2	3	0	9
Shreveport	57, 857	6	0	1	0	0	15	5	2
Oklahoma:									
Tulsa	124, 478	6	1	1	0	0	36	20	
Texas:									
Dallas	194, 450	3	3	2	1	3	102	1	5
Galveston	45, 375	0	0	0	0	0	1	0	0
Houston	164, 954	2	3	5	0	0	11	0	1
San Antonio	193, 069	0	1	2	0	1	4	0	5
<b>MOUNTAIN</b>									
Montana:									
Billings	17, 971	6	0	0	0	0	1	0	2
Great Falls	29, 893	2	1	1	0	0	3	1	0
Helena	12, 037	0	0	0	0	0	2	0	0
Missoula	12, 668	0	0	0	0	0	0	2	0
Idaho:									
Boise	23, 042	0	1	0	0	0	0	0	0
Colorado:									
Denver	280, 911	9	10	4	0	1	26	6	2
Pueblo	43, 787	1	1	0	0	0	67	0	1
New Mexico:									
Albuquerque	21, 000	0	0	0	0	0	5	7	1
Utah:									
Salt Lake City	130, 948	31	3	6	0	0	2	0	2
Nevada:									
Reno	12, 685	0	0	1	0	0	0	0	0

1 No estimate made.

## City reports for week ended May 21, 1927—Continued

Division, State, and city	Population July 1, 1925, estimated	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported		
			Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported					
<b>PACIFIC</b>											
Washington:											
Seattle.....	(1)	19	5	2	0	0	124	36	0		
Spokane.....	106,897	5	2	0	0	0	3	0	0		
Tacoma.....	104,455	6	1	0	0	0	64	0	5		
Oregon:											
Portland.....	282,383	5	5	8	0	1	196	2	5		
California:											
Los Angeles.....	(1)	25	36	30	14	0	169	8	22		
Sacramento.....	72,280	8	2	1	0	0	6	10	0		
San Francisco.....	557,530	22	18	7	1	0	99	106	8		
Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
<b>NEW ENGLAND</b>											
Maine:											
Portland.....	3	2	0	0	0	2	0	1	0	2	30
New Hampshire:											
Concord.....	1	0	0	0	0	2	0	0	0	0	8
Manchester.....	1	0	0	0	0	0	0	0	0	0	21
Vermont:											
Barre.....	0	0	0	0	0	1	0	0	0	0	3
Burlington.....	0	0	0	0	0	0	0	0	0	2	3
Massachusetts:											
Boston.....	56	123	0	0	0	19	2	1	0	19	213
Fall River.....	3	4	0	0	0	0	0	0	0	0	22
Springfield.....	5	4	0	0	0	3	0	0	0	4	32
Worcester.....	8	11	0	0	0	1	1	0	0	17	48
Rhode Island:											
Pawtucket.....	1	1	0	0	0	1	0	0	0	0	22
Providence.....	9	8	0	0	0	3	0	0	0	0	62
Connecticut:											
Bridgeport.....	8	14	0	0	0	2	0	0	0	0	31
Hartford.....	3	11	0	0	0	4	1	0	0	1	41
New Haven.....	5	8	0	0	0	2	0	0	0	0	34
<b>MIDDLE ATLANTIC</b>											
New York:											
Buffalo.....	17	24	0	0	0	13	1	0	0	10	169
New York.....	245	618	0	1	0	112	9	7	0	99	1,432
Rochester.....	13	18	0	0	0	1	0	2	0	8	74
Syracuse.....	9	4	0	0	0	4	0	0	0	5	57
New Jersey:											
Camden.....	6	5	0	0	0	1	1	1	0	1	23
Newark.....	22	36	0	0	0	6	0	0	0	38	82
Trenton.....	3	3	0	0	0	5	0	0	0	0	27
Pennsylvania:											
Philadelphia.....	79	114	0	0	0	38	4	2	0	21	433
Pittsburgh.....	30	19	0	0	0	1	0	0	0	5	162
Reading.....	2	3	0	0	0	1	1	0	0	1	24
<b>EAST NORTH CENTRAL</b>											
Ohio:											
Cincinnati.....	14	23	2	2	0	10	1	0	0	3	123
Cleveland.....	30	35	0	0	0	17	1	3	0	28	174
Columbus.....	10	13	3	1	0	11	1	0	0	11	97
Toledo.....	12	6	3	0	0	10	0	1	0	11	63

<sup>1</sup> No estimate made.

<sup>2</sup> Pulmonary tuberculosis only.





## City reports for week ended May 21, 1927—Continued

Division, State, and city.	Scarlet fever		Smallpox			Tuber- culosis, deaths re- ported	Typhoid fever			Whoop- ing cough, cases re- ported	Deaths all causes
	Cases, esti- mated expect- ancy	Cases re- ported	Cases, esti- mated expect- ancy	Cases re- ported	Deaths re- ported		Cases, esti- mated expect- ancy	Cases re- ported	Deaths re- ported		
<b>SOUTH ATLANTIC— continued</b>											
<b>Georgia:</b>											
Atlanta.....	3	1	5	3	0	4	0	3	1	9	68
Brunswick.....	0	0	1	0	0	1	0	0	0	0	4
Savannah.....	0	1	1	5	0	1	1	0	0	2	37
<b>Florida:</b>											
Miami.....	0	0	0	1	0	2	2	0	0	21	29
St. Petersburg.....	0	0	0	0	0	0	0	0	0	0	8
Tampa.....	0	1	1	0	0	2	1	0	0	2	22
<b>EAST SOUTH CENTRAL</b>											
<b>Kentucky:</b>											
Covington.....	1	0	0	0	0	2	1	0	0	0	18
Louisville.....	5	7	1	0	0	2	2	1	0	15	76
<b>Tennessee:</b>											
Memphis.....	4	15	2	9	0	4	1	6	6	23	76
Nashville.....	3	2	1	0	0	3	0	2	1	4	42
<b>Alabama:</b>											
Birmingham.....	1	0	3	5	0	5	2	5	1	9	77
Mobile.....	0	0	1	9	0	0	0	0	0	0	20
Montgomery.....	0	2	1	1	0	0	0	0	0	10	19
<b>WEST SOUTH CENTRAL</b>											
<b>Arkansas:</b>											
Fort Smith.....	0	0	0	0	0	0	2	0	1	0	7
Little Rock.....	0	0	1	0	0	0	3	0	3	0	0
<b>Louisiana:</b>											
New Orleans.....	4	6	2	0	0	18	2	2	2	2	153
Shreveport.....	0	0	1	1	0	0	0	0	0	0	28
<b>Oklahoma:</b>											
Tulsa.....	1	7	3	1	0	0	0	0	2	0	0
<b>Texas:</b>											
Dallas.....	2	0	4	1	0	1	0	0	2	0	52
Galveston.....	0	0	1	0	0	0	0	0	0	0	10
Houston.....	1	1	1	2	0	4	0	3	0	1	52
San Antonio.....	0	1	0	0	0	4	1	1	0	0	48
<b>MOUNTAIN</b>											
<b>Montana:</b>											
Billings.....	1	0	0	1	0	1	0	0	0	0	6
Great Falls.....	1	3	1	0	0	2	0	0	0	0	13
Helena.....	1	1	0	0	0	1	0	0	0	0	5
Misoula.....	0	2	1	0	0	0	1	0	0	0	7
<b>Idaho:</b>											
Boise.....	0	0	1	0	0	0	0	0	0	0	3
<b>Colorado:</b>											
Denver.....	11	54	1	0	0	7	0	0	1	78	78
Pueblo.....	1	33	0	0	0	0	0	0	0	0	11
<b>New Mexico:</b>											
Albuquerque.....	0	0	0	0	0	2	0	0	0	0	6
<b>Utah:</b>											
Salt Lake City.....	2	16	0	4	0	0	0	0	28	26	26
<b>Nevada:</b>											
Rebo.....	0	1	0	0	0	0	0	0	0	0	0
<b>PACIFIC</b>											
<b>Washington:</b>											
Seattle.....	9	3	4	0	0	1	2	0	28	0	0
Spokane.....	4	10	4	12	0	0	0	0	1	0	0
Tacoma.....	3	2	2	8	0	0	0	0	0	0	23
<b>Oregon:</b>											
Portland.....	7	2	6	4	0	6	0	0	5	56	56
<b>California:</b>											
Los Angeles.....	23	34	7	0	0	25	1	0	26	244	244
Sacramento.....	2	2	0	0	0	5	1	0	4	0	0
San Francisco.....	14	13	2	1	0	10	1	1	42	154	154

## City reports for week ended May 21, 1927—Continued

Division, State, and city	Cerebrospinal meningitis		Lethargic encephalitis		Pellagra		Poliomylitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
<b>NEW ENGLAND</b>									
Massachusetts:									
Boston.....	0	0	0	0	0	0	0	1	1
Springfield.....	0	0	0	0	0	0	0	1	0
Worcester.....	0	0	1	0	0	0	0	0	0
Rhode Island:									
Providence.....	0	0	0	0	0	0	0	1	0
Connecticut:									
New Haven.....	0	0	1	0	0	0	0	0	0
<b>MIDDLE ATLANTIC</b>									
New York:									
New York <sup>1, 2</sup> .....	4	4	7	1	0	0	0	2	0
New Jersey:									
Newark.....	0	0	0	0	0	0	0	1	0
Pennsylvania:									
Philadelphia.....	0	0	0	1	0	0	0	1	0
Pittsburgh.....	2	0	0	0	0	0	0	0	0
<b>EAST NORTH CENTRAL</b>									
Ohio:									
Cleveland.....	0	1	0	0	0	0	0	0	0
Illinois:									
Chicago.....	4	2	1	0	1	1	0	0	0
Wisconsin:									
Milwaukee.....	4	1	0	0	0	0	1	0	0
<b>WEST NORTH CENTRAL</b>									
Minnesota:									
St. Paul.....	0	0	0	0	0	0	0	1	0
Iowa:									
Waterloo.....	0	0	0	0	0	0	0	1	0
Missouri:									
Kansas City.....	1	1	0	0	0	0	0	0	0
St. Louis.....	4	1	0	0	0	0	0	0	0
North Dakota:									
Fargo.....	0	1	0	0	0	0	0	0	0
Kansas:									
Wichita.....	0	1	0	0	0	0	0	0	0
<b>SOUTH ATLANTIC</b>									
Maryland:									
Baltimore.....	0	0	1	1	0	0	0	0	0
North Carolina:									
Winston-Salem.....	0	0	0	0	1	1	0	0	0
South Carolina:									
Charleston.....	0	0	0	1	1	1	0	0	0
Georgia:									
Savannah.....	0	0	0	0	1	1	0	0	0
Florida:									
Tampa.....	0	0	0	0	0	1	0	0	0
<b>EAST SOUTH CENTRAL</b>									
Kentucky:									
Louisville.....	0	0	0	0	1	0	0	1	0
Tennessee:									
Nashville.....	0	1	0	0	0	0	0	0	0
Alabama:									
Birmingham.....	0	0	0	0	0	1	0	0	0
<b>WEST SOUTH CENTRAL</b>									
Arkansas:									
Little Rock.....	0	0	0	0	1	0	0	0	0
Louisiana:									
Shreveport.....	0	0	0	0	0	2	0	0	0
Texas:									
Dallas <sup>3</sup> .....	0	0	0	0	2	1	0	0	0

<sup>1</sup> Rabies (human): 1 case and 1 death at New York, N. Y.<sup>2</sup> Typhus fever: 1 case at New York, N. Y.<sup>3</sup> Dengue: 1 case at Dallas, Tex.

## City reports for week ended May 21, 1927—Continued

Division, State, and city	Cerebrospinal meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
<b>MOUNTAIN</b>									
Colorado:									
Denver.....	0	1	0	0	0	0	0	0	0
<b>PACIFIC</b>									
Washington:									
Seattle.....	1	-----	0	-----	0	-----	0	0	-----
Spokane.....	2	-----	0	-----	0	-----	0	0	-----
Oregon:									
Portland.....	1	0	0	0	0	0	0	0	0
California:									
Sacramento.....	1	1	0	0	0	0	0	0	0
San Francisco.....	1	0	0	0	0	0	1	0	0

The following table gives the rates per 100,000 population for 101 cities for the five-week period ended May 21, 1927, compared with those for a like period ended May 22, 1926. The population figures used in computing the rates are approximate estimates as of July 1, 1926 and 1927, respectively, authoritative figures for many of the cities not being available. The 101 cities reporting cases had estimated aggregate populations of approximately 30,440,000 in 1926 and 30,960,000 in 1927. The 95 cities reporting deaths had nearly 20,780,000 estimated population in 1926 and nearly 30,290,000 in 1927. The number of cities included in each group and the estimated aggregate populations are shown in a separate table below.

Summary of weekly reports from cities, April 17 to May 21, 1927—Annual rates per 100,000 population, compared with rates for the corresponding period of 1926<sup>1</sup>

## DIPHTHERIA CASE RATES

	Week ended—									
	Apr. 24, 1926	Apr. 25, 1927	May 1, 1926	Apr. 30, 1927	May 2, 1926	May 7, 1927	May 15, 1926	May 14, 1927	May 22, 1926	May 21, 1927
101 cities.....	118	180	110	171	115	183	121	175	118	175
New England.....	73	135	83	95	106	130	87	104	79	120
Middle Atlantic.....	162	270	114	243	126	273	135	282	129	285
East North Central.....	87	132	98	138	89	160	96	132	117	162
West North Central.....	182	141	204	159	198	131	202	135	147	106
South Atlantic.....	67	136	67	105	75	120	78	116	71	112
East South Central.....	26	31	72	76	62	76	59	83	26	36
West South Central.....	47	126	56	180	60	143	82	113	47	50
Mountain.....	82	189	118	99	146	153	132	96	128	108
Pacific.....	145	157	153	188	177	146	174	94	163	105

<sup>1</sup> The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1926 and 1927, respectively.

<sup>2</sup> Madison, Wis., Sioux City, Iowa, and Greenville, S. C., not included.

<sup>3</sup> Madison, Wis., not included.

<sup>4</sup> Sioux City, Iowa, not included.

<sup>5</sup> Greenville, S. C., not included.

Summary of weekly reports from cities, April 17 to May 21, 1927—Annual rates per 100,000 population, compared with rates for the corresponding period of 1926—Continued

MEASLES CASE RATES

	Week ended—									
	Apr. 24, 1926	Apr. 23, 1927	May 1, 1926	Apr. 30, 1927	May 8, 1926	May 7, 1927	May 15, 1926	May 14, 1927	May 22, 1926	May 21, 1927
101 cities.....	1,792	785	1,708	640	1,713	699	1,565	605	1,433	608
New England.....	1,663	295	1,526	323	1,710	269	1,196	346	1,073	416
Middle Atlantic.....	1,596	146	1,420	231	1,432	213	1,200	298	1,135	324
East North Central.....	1,459	778	1,488	638	1,456	568	1,373	453	1,374	487
West North Central.....	4,148	1,556	4,060	1,229	4,511	1,527	4,181	935	3,465	621
South Atlantic.....	2,516	1,596	2,507	1,022	1,926	1,583	1,917	1,553	1,645	1,552
East South Central.....	3,434	520	2,875	377	3,237	520	3,449	346	2,989	357
West South Central.....	163	1,267	159	935	125	899	155	575	142	629
Mountain.....	1,075	1,798	866	1,546	884	1,636	1,394	1,304	1,385	908
Pacific.....	501	2,107	664	1,532	656	1,605	675	1,262	688	1,217

SCARLET FEVER CASE RATES

101 cities.....	284	363	292	338	294	360	326	341	306	311
New England.....	222	346	261	402	222	302	311	439	288	432
Middle Atlantic.....	201	529	221	448	217	541	249	475	256	416
East North Central.....	288	296	280	282	310	283	356	290	342	288
West North Central.....	899	343	879	334	940	272	871	329	720	295
South Atlantic.....	158	161	216	194	175	129	220	149	194	102
East South Central.....	228	168	171	194	186	183	202	153	176	132
West South Central.....	172	42	146	34	176	59	155	21	172	84
Mountain.....	210	935	219	953	137	1,007	246	728	173	989
Pacific.....	260	209	204	199	206	212	257	202	292	168

SMALLPOX CASE RATES

101 cities.....	31	33	26	21	26	22	26	21	19	25
New England.....	0	0	0	0	0	0	0	0	0	0
Middle Atlantic.....	0	0	0	0	0	0	0	0	0	0
East North Central.....	22	29	19	33	22	28	20	20	18	38
West North Central.....	44	40	30	38	58	34	36	26	28	45
South Atlantic.....	47	65	28	20	30	36	39	38	24	35
East South Central.....	98	163	98	66	72	59	119	56	62	76
West South Central.....	112	96	146	25	159	34	116	59	95	17
Mountain.....	46	54	36	9	36	36	55	9	18	45
Pacific.....	139	97	102	65	56	73	67	92	51	71

TYPHOID FEVER CASE RATES

101 cities.....	8	7	9	8	8	9	8	8	11	10
New England.....	5	0	5	5	9	2	0	5	9	5
Middle Atlantic.....	8	7	6	5	7	10	10	5	7	6
East North Central.....	1	3	4	6	4	6	5	3	5	5
West North Central.....	6	4	6	4	6	2	2	2	8	6
South Atlantic.....	7	11	19	16	13	18	4	9	32	13
East South Central.....	26	31	21	31	16	15	0	66	10	56
West South Central.....	26	13	17	13	17	38	43	25	26	46
Mountain.....	0	27	18	9	0	18	9	9	9	9
Pacific.....	21	10	27	18	11	3	8	10	19	10

<sup>1</sup> Madison, Wis.; Sioux City, Iowa; and Greenville, S. C., not included.

<sup>2</sup> Madison, Wis., not included.

<sup>3</sup> Sioux City, Iowa, not included.

<sup>4</sup> Greenville, S. C., not included.

Summary of weekly reports from cities, April 17, to May 31, 1927—Annual rates per 100,000 population, compared with rates for the corresponding period of 1926—Continued

## INFLUENZA DEATH RATES

	Week ended—									
	Apr. 24, 1926	Apr. 25, 1927	May 1, 1926	Apr. 30, 1927	May 8, 1926	May 7, 1927	May 15, 1926	May 14, 1927	May 22, 1926	May 21, 1927
95 cities.....	38	18	33	18	25	13	16	13	15	* 12
New England.....	40	12	35	7	14	5	5	14	12	14
Middle Atlantic.....	34	20	27	21	22	15	17	14	16	10
East North Central.....	42	11	46	10	29	7	18	10	18	* 12
West North Central.....	32	21	17	12	13	8	6	4	8	8
South Atlantic.....	30	22	28	29	19	17	17	24	11	* 11
East South Central.....	103	56	98	36	96	41	31	31	36	41
West South Central.....	62	31	26	47	44	13	26	13	22	26
Mountain.....	46	0	0	9	18	0	18	9	0	9
Pacific.....	4	10	11	21	4	21	4	7	4	0

## PNEUMONIA DEATH RATES

95 cities.....	201	159	177	144	163	131	150	123	141	* 109
New England.....	233	151	210	183	170	139	165	144	144	100
Middle Atlantic.....	240	199	219	169	175	167	166	151	173	119
East North Central.....	192	135	152	128	178	122	147	99	133	* 104
West North Central.....	137	125	108	56	122	69	82	71	95	58
South Atlantic.....	206	180	178	156	170	114	183	125	149	* 147
East South Central.....	259	182	263	197	222	143	181	122	171	107
West South Central.....	128	78	150	125	110	112	128	134	84	103
Mountain.....	109	162	118	189	82	99	91	54	82	63
Pacific.....	71	97	74	117	78	79	92	114	53	121

\* Madison, Wis., not included.

† Greenville, S. C., not included.

‡ Madison, Wis., and Greenville, S. C., not included.

Number of cities included in summary of weekly reports, and aggregate population of cities in each group, approximated as of July 1, 1926 and 1927, respectively

Group of cities	Number of cities reporting cases	Number of cities reporting deaths	Aggregate population of cities reporting cases		Aggregate population of cities reporting deaths	
			1926	1927	1926	1927
Total.....	161	95	30,438,500	30,960,600	29,778,490	30,269,800
New England.....	12	12	2,211,000	2,245,900	2,211,000	2,245,900
Middle Atlantic.....	10	10	10,457,000	10,567,000	10,457,000	10,567,000
East North Central.....	16	16	7,644,900	7,804,500	7,644,900	7,804,500
West North Central.....	12	10	2,585,500	2,626,600	2,470,600	2,510,680
South Atlantic.....	21	20	2,799,500	2,878,100	2,757,700	2,835,700
East South Central.....	7	7	1,008,309	1,032,500	1,008,309	1,032,500
West South Central.....	8	7	1,213,800	1,243,309	1,181,800	1,210,400
Mountain.....	9	9	572,100	580,000	572,100	580,000
Pacific.....	6	4	1,946,400	1,991,700	1,475,300	1,517,800

# FOREIGN AND INSULAR

## THE FAR EAST

*Report for week ended May 7, 1927.*—The following report for the week ended May 7, 1927, was transmitted by the Eastern Bureau of the Health Section of the Secretariat of the League of Nations, located at Singapore, to the headquarters at Geneva:

Maritime towns	Plague		Cholera		Small-pox		Maritime towns	Plague		Cholera		Small-pox	
	Cases	Deaths	Cases	Deaths	Cases	Deaths		Cases	Deaths	Cases	Deaths	Cases	Deaths
Ceylon: Colombo.....	1	1	0	0	0	0	Siam: Bangkok.....	0	0	9	1	2	2
British India:							French Indo-China:						
Karachi.....	0	0	0	0	1	0	Saigon and Cholon.....	0	0	54	37	0	0
Bombay.....		17		1	73	37	Haiphong.....	0	0	286	240	0	0
Calcutta.....		0		87	73	61	China:						
Rangoon.....		2		4	19	7	Canton.....	0	0	0	0	14	0
Bassein.....		2		2	0	0	Macao.....	0	0	0	0		1
Madras.....		0		0	8	0	Hong Kong.....	0	0	0	0	5	5
Negapatam.....		0		1	1	0	Kwantung: Dairen.....	0	0	0	0	1	0
Straits Settlements:													
Singapore.....	0	0	0	0	2	0							

Telegraphic reports from the following maritime towns indicated that no case of plague, cholera, or smallpox was reported during the week:

### ASIA

*Arabia.*—Jeddah, Perim, Aden.  
*Ira.*—Basra.  
*Persia.*—Mohammerah, Bender-Abbas, Bushire, Lingah.  
*British India.*—Chittagong, Cochin, Tuticorin, Moulmein, Vizagapatam.  
*Portuguese India.*—Nova Goa.  
*Federated Malay States.*—Port Swettenham.  
*Straits Settlements.*—Penang.  
*Dutch East Indies.*—Batavia, Sabang, Belawan-Deli, Pontianak, Semarang, Menado, Banjarmasin, Cheribon, Palembang, Makassar, Balikpapan, Surabaya.  
*Sarawak.*—Kuching.  
*British North Borneo.*—Sandakan, Jesselton, Kudat, Tawao.  
*Portuguese Timor.*—Dilly.  
*French Indo-China.*—Tourane.  
*Philippine Islands.*—Manila, Iloilo, Jolo, Cebu, Zamboanga.  
*China.*—Amoy, Tientsin, Shanghai.  
*Formosa.*—Keelung, Takao.  
*Chosen.*—Chemulpo, Fusan.  
*Manchuria.*—Yingkow, Antung, Changchun, Harbin, Mukden.  
*Kwantung.*—Port Arthur.  
*Japan.*—Yokohama, Nagasaki, Niigata, Shimodaseki, Moji, Tsuruga, Kobe, Osaka, Hakodate.

### AUSTRALASIA AND OCEANIA

*Australia.*—Adelaide, Melbourne, Sydney, Brisbane, Rockhampton, Townsville, Port Darwin, Broome, Fremantle, Carnarvon, Thursday Island, Cairns.

### AUSTRALASIA AND OCEANIA—continued

*New Guinea.*—Port Moresby.  
*New Britain Mandated Territory.*—Rabaul and Kokopo.  
*New Zealand.*—Auckland, Wellington, Christchurch, Invercargill, Dunedin.  
*Samoa.*—Apia.  
*New Caledonia.*—Noumea.  
*Fiji.*—Suva.  
*Hawaii.*—Honolulu.  
*Society Islands.*—Papeete.

### AFRICA

*Egypt.*—Port Said, Suez, Alexandria.  
*Anglo-Egyptian Sudan.*—Port Sudan, Suakin.  
*Eritrea.*—Massaua.  
*French Somaliland.*—Djibouti.  
*British Somaliland.*—Berbera.  
*Italian Somaliland.*—Mogadiscio.  
*Zanzibar.*—Zanzibar.  
*Kenya.*—Mombasa.  
*Tanganyika.*—Dar-es-Salaam.  
*Seychelles.*—Victoria.  
*Portuguese East Africa.*—Mozambique, Beira, Lourenco-Marques.  
*Union of South Africa.*—East London, Port Elizabeth, Cape Town, Durban.  
*Reunion.*—St. Denis.  
*Mauritius.*—Port Louis.  
*Madagascar.*—Majunga, Tamatave, Diégo-Suarez.

### AMERICA

*Panama.*—Colon, Panama.

Reports had not been received in time for publication from:

*Arabia*.—Kamaran.

*Dutch East Indies*.—Tarakan, Samarinda, Padang.

*Union of Socialist Soviet Republics*.—Vladivostok.

Belated information:

Week ended April 30: *Colombo*, four fatal plague cases; *Pondicherry*, four fatal smallpox cases; *Kerikal*, nil; *Fusan*, one smallpox case.

Week ended April 23: *Pondicherry and Kerikal*, nil.

### AZORES

*Plague—Ponta Delgada—April 17-23, 1927*.—During the week ended April 23, 1927, a case of plague, occurring in a suburb of Ponta Delgada, was reported in the Azores.

### CANADA

*Communicable diseases—Week ended May 21, 1927*.—The Canadian Ministry of Health reports cases of certain communicable diseases from six Provinces of Canada for the week ended May 21, 1927, as follows:

Disease	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Total
Influenza				1			1
Smallpox				16	1	4	21
Typhoid fever	1	4	797	5	3		810

*Communicable diseases—Quebec—Weeks ended May 21 and May 28, 1927*.—The Bureau of Health of the Province of Quebec reports cases of certain communicable diseases for the weeks ended May 21 and May 28, 1927, as follows:

#### WEEK ENDED MAY 21, 1927

Disease	Cases	Disease	Cases
Chicken pox	13	Scarlet fever	62
Diphtheria	31	Tuberculosis	69
German measles	89	Typhoid fever	798
Influenza	4	Whooping cough	20
Measles	185		

#### WEEK ENDED MAY 28, 1927

Disease	Cases	Disease	Cases
Chicken pox	24	Scarlet fever	51
Diphtheria	38	Smallpox	2
German measles	15	Tuberculosis	39
Influenza	4	Typhoid fever	499
Measles	192	Whooping cough	11

*Vital statistics—Quebec—March, 1927.*—Births and deaths in the Province of Quebec for the month of March, 1927, were reported as follows:

Estimated population.....	2,604,000	Deaths from—Continued.	
Births.....	6,888	Heart disease.....	402
Birth rate per 1,000 population.....	31.74	Influenza.....	113
Deaths.....	2,971	Measles.....	32
Death rate per 1,000 population.....	13.69	Pneumonia.....	280
Deaths under 1 year.....	850	Pollomyelitis.....	2
Infant mortality rate.....	123.40	Scarlet fever.....	13
Deaths from—		Syphilis.....	7
Accidents (all).....	53	Tuberculosis (pulmonary).....	223
Cancer.....	126	Tuberculosis (other forms).....	54
Cerebrospinal meningitis.....	9	Typhoid fever.....	102
Diabetes.....	18	Whooping cough.....	31
Diphtheria.....	29		

#### ECUADOR

*Plague—April 1–30, 1927.*—During April, 1927, eight cases of plague with two deaths were reported at Guayaquil, Ecuador.

*Plague-infected rats.*—During the same period, of 23,065 rats taken at Guayaquil, 74 rats were found plague infected.

#### EGYPT

*Plague—April 30–May 7, 1927.*—Plague has been reported in Egypt as follows: Port Said—May 1, 1927—one case, one death. Beni-Suef Province—April 30—five cases, one death; Guerga Province—one death.

#### GREAT BRITAIN (SCOTLAND)

*Chicken pox—Glasgow—April, 1927.*—During the month of April, 1927, prevalence of chicken pox, in mild form, with 1,028 cases, was reported at Glasgow, Scotland.

#### SENEGAL

*Plague—May 11, 1927.*—Under date of May 11, 1927, 2 cases of plague with 1 death were reported in the district of Thies and 22 cases with 13 deaths in the district of Tivaouane, Senegal.

*Smallpox.*—In the Niger Territory, under the same date, 95 deaths from smallpox were reported, occurring in the Canton of Birni. Many cases were stated to be present in the region of Filingue Sandire.

#### TOGOLAND (WEST AFRICA)

*Yellow fever—Lome—May 7–8, 1927.*—Two fatal cases of yellow fever were reported at Lome, Togoland, West Africa, May 7 and 8, 1927, occurring in Europeans.

#### UNION OF SOUTH AFRICA

*Plague—Orange Free State—April 10–16, 1927.*—During the week ended April 16, 1927, a fatal case of plague (native), was reported in the Orange Free State. The occurrence was in the Rouville district,



on Klipplaatsdrift farm, the locality in which the case reported during the previous week occurred.

## YUGOSLAVIA

*Communicable diseases—April, 1927.*—During the month of April 1927, communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax.....	15	2	Measles.....	1,828	32
Cerebrospinal meningitis.....	5	5	Rabies.....	1	1
Diphtheria.....	101	24	Scarlet fever.....	427	54
Dysentery.....	18	2	Tetanus.....	17	9
Influenza.....	2,646	167	Typhoid fever.....	90	15
Leprosy.....	1	—	Typhus fever.....	29	5
Lethargic encephalitis.....	5	4	Whooping cough.....	115	8

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

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

Reports Received During Week Ended June 10, 1927 <sup>1</sup>

## CHOLERA

Place	Date	Cases	Deaths	Remarks
India.....				Mar. 27-Apr. 2, 1927: Cases, 5,538; deaths, 2,788.
Bombay.....	Apr. 17-23.....	2	1	
Calcutta.....	Apr. 9-23.....	413	264	
Rangoon.....	Apr. 3-16.....	5	4	
Indo-China (French):				
Saigon.....	Mar. 27-Apr. 9....	14	12	Including area of 100 surrounding kilometers.
Siam.....				Apr. 9-16, 1927: Cases, 106; deaths, 88.
Bangkok.....	Apr. 9-16.....	19	20	

## PLAGUE

Azores:				
Ponta Delgada.....	Apr. 17-23.....	1	—	
British East Africa:				
Tanganyika Territory.....	Mar. 27-Apr. 9....	12	18	
Ceylon:				
Colombo.....	Apr. 10-23.....	8	5	One plague rodent.
Ecuador:				
Guayaquil.....	Apr. 1-30.....	8	2	Rats taken, 23,065; found infected, 74.
Egypt:				
Beni Souef Province.....	Apr. 30-May 7....	5	1	
Gurgua Province.....	do.....	—	1	
Port Said.....	do.....	1	1	
India.....				Mar. 27-Apr. 2, 1927; Cases, 3,350; deaths, 2,315.
Bombay.....	Apr. 17-23.....	15	13	
Calcutta.....	do.....	1	—	
Madras Presidency.....	Apr. 3-9.....	19	6	
Rangoon.....	Apr. 3-16.....	5	6	
Java:				
Batavia.....	Apr. 10-23.....	22	22	Province.
East Java and Madura.....	Mar. 13-Apr. 2....	13	14	
Senegal:				
Thies District.....	May 11.....	2	1	
Tivouane.....	do.....	22	13	
Union of South Africa:				
Orange Free State.....				
Rouxville District.....	Apr. 10-16.....	1	1	Native. On farm.

<sup>1</sup> From medical officers of the Public Health Service, American consuls, and other sources.

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

Reports Received During Week Ended June 10, 1927—Continued

**SMALLPOX**

Place	Date	Cases	Deaths	Remarks
British East Africa: Tanganyika Territory Zanzibar	Mar. 27-Apr. 9		14	Jan.-Feb., 1927: Cases, 31; Deaths, 14. Cases, 21.
Canada	May 15-21			
Manitoba	do	1		
Ontario	do	16		
Ottawa	do	1		
Toronto	do	3		
Quebec				May 22-23, 1927: Cases, 2.
Saskatchewan	May 15-21	4		
China:				
Amoy	Apr. 3-23	3		Present.
Chungking	Mar. 20-26			
Hong Kong	Apr. 3-23	18	20	
Manchuria— Fushun	Apr. 11-24	3		
Mukden	Apr. 18-24	1		
Shanghai	Apr. 29-May 1		1	International Settlement.
Tientsin	Apr. 17-23	2		
Egypt:				
Alexandria	Apr. 9-15	1		
France:				
Paris	Apr. 21-30	5	1	
Great Britain:				
England— Newcastle-on-Tyne	May 8-14	1		
Sheffield	May 1-23	14		
Scotland— Dundee	May 8-14	5		
India				Mar. 27-Apr. 2, 1927: Cases, 9,075; deaths, 2,134.
Bombay	Apr. 17-23	30	36	
Calcutta	Apr. 10-23	376	299	
Madras	Apr. 24-30	6	1	
Rangoon	Apr. 3-16	22	29	
Japan:				
Yokohama	Apr. 23-May 6	1	1	
Mexico:				
Tampico	May 11-20		2	
Portugal:				
Lisbon	May 8-14	1		
Senegal:				
Niger Territory— Birni Canton	May 11		95	Present in region of Filingue Sandiro.
Siam				Apr. 10-16, 1927: Cases, 4; deaths, 2.
Bangkok	Apr. 10-16	2	2	
Spain:				
Valencia	May 8-14	1		

**TYPHUS FEVER**

Algeria:				
Algiers	Apr. 21-30	9	6	
Oran	May 1-10	7		
China:				
Manchuria— Harbin	Apr. 11-17	1		
Egypt:				
Alexandria	Apr. 9-29	4		
Mexico:				
Durango	Apr. 1-30		1	
Mexico City	May 8-14	6		Including municipalities in Fed- eral District.
Palestine				Apr. 26-May 2, 1927: Cases 3.
Union of South Africa:				
Cape Province— Qumbu District	Apr. 10-16			Outbreaks.
Yugoslavia				Apr. 1-30, 1927: Cases, 29; deaths, 5.

**YELLOW FEVER**

Togoland:				
Lome	May 7-8	2	2	Europeans.

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

Reports Received from January 1 to June 3, 1927 <sup>1</sup>

### CHOLERA

Place	Date	Cases	Deaths	Remarks
China:				
Canton.....	Nov. 1-30.....	10	3	
Chungking.....	Nov. 14-20.....			Present.
Do.....	Jan. 2-Mar. 19.....			Do.
Tsingtao.....	Nov. 14-Dec. 11.....			Do.
Chosen.....	Sept. 1-Oct. 31.....	252	159	
French Settlements in India.....	Aug. 29-Dec. 18.....	131	97	
Do.....	Jan. 2-Mar. 5.....	20	15	
India:				
Do.....	Oct. 10-Jan. 1.....			Cases, 20,298; deaths, 13,507.
Do.....	Jan. 2-Mar. 26.....			Cases, 28,053; deaths, 15,261.
Bombay.....	Jan. 9-Apr. 16.....	6	2	
Calcutta.....	Oct. 31-Jan. 1.....	385	313	
Do.....	Jan. 2-Apr. 9.....	745	601	
Madras.....	Dec. 26-Jan. 1.....	2	2	
Do.....	Jan. 2-Apr. 16.....	13	10	
Rangoon.....	Nov. 21-Jan. 1.....	11	7	
Do.....	Jan. 2-Apr. 2.....	62	52	
Indo-China:				
Do.....	July 1-Dec. 31.....			Cases, 8,508
Do.....	Jan. 1-Mar. 20.....	772		
Saigon.....	Oct. 31-Nov. 13.....	2	2	
Japan:				
Hiogo.....	Nov. 14-20.....	3		
Philippine Islands:				
Manila.....	Oct. 31-Nov. 6.....	1		
Russia.....	Aug. 1-Sept. 30.....	8		
Siam:				
Do.....	Apr. 1-Jan. 1.....			Cases, 7,847; deaths, 5,164.
Do.....	Jan. 2-Apr. 9.....			Cases, 733; Deaths, 506.
Bangkok.....	Oct. 31-Jan. 1.....	16	5	
Do.....	Jan. 9-Apr. 9.....	146	89	
Straits Settlements:				
Singapore.....	July 25-Oct. 16.....		60	
Do.....	Nov. 21-Jan. 1.....	14	8	
Do.....	Feb. 6-12.....	1		

### PLAGUE

Algeria:				
Algiers.....	Reported Nov. 16.....	1		
Bona.....	Jan. 11-19.....	3	2	
Oran.....	Nov. 21-Dec. 10.....	32	22	
Tarafaraoui.....	Nov. 1-Dec. 9.....	10	9	Near Oran.
Angola:				
Benguela district.....	Oct. 1-Dec. 31.....	17	10	
Do.....	Jan. 19-Mar. 15.....	6		At Cavaco.
Cuanza Norte district.....	Dec. 1-31.....	18	10	
Mossamedes district.....	Dec. 16-31.....	10		
Do.....	Jan. 19-Feb. 28.....	8		
Port Alexander.....	Feb. 9-Mar. 15.....	2	2	
Argentina.....	Jan. 9-15.....	5		
Azores:				
St. Michaels Island— Furnas.....	Nov. 3-17.....	4	1	27 miles distant from port.
Brazil:				
Porto Alegre.....	Jan. 1-31.....	4	2	
Rio de Janeiro.....	Nov. 28-Dec. 4.....	2	2	
Do.....	Dec. 26-Jan. 1.....	1	1	On vessel in harbor.
Do.....	Jan. 2-8.....	1		
Sao Paulo.....	Nov. 1-14.....	1	1	
British East Africa:				
Kenya—				
Kisumu.....	Jan. 16-22.....	1	1	
Mombasa.....	Feb. 27-Mar. 19.....	7	7	
Tanganyika Territory.....	Nov. 21-Dec. 18.....		12	
Uganda.....	Sept. 1-Oct. 31.....	162	152	
Canary Islands:				
Atarfe.....	Dec. 20.....	1	1	Vicinity of Las Palmas.
Las Palmas.....	Jan. 8-Feb. 12.....	2		
San Miguel.....	do.....	1		Vicinity of Santa Cruz de Tenerife.
Celebes:				
Makassar.....	Dec. 22.....			Outbreak.
Ceylon:				
Colombo.....	Nov. 14-Dec. 11.....	3	1	2 plague rodents.
Do.....	Jan. 2-Apr. 2.....	47	26	13 plague rodents.

<sup>1</sup> From medical officers of the Public Health Service, American consuls, and other sources.

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

Reports Received from January 1 to June 3, 1927—Continued

**PLAGUE—Continued**

Place	Date	Cases	Deaths	Remarks
China:				
Mongolia	Reported Dec. 21	500		
Nanking	Oct. 31-Dec. 18			Present.
Do.	Feb. 6-Mar. 5			Do.
Ecuador:				
Guayaquil	Nov. 1-Dec. 31	26	8	Rats taken, 50,615; found infected, 184.
Do.	Jan. 1-Mar. 31	79	22	Rats taken, 71,517; found infected, 237
Egypt	Jan. 1-Dec. 9			Cases, 149.
Do.	Jan. 1-Apr. 22			Cases, 30.
Alexandria	Nov. 19-Dec. 2	2		
Do.	Apr. 2-15	3	1	
Charkia Province	Jan. 5	1	1	At Zagazig (Tel el Kebir).
Gharbia Province	Jan. 4	1	1	
Do.	Apr. 29	1		
Guerga district	Apr. 5-28	16	7	
Kafr el Sheikh	Dec. 3-9	2		
Marsa Matrah	Dec. 23-29	10		
Do.	Jan. 27	1		
Port Said	Mar. 12-18	2	1	
Tanta district	Nov. 19-Dec. 20	3		
Greece:				
Athens and Piræus	Nov. 1-Dec. 31	19	5	
Do.	Jan. 1-Mar. 31	24	3	
Patras	Nov. 23-Dec. 4		1	
Pravi	Nov. 27	1	1	Province of Drama-Kavalla.
India	Oct. 10-Jan. 1			Cases, 16,163; deaths, 9,005.
Do.	Jan. 2-Mar. 26			Cases, 21,144; deaths, 15,243.
Bombay	Nov. 21-27	1	1	
Do.	Jan. 16-Apr. 16	45	42	
Madras	Jan. 31-Jan. 1	581	324	
Do.	Jan. 2-Apr. 2	1,017	507	
Rangoon	Nov. 14-Dec. 25	11	9	
Do.	Jan. 2-Apr. 2	55	50	Rats found plague infected, 12.
Indo-China	July 1-Dec. 31			Cases, 52; deaths, 34.
Do.	Jan. 1-Feb. 28	15		
Province—				
Cambodia	do.	10	10	
Cochin-China	do.	14	9	
Kwang-Chow-Wan	do.	10		
Iraq:				
Baghdad	Jan. 23-Mar. 12	4	1	
Java:				
Batavia	Nov. 7-Jan. 1	91	90	Province.
Do.	Jan. 2-Apr. 9	251	244	Do.
East Java and Madura	Oct. 24-Jan. 1	17	17	
Do.	Jan. 2-Mar. 5	18	18	
Probolinggo I District	Jan. 7			Outbreak at Ngadas.
Semarang	do.			Seaport. Present
Madagascar:				
Province—				
Ambositra	Dec. 16-31	10	10	
Do.	Jan. 1-Mar. 15	65	63	
Analalava	Oct. 16-31	1	1	
Antsirabe	Dec. 16-21	2	2	
Do.	Jan. 1-Mar. 15	82	82	
Diego-Suarez	Jan. 1-Feb. 28	7	7	
Itasy	Oct. 16-Dec. 31	39	39	
Do.	Jan. 1-Mar. 15	170	156	
Maevatanana	Oct. 16-31	10	10	
Majunga	do.	3	1	
Morsmanga	Oct. 16-Dec. 31	92	67	
Do.	Jan. 1-Mar. 15	60	61	
Tamatava	Oct. 16-Dec. 31	107	69	
Tananarive	do.			Cases, 533; deaths, 497.
Do.	Jan. 1-Mar. 15	500	470	
Town—				
Tamatava	Nov. 16-30	2		
Tananarive	Oct. 16-Dec. 31	48	47	
Do.	Jan. 1-Feb. 15	19	18	
Mauritius:				
Plaines Wilhems	Oct. 1-Nov. 30	3	3	
Pamplemousses	Dec. 1-31	3	3	
Port Louis	Oct. 1-Dec. 31	39	25	
Do.	Jan. 1-Feb. 28	6	4	

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

**Reports Received from January 1 to June 3, 1927—Continued**

**PLAGUE—Continued**

Place	Date	Cases	Deaths	Remarks
Nigeria	Aug. 1-Dec. 21	1,066	967	
Do.	Jan. 1-31	42	42	
Peru	Nov. 1-Dec. 31			Cases, 90; deaths, 26.
Do.	Jan. 1-Mar. 31	92	23	
Department—				
Ancash	Dec. 1-31	6	6	
Do.	Jan. 1-Mar. 31	3		
Cajamarca	do	36	6	
Callao	Mar. 1-31	1	1	
Ica				
Chincha	Nov. 1-30	1		
Lambayeque	Feb. 1-28	6	2	
Chiclayo	Nov. 1-30	3		
Do.	Jan. 1-31	2		
Libertad	Dec. 1-31	2		
Do.	Jan. 1-Feb. 28	6		
Lima	Nov. 1-Dec. 31	42	14	
Do.	Jan. 1-Mar. 31	75	20	
Piura	Feb. 1-28	1		
Portugal:				
Lisbon	Nov. 23-26	3	2	
Russia	May 1-June 30	44		
Do.	July 1-Dec. 31	98		
Senegal	July 1-31	178	162	
Dakar	Apr. 1-10	10	7	
Diourbel	Nov. 20-30	12	1	
Thies	Mar. 28-Apr. 20	17	15	
Tivaouane	Dec. 19-25	6	2	In interior.
Do.	Mar. 21-Apr. 20	27	10	Do.
Siam	Apr. 1-Jan. 1			Cases, 30; deaths, 22.
Do.	Jan. 16-Apr. 9			Cases, 13; deaths, 11.
Bangkok	Feb. 27-Apr. 9	3	3	
Syria:				
Beirut	Nov. 11-Dec. 20	4		
Do.	Feb. 1-10	1		
Tunisia	Dec. 1-31			Cases, 43.
Do.	Jan. 12-26			Cases, 34.
Acheche district	Feb. 11-14	14	14	Pneumonia.
Bousse	Jan. 12-26	8		
Djeneniana	Feb. 11-14	8		
Kairouan	do	3		
Mahares	do	15		
Sfax	Oct. 1-Dec. 31	304	123	
Turkey:				
Constantinople	Dec. 15-25	1		
Union of South Africa:				
Cape Province—				
Cradock district	Jan. 2-Mar. 26	4	2	
De Aar district	Nov. 21-27	1		Native.
Glen Gray district	Jan. 31-Feb. 12	8	8	
Hanover district	Nov. 14-Jan. 1	3	2	
Do.	Jan. 2-Apr. 2	3	2	
Middleburg district	Dec. 5-11	1	1	Do.
Richmond district	Mar. 6-12	3	2	
Tarkastad district	Mar. 27-Apr. 2	3	1	
Orange Free State	do			Cases, 12; deaths, 2.
Bloomfontein district	Feb. 27-Mar. 19	3	3	
Bothaville district	Dec. 5-18	2	1	
Hoopstad district	Nov. 7-13	1	1	Native.
Do.	Dec. 5-25	2	1	Do.
Do.	Jan. 2-Feb. 12	4		
Rouville district	Apr. 3-9	1	1	
Vrededorf district	Dec. 19-25	10	5	
Do.	Feb. 6-12	2	1	
On vessel:				
S. S. Armadale Castle	Apr. 4	1	1	At Cape Town.
S. S. Leconte de Lisle	Feb. 21-23	2		At Tamatave, Madagascar.

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

Reports Received from January 1 to June 3, 1927—Continued

### SMALLPOX

Place	Date	Cases	Deaths	Remarks
Algeria.....	Sept. 21-Dec. 31	.....	.....	Cases, 797.
Do.....	Jan. 1-Mar. 29	.....	.....	Cases, 518.
Algiers.....	Dec. 11-31	4	.....	
Do.....	Jan. 1-Apr. 16	14	.....	
Oran.....	Mar. 21-Apr. 30	51	.....	
Angola.....	Oct. 1-15	.....	.....	Present in Congo district.
Congo.....	Feb. 2-15	1	.....	
Cuanza Norte	Nov. 1-15	.....	.....	Present.
Do.....	Mar. 1-15	2	.....	
Malange.....	Feb. 2-15	2	.....	
Arabia:				
Aden.....	Dec. 12-18	1	.....	Imported.
Do.....	Apr. 3-9	1	.....	
Belgium.....	Oct. 1-10	1	.....	
Brazil:				
Bahia.....	Oct. 30-Dec. 18	12	8	
Para.....	Oct. 31-Nov. 6	1	1	
Do.....	Feb. 5-12	1	1	
Pernambuco	Oct. 17-Dec. 25	58	4	
Rio de Janeiro	Year 1926	.....	.....	Cases, 4,033; deaths, 2,169.
Do.....	Jan. 2-Apr. 15	77	34	
Sao Paulo	Aug. 23-Dec. 5	34	18	
British East Africa:				
Kenya:				
Nairobi.....	Dec. 1-31	15	5	
Tanganyika Territory	Oct. 31-Nov. 20	2	.....	
Do.....	Jan. 2-Mar. 5	24	21	
Zanzibar.....	Oct. 1-31	23	12	
British South Africa:				
Northern Rhodesia	Nov. 27-Dec. 3	.....	.....	Cases, 200. In natives.
Do.....	Feb. 26-Mar. 25	131	4	
Bulgaria.....	Nov. 1-30	1	.....	
Canada	Dec. 5-Jan. 1	.....	.....	Cases, 155.
Do.....	Jan. 2-May 14	.....	.....	Cases, 657.
Alberta.....	Dec. 5-Jan. 1	132	.....	
Do.....	Jan. 2-May 14	252	.....	
Calgary.....	Nov. 28-Dec. 25	12	.....	
Do.....	Jan. 2-May 7	38	1	
Edmonton.....	Dec. 1-31	4	.....	
Do.....	Jan. 1-Mar. 31	18	.....	
British Columbia—				
Vancouver.....	Jan. 31-May 2	11	.....	
Manitoba.....	Dec. 5-Jan. 1	9	.....	
Do.....	Jan. 2-May 14	28	.....	
Winnipeg.....	Dec. 19-25	1	.....	
Do.....	Jan. 2-May 21	14	.....	
New Brunswick.....	Feb. 13-26	2	.....	
Ontario.....	Dec. 5-Jan. 1	90	.....	
Do.....	Jan. 2-May 14	314	.....	
Kingston.....	Jan. 1-Feb. 19	3	.....	
Ottawa.....	Dec. 12-31	5	.....	
Do.....	Jan. 9-May 7	11	.....	
Toronto.....	Dec. 14-25	14	.....	
Do.....	Jan. 1-May 14	83	1	
Saskatchewan.....	Dec. 5-Jan. 1	13	.....	
Do.....	Jan. 2-May 7	64	.....	
Regina.....	Jan. 16-22	1	.....	
Chile:				
Concepcion.....	Dec. 26-Jan. 1	.....	5	
Iquique.....	Mar. 1-15	2	.....	
China:				
Amoy.....	Jan. 1-Mar. 26	8	.....	
Antung.....	Mar. 21-27	1	.....	
Canton.....	Nov. 1-Dec. 31	6	.....	
Chefoo.....	Jan. 23-Apr. 9	.....	.....	Present.
Chungking.....	Nov. 7-Dec. 25	.....	.....	Do.
Do.....	Jan. 2-Mar. 19	.....	.....	Do.
Foochow.....	Nov. 7-Dec. 25	.....	.....	Do.
Do.....	Feb. 27-Apr. 2	.....	.....	Do.
Hankow.....	Nov. 6-30	.....	.....	Do.
Hong Kong.....	Jan. 23-Apr. 2	121	81	
Manchuria—				
An-shan.....	Mar. 21-Apr. 16	4	.....	
Dairen.....	Feb. 20-Apr. 3	23	6	
Harbin.....	Dec. 16-31	3	.....	
Do.....	Feb. 7-13	1	.....	

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

## Reports Received from January 1 to June 3, 1927—Continued

### SMALLPOX—Continued

Place	Date	Cases	Deaths	Remarks
China—Continued.				
Manchuria—Continued.				
Kal-Yuan	Mar. 20-27	2		
Mukden	Dec. 5-11	1		
Do	Apr. 3-9	1		
Tiehling	do	1		
Nanking	Dec. 12-25			Present.
Do	Jan. 2-Mar. 5			Do.
Shanghai	Dec. 12-18		1	
Do	Jan. 20-Apr. 9	2	2	
Swatow	Nov. 21-27			Do.
Do	Mar. 27-Apr. 16			Do.
Tientsin	Jan. 16-Apr. 2	27		
Do	Apr. 3-9	6	1	
Chosen	Aug. 1-Nov. 30	53	19	
Do	Jan. 1-31	96	21	
Seoul	Nov. 1-30	2		
Egypt	Apr. 2-8			Cases, 6; deaths, 1.
Alexandria	Jan. 8-Apr. 8	2		
Cairo	June 11-Aug. 26	27	4	
Estonia	Oct. 1-30	2		
France	Sept. 1-Dec. 31	293		
Paris	Dec. 1-31	10	3	
Do	Jan. 1-Apr. 20	29	4	
French Guinea	Apr. 21-30	1		
Kissidougou	Feb. 10			Present.
French Settlements in India	Aug. 20-Jan. 1	127	127	
Do	Jan. 2-Feb. 20	58	58	
French Sudan:				
Kayes	Feb. 19			Do.
Kita	Mar. 28-Apr. 3			Do.
Germany:				
Stuttgart	Nov. 28-Dec. 4	7		
Gold Coast	Aug. 1-Nov. 30	50	14	
Do	Jan. 1-31	5	1	
Great Britain:				
England and Wales	Nov. 14-Jan. 1			Cases, 2,262.
Do	Jan. 2-Apr. 30			Cases, 7,546.
Birmingham	Mar. 13-19	5		
Bradford	Jan. 9-Apr. 30	7		
Cardiff	Feb. 13-19	1		
Hull	May 1-7	1		
Leeds	Mar. 27-Apr. 16	2		
London	Apr. 28-May 9	9	4	
Monmouthshire	Feb. 25	2		
Newcastle-on-Tyne	Dec. 5-13	28		
Do	Jan. 2-May 7	2		
Normanton	Dec. 30	1		9 miles from Leeds.
Sheffield	Nov. 28-Jan. 1	60		
Do	Jan. 2-Apr. 30	554	1	
Stoke on Trent	May 1-7	1		
Wakefield	Jan. 30-Feb. 2	2		
Scotland—				
Dundee	Mar. 31-May 7	121		
Greece	Nov. 1-Dec. 31	25		
Athens	Dec. 1-31	14	2	
Do	Mar. 1-31	9	2	Including Piræus.
Saloniki	Mar. 8-14		1	
Guatemala:				
Guatemala City	Nov. 1-Dec. 31		15	
Do	Jan. 1-Mar. 31		74	
India				
Do	Oct. 10-Jan. 1			Cases, 22,946; deaths, 6,006.
Do	Jan. 2-Mar. 26			Cases, 64,992; deaths, 15,681.
Bombay	Nov. 7-Jan. 1	37	20	
Do	Jan. 2-Apr. 16	720	403	
Calcutta	Oct. 31-Jan. 1	449	311	
Do	Jan. 2-Apr. 9	2,414	1,776	
Karachi	Dec. 19-25	1	1	
Do	Jan. 2-Apr. 18	43	26	
Madras	Nov. 21-Jan. 1	32	2	
Do	Jan. 2-Apr. 23	300	12	
Rangoon	Nov. 28-Jan. 1	2	2	
Do	Jan. 2-Apr. 2	309	71	
Indo-China:				
Saigon	Dec. 26-Jan. 1	3		
Do	Feb. 6-Mar. 12	2		

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

**Reports Received from January 1 to June 3, 1927—Continued**

**SMALLPOX—Continued**

Place	Date	Cases	Deaths	Remarks
<b>Iraq:</b>				
Baghdad	Oct. 31-Dec. 4	7	4	
Do	Jan. 23-Apr. 2	7	1	
Basra	Nov. 7-13	2	1	
Do	Mar. 20-26			
<b>Italy</b>	Aug. 29-Jan. 1	28		
Do	Jan. 2-Feb. 26	4		
Genoa	Dec. 30-31	1		
Do	Jan. 1-10	2		
<b>Jamaica</b>	Nov. 26-Jan. 1	37		Reported as alastrim.
Do	Jan. 2-Apr. 30	128		Do.
<b>Japan</b>	Oct. 24-Jan. 1	27		
Do	Jan. 2-Feb. 26	61		
Kobe	Nov. 14-20	1		
Do	Jan. 23-Apr. 2	3		
Sasebo	May 8-14	3		
Yokohama	Nov. 27-Dec. 3	2		
Do	Mar. 26-Apr. 1	3		
<b>Java:</b>				
Batavia	Nov. 29-Dec. 3	2		Province.
Do	Mar. 13-19	1		
East Java and Madura	Oct. 24-Dec. 25	11	1	
Do	Jan. 2-27	4	3	
<b>Lithuania</b>	Nov. 1-30	2		
<b>Luxemburg</b>	Nov. 1-Dec. 31	2		
<b>Mexico</b>	July 1-Dec. 31		799	
Chihuahua	Dec. 31			Several cases; mild.
Do	Jan. 31-Feb. 6			Present.
Ciudad Camargo	May 21	4		
Ciudad Juarez	Dec. 14-27		2	
Manzanillo	Mar. 5-Apr. 25	7	5	
Mazatlan	Feb. 14-Apr. 17		3	
Mexico City	Nov. 23-Dec. 25	6		Including municipalities in Federal District.
Do	Dec. 26-Apr. 30	9		Do.
Nuevo Leon State—				
Cerralvo	Mar. 11			Epidemic.
Montemorelos	Feb. 24			Reported present.
Monterey	Feb. 24-Mar. 20	64	2	Other cases stated to exist.
Parral	Jan. 31-Feb. 6			Cases, 25. Unofficially reported
Piedras Negras district	Feb. 25	68		at Nueva Rosita.
Saltillo	Feb. 6-Apr. 9		2	
San Luis Potosi	Nov. 12-Dec. 18		3	
Do	Jan. 9-May 7		28	
San Miguel	May 21	36		
Tampico	Jan. 21-31	1		
Torreón	Nov. 28-Jan. 1		12	
Do	Jan. 2-Mar. 19		13	
Victoria	Feb. 24			Present.
<b>Netherlands East Indies</b>	Dec. 14			Island of Borneo; epidemic in two villages.
Do	Feb. 7-28			Epidemic in 6 localities.
<b>Nigeria</b>	Aug.-Dec. 31	165	40	
Do	Jan. 1-31	96	12	
<b>Persia:</b>				
Teheran	Nov. 22-Dec. 23		5	
Do	Dec. 24-Feb. 23		5	
<b>Peru:</b>				
Arequipa	Dec. 1-31		1	
Do	Jan. 1-31		1	
Laredo	Dec. 1			Severe outbreak; vicinity of Trujillo.
<b>Poland</b>	Oct. 11-Dec. 31			Cases, 32; deaths, 2.
Do	Jan. 1-8			Deaths, 1.
<b>Portugal:</b>				
Lisbon	Nov. 22-Jan. 1	43	4	
Do	Jan. 2-Apr. 30	43		
<b>Rumania</b>	Jan. 1-Sept. 30	7	1	
<b>Russia</b>	May 1-June 30	705		
Do	July 1-Sept. 30	884		
Do	Nov. 1-Dec. 31	1,815		
<b>Senegal:</b>				
Dakar	Jan. 9-Apr. 3	4		
Gueudel	Apr. 11-17	1		
Kebener	do	1		
Niger Colony	Apr. 1-30	3		
Ouakam	Mar. 20-27	4		
Tivaouane	Apr. 11-17	2		Vicinity of Dakar.



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

### Reports Received from January 1 to June 3, 1927—Continued

#### SMALLPOX—Continued

Place	Date	Cases	Deaths	Remarks
Siam	Apr.-Jan. 1			Cases, 711; deaths, 265.
Do.	Jan. 2-Apr. 9			Cases, 111; deaths, 45.
Bangkok	Oct. 31-Jan. 1	28	10	
Do.	Jan. 2-Apr. 9	50	30	
Sierra Leone:				
Makeni	Feb. 22-28	3		
Nanowa	Dec. 1-15	1		Pendembu district.
Spain	July 1-Oct. 31		15	
Valencia	Feb. 8-May 7	15		
Sumatra:				
Medan	Feb. 20-26	1		
Straits Settlements:				
Singapore	Oct. 31-Jan. 1	12	2	
Do.	Jan. 2-Feb. 26	4	3	
Tunisia	Oct. 1-Dec. 31	9		
Do.	Jan. 1-Mar. 20	23		
Tunis	Jan. 1-Mar. 10	3		
Turkey:				
Constantinople	Feb. 1-7		1	
Union of South Africa:				
Cape Province—				
Albany district	Jan. 23-29			Outbreaks.
Caledon district	Dec. 5-11			Do.
Steynsburg district	do.			Do.
Stutterheim district	Nov. 21-27			Do.
Wodehouse district	Jan. 30-Feb. 12			Do.
Natal—				
Durban district	Nov. 7-27	9		Including Durban municipality. Total from date of outbreak: Cases, 62; deaths, 16.
Orange Free State	Nov. 14-27			Outbreaks.
Bothaville district	Nov. 21-27			Do.
Transvaal	Nov. 7-20	2		Europeans.
Bethel district	Jan. 23-29			Outbreaks.
Johannesburg	Nov. 14-20	1		
Yugoslavia	Nov. 1-Dec. 31	4	1	
Do.	Jan. 1-31	3		

#### TYPHUS FEVER

Algeria	Sept. 21-Dec. 20	50	2	Cases, 210; deaths, 11.
Do.	Jan. 1-Mar. 20			
Algiers	Feb. 1-Apr. 20	53		
Oran	Mar. 21-Apr. 30	12		
Angola:				
Benguela district	Feb. 16-28	1		
Argentina:				
Rosario	Dec. 1-31		1	
Do.	Jan. 25-31		3	
Bulgaria	July 1-Dec. 31	39	5	
Do.	Jan. 1-Feb. 28	12	5	
Sofia	Apr. 16-29	2	1	
Chile	Sept. 15-Nov. 15	39	4	
Chillan	Jan. 1-31	4	3	
Concepcion	Sept. 15-Nov. 15	1		
Do.	Jan. 23-29		1	
Iquique	Apr. 3-9		1	
Lebu	Sept. 15-Nov. 15	6	2	
Linares	do.	2		
Los Andes	do.	8		
Santiago	Sept. 15-Dec. 31	25	2	
Do.	Feb. 1-28	3		
Valparaiso	Sept. 15-Dec. 25	10		
Do.	Jan. 2-Apr. 16	-6	2	
China:				
Antung	Nov. 22-Dec. 5	4		Present. Do. Do.
Chefoo	Oct. 24-Nov. 6			
Chungking	Dec. 25-31			
Do.	Feb. 27-Mar. 12			
Manchuria—				
Harbin	Mar. 28-Apr. 3	1		

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

## Reports Received from January 1 to June 3, 1927—Continued

### TYPHUS FEVER—Continued

Place	Date	Cases	Deaths	Remarks
Chosen	Aug. 4-Dec. 31	54	5	
Do.	Jan. 1-31	65	10	
Chemulpo	Mar. 1-31	5		
Seoul	Nov. 1-30	1		
Do.	Jan. 1-Mar. 31	10	2	
Czechoslovakia	Oct. 1-Dec. 31	10		
Do.	Jan. 1-Mar. 31	83	3	
Egypt	Apr. 2-8	45	7	
Alexandria	Dec. 3-9		1	
Do.	Jan. 22-Apr. 29	7	4	
Cairo	Oct. 29-Nov. 4	1	1	
Estonia	Dec. 1-31	1		
Do.	Jan. 1-Mar. 31	14		
France	Nov. 1-30	1		
Gold Coast	Sept. 1-30	1	1	
Greece	Nov. 1-30			Cases, 12.
Athens	Nov. 1-Dec. 31	19	2	
Do.	Feb. 1-Mar. 31	17	3	
Drama	Dec. 1-31	2		
Kavalla	do.	2		
Patras	Jan. 23-29		1	
Ravokan	Dec. 1-31	1		
Saloniki	Jan. 25-31	1		
Indo-China:				
Tonkin	Aug. 1-31	2		
Iraq:				
Baghdad	Mar. 6-19	2	2	
Ireland:				
Clare County— Tulla district	Jan. 9-15	1		Suspect.
Donegal County— Letterkenny	Mar. 27-May 1	7		Rural district.
Milford	Mar. 27-Apr. 3	3		
Dublin district	May 1-7	1		
Italy	Aug. 29-Sept. 23	3		
Do.	Jan. 16-Feb. 26	15		
Japan	Jan. 2-29			Cases, 2.
Tokyo prefecture	Dec. 5-25	9		
Tokyo City	do.	5	1	
Latvia	Jan. 1-31	2		
Lithuania	Sept. 1-Dec. 31	41	4	
Do.	Jan. 1-31	24		
Mexico	July 1-Dec. 31			Deaths, 604.
Aguascalientes	Jan. 9-Feb. 5	2		
Durango	Jan. 1-31		1	
Guadalajara	Jan. 25-31		1	
Mexico City	Dec. 5-11	3		Including municipalities in Federal District.
Do.	Jan. 2-May 7	97		Do.
Parral	Jan. 30-Feb. 5	1		
Morocco	Apr. 9			Present.
Marrakech	do.			Do.
Mogador	do.			Do.
Nigeria	Sept. 1-30	1		
Palestine	Apr. 12-15	3		
Acre	Dec. 29-Jan. 3	1		
Beisan	Dec. 21-27	1		
Haifa	Nov. 23-Dec. 13	5		
Do.	Dec. 28-Feb. 7	7		
Jaffa	Nov. 23-Dec. 27	7		
Do.	Jan. 11-Feb. 21	3		
Majdal	Dec. 28-Jan. 3	1		
Do.	Apr. 5-11	1		
Nazareth	Nov. 16-Jan. 3	12		
Do.	Mar. 1-7	1		
Ramleh	Jan. 31-Feb. 7	1		
Safad	Dec. 21-Jan. 3	2		
Peru:				
Arequipa	Year, 1926		9	District.
Lima	Jan. 1-31		1	
Poland	Oct. 11-Dec. 25			Cases, 341; deaths, 27.
Do.	Jan. 1-Mar. 12			Cases, 825; deaths, 68.
Portugal:				
Lisbon	May 1-7	1		
Rumania	Aug. 1-Nov. 30	255	11	
Do.	Jan. 1-31	391	31	

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

**Reports Received from January 1 to June 3, 1927—Continued**

**TYPHUS FEVER—Continued**

Place	Date	Cases	Deaths	Remarks
Russia.....	May 1-June 30.....	6,043		
Do.....	July 1-Aug. 31.....	3,060		
Do.....	Nov. 1-Dec. 31.....	4,609		
Spain.....	July 1-Sept. 30.....		4	
Seville.....	Mar. 16-22.....		1	
Syria:				
Aleppo.....	Mar. 13-19.....	1		
Tunisia.....	Oct. 1-Dec. 27.....	30		
Do.....	Jan. 1-Mar. 20.....	141		
Tunis.....	Jan. 21-Apr. 30.....	11		
Turkey:				
Constantinople.....	Dec. 12-25.....	3		
Do.....	Jan. 16-22.....			
Union of South Africa.....	Oct. 1-Dec. 31.....			1 death reported by press. Cases, 233; deaths, 30.
Cape Province.....	do.....	47	7	
Do.....	Jan. 1-Feb. 28.....	51	4	
Do.....	Mar. 13-19.....			Outbreaks.
Clydesdale.....	Mar. 6-12.....			Do.
East London.....	Nov. 21-27.....	1		Native. Imported.
Port St. Johns district.....	Dec. 5-11.....			Outbreaks. On farm.
Xalanga district.....	Mar. 20-Apr. 2.....			Outbreaks.
Natal.....	Oct. 1-31.....	1		
Do.....	Jan. 1-31.....	6		
Do.....	Mar. 27-Apr. 2.....			Do.
Orange Free State.....	Oct. 1-Dec. 31.....	31	2	
Do.....	Jan. 1-Feb. 28.....	17	3	
Do.....	Mar. 13-19.....			Outbreaks.
Transvaal.....	Oct. 1-31.....	1		
Do.....	Jan. 1-31.....	1		Native.
Yugoslavia.....	Nov. 1-Dec. 31.....	30	2	
Do.....	Jan. 1-Mar. 31.....	74	4	

**YELLOW FEVER**

French Sudan.....	Dec. 19-25.....	1	1	
Gold Coast.....	Aug. 1-Nov. 30.....	10	5	
Do.....	Jan. 1-31.....	17	7	
Nigeria.....	Sept. 1-Nov. 30.....	4	3	
Do.....	Jan. 1-31.....	1	1	
Senegal.....	Dec. 19-25.....	3	3	
Diourbel.....	Dec. 6.....	1	1	
Do.....	Jan. 1-20.....	1	1	At N'Bako.
Guinguineo.....	Dec. 7.....	1	1	
Rufisque.....	Nov. 27-Dec. 29.....	2	1	In European.
Do.....	Jan. 2-8.....	3	3	
Upper Volta:				
Gaoua district.....	Oct. 25.....	2		