Public Health Reports

Vol. 56 • OCTOBER 17, 1941 • *No. 42*

THE PUBLIC HEALTH ADMINISTRATOR'S RESPONSIBILITY IN THE FIELD OF OCCUPATIONAL DISEASE LEGISLATION[1]

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One of the important factors contributing to the progress made in health and safety in American industries has been the passage of constructive workmen's compensation legislation. Although such legislation has been in effect in other countries for many years, the United States was the last important industrial country to adopt the compensation principle. All but one State now provide compensation to workers for accidental injuries; however, there are only 25 States which make provision for compensating workers suffering from occupational diseases. Even in these 25 States, the laws are far from uniform and the diseases compensated vary from one in one State to any and all diseases which may be traceable to the occupation in other States.

The present paper does not concern itself particularly with the subject of compensation for occupational diseases, nor does it treat with the many controversial aspects of the problem. It does deal, however, with the role which the public health administrator can play in the development of such legislation and discusses certain responsibilities which such laws necessarily impose upon him.

PRESENT METHODS OF DEVELOPING FACTS FOR LEGISLATION

A review of our State occupational disease compensation laws will readily disclose that in certain instances a State with little or no knowledge of its own needs has merely copied what has been found to be expedient to enact in some other State. This has been especially true in the enactment of the so-called schedule type of law where the specific diseases for which compensation will be provided are listed. Of late, however, there has been a definite trend toward obtaining factual data on needs. This has been accomplished by the appointment, either by the governor of the State or the legislature, of an occupational disease commission, which is charged with the express duties of determining the nature and extent of the occupational disease problem of the State, and any other facts which may

[1] From the Division of Industrial Hygiene, National Institute of Health.

be used as a guide in the development of a fair and just compensation law.

In most States these occupational disease commissions have realized that, along with certain legal and administrative questions, there are also health problems involved. For information on health the State health departments have usually been consulted. Because industrial hygiene has been, until recently, a new departure in many States, the State departments of health have looked to the Division of Industrial Hygiene, National Institute of Health, of the United States Public Health Service, for guidance in such matters. The Public Health Service has welcomed such requests for collaboration, since it realized that here was a rare opportunity to perform a dual service: First, the necessary information may be obtained for the guidance of the occupational disease commission; and second, the State department of health has the opportunity to define the State's industrial hygiene problem, and thus the opportunity to lay the foundation for a future program of prevention of industrial health hazards. This cooperative effort is illustrated by what has recently taken place in the State of Utah.

In 1936, the Industrial Commission of Utah requested the Federal Government to make a study of the nature and prevalence of occupational diseases in Utah industries. Following a number of conferences the Division of Industrial Hygiene, National Institute of Health, of the United States Public Health Service, agreed to undertake such a study with the cooperation of Utah State agencies, such as, among others, the Industrial Commission, the State Board of Health, industrial organizations, and labor groups.

In order that the objectives of the proposed study and the responsibilities of each agency affected would be understood, the Public Health Service prepared a memorandum in the form of an agreement, which could be used for the guidance of all organizations that were to take part in the proposed survey. As set forth in this memorandum the purpose of the study was to evaluate the various factors bearing on the health of Utah workers, in order that this information could be used as a guide in the drafting and enactment of legislation for the compensation of injury to health resulting from exposure to industrial health hazards. It was also pointed out that basic data such as would be revealed by these studies would be useful in the support and application of a program designed to control industrial health hazards.

In the memorandum submitted on October 6, 1936, the plan called for two studies: The first, of a preliminary and qualitative nature, was expected to be more in the form of a general inventory of working conditions to reveal the potential industrial health hazards existing in the State. It was thought that from this preliminary survey it would be possible to determine which particular health hazards were

in need of further study. The second survey was to be more detailed and specific, quantitative in nature, and to include medical examinations of workers, engineering studies of the working environment to determine the relationship between the environment and the health of workers, and investigation of any other factors throwing light on the industrial health problem. The responsibilities of all cooperating agencies were clearly defined in this memorandum, which was signed on February 24, 1937, by representatives of industry and labor.

The preliminary survey was conducted during the latter part of 1937 and the early part of 1938 by personnel from the Utah State Board of Health under the guidance of Public Health Service officers. The data were analyzed and the report was prepared and published by the Public Health Service. The report, issued in October 1938, showed the number of workers in the various industries in the State who were exposed to certain materials and conditions which might be considered potentially hazardous to health. As a result of this study it was possible to determine the major potential hazards in Utah industries, in which industries they occurred, and those which merited further study. The report also disclosed present facilities for coping with industrial health hazards in the State and specific data on the extent of control measures then in vogue.

In connection with these findings, however, attention was called to the limitations of the data which were collected. Since no quantitative measurements of the working environment were made, and no medical examinations were conducted at this time, the information obtained disclosed only the potentialities involved, and in no way could exposure be implied to indicate actual injury. Likewise, the listing of control measures merely indicated that such control measures were available, and did not show whether or not they were effective. Hence, although it was known from this first study that conditions existed favoring the occurrence of certain occupational diseases, it was still necessary to determine to what extent these diseases occurred and the public health and economic implications involved. These answers could be obtained by carrying out the second series of studies as outlined in the original agreement of 1937. For this reason, the State legislature was requested to appropriate certain funds to help defray the expense of such a study. It was assured that the Public Health Service, in compliance with the original agreement, would assign personnel to work in cooperation with the State Board of Health and other agencies for the purpose of conducting detailed studies of industrial health hazards revealed in the first survey.

In March 1939, legislation was passed authorizing and directing the State Board of Health, in collaboration with the Public Health Service

and the State Industrial Commission, to carry out such a study. This legislation included an appropriation of $25,000.

After analysis of the data obtained in the first survey, the Public Health Service considered that the major problems for detailed investigation in Utah were exposure to siliceous dusts, lead and other metallic dusts, fumes, and gases. The chief industries in which these hazards might exist were coal mines, nonferrous metal mines, and nonferrous smelters.

The time allowed by the legislature in which to complete this study necessarily limited the number of industries which could be investigated, and, hence, the study was confined to these three industries. There are potential health hazards in other industries of the State which are constantly being studied by the industrial hygiene personnel of the State Board of Health. Information already exists concerning the health hazards in some of these industries which should permit the planning of a preventive program for their control.

The United States Census for 1930 showed that there were approximately 170,000 persons gainfully employed in the State of Utah, out of a total population of over 500,000. The industries included in this study employed approximately 16,000 workers. Representative plants employing some 3,000 workers were selected for detailed study; the selection was made by the Public Health Service and was based on all available data obtained in the preliminary survey. Three coal mines, three metal mining enterprises, and two smelters were selected for intensive medical and environmental study.

The plant operators furnished certain services and facilities to assist the field staff in its study of working conditions in the plants and of the health of the employees. The local labor unions assumed the responsibility of supplying members for physical examination and assisted in various other ways with the study. Every available employee of each plant, including the clerical staff and officers, was examined. It was decided that all records obtained in the study were to become the property of the Public Health Service, and that all information obtained would be strictly confidential. In this connection, instead of recording the man's name, he was given a serial number. Physical examination findings of the individual were not revealed to the employer and the environmental findings of the plant were not revealed to the employees.

The field work was begun early in July 1939, and continued until the latter part of December. During this period occupational and medical histories, and physical and roentgenologic examinations were made on 2,839 men in the three industries. The medical examination included a complete oral examination by a dentist as well as the following laboratory examinations: serologic tests for syphilis, punctate basophilia and reticulocyte estimations for lead absorption, hemo-

globin determinations, and routine urinalyses. Also, 961 urine specimens, collected from workers who were exposed to various compounds of lead, were examined spectroscopically for lead content.

Engineering studies were made in each plant to evaluate the working environment in the various occupations by making determinations of the environmental factors which may have a bearing on health. In this connection, examinations were made as to the nature and concentration of various types of dust such as silica, lead, arsenic, and cadmium. Studies of ventilation and humidity were carried out, and exposure to various gases, such as sulfur dioxide, carbon dioxide, carbon monoxide, hydrogen sulfide, hydrogen cyanide, and methane, was determined. Moreover, methods and facilities for the control of health hazards, already in use by the industries, were investigated, with the view of recommending additional control measures which might be necessary to eliminate such hazards.

A general sanitary survey of these plants and the communities in which the workers lived was carried out by the Division of Sanitary Engineering of the Utah State Board of Health. Such items as water supply, sewage disposal, milk sanitation, housing, and other data pertinent to the problem were studied.

In the original memorandum of 1937, the Public Health Service stressed the importance of a continuing program designed to control industrial health hazards. For this reason the Public Health Service agreed to assume full responsibility in carrying out the provisions of the law relative to this study, and in consideration of this, recommended to the Utah State Board of Health that it employ the $25,000 appropriated by the legislature for the conduct of the study toward the development of a permanent industrial hygiene service in the State. This recommendation was adopted and such a service is now available in the State Health Department, the personnel consisting of a physician-director, an engineer, a laboratory technician, and a clerk, and provided with facilities and equipment necessary to carry out a program of industrial health conservation. The above personnel augmented the staff of the Public Health Service in carrying out all phases of the study, and thereby have gained practical training and experience in the practice of industrial hygiene.

In addition to the above services contributed by the Utah State Board of Health, all of the full-time district health officers of Utah took an active part in the medical field studies; serologic tests were conducted by the State public health laboratory; the dental division cooperated by furnishing the services of a dentist for the oral hygiene studies; the Division of Epidemiology furnished valuable statistical information concerning the extent of certain diseases in the communities in which the workers lived; and, finally, the Division of Sanitary Engineering carried out a sanitary survey as mentioned above.

Thus, it is evident that through the medium of these industrial hygiene studies, an earnest effort has been made in Utah to lay a basis for the modern approach to the industrial hygiene problem, integrating industrial hygiene services with the various other services of the State health department and cooperating with all other interested State agencies and organizations.

The Utah occupational disease compensation law, officially known as the "Utah Occupational Disease Disability Law", became effective July 1, 1941, two years after the State legislature authorized the making of the industrial hygiene studies. The law is administered by the Industrial Commission and provides for the compensation of specific diseases or conditions covered by a schedule containing 27 items. Reference has been made to the desirability, if not the necessity, of obtaining factual data on needs to facilitate the preparation of adequate occupational disease legislation. Furthermore, it is generally agreed at the present time that an occupational disease law should:

(1) Provide for an agency for the administration of the law.
(2) Unambiguously define the diseases or conditions to be compensated.
(3) Make clear the liability of an employer for disease existing on the effective date of the law.
(4) Provide for limitations relating to the filing and establishment of claims.
(5) Provide for the diagnosis of disease, and the evaluation of disability.
(6) Provide for the awarding of adequate compensation.
(7) Impose the cost of compensation upon the employer responsible for the disablement, and relieve from liability an employer not responsible for the disablement.
(8) Provide for alternate liabilities or remedies of employers and employees electing or rejecting compensation under provisions of the occupational disease law.
(9) Provide for the prevention and control of occupational diseases.

No item of those listed is probably of more importance than the last which has to do with prevention and control. Since generally the various State occupational disease laws were not prepared with the idea of preventing and controlling occupational diseases, it is desirable to consider the subject, particularly, certain responsibilities created by the inclusion in the law of provisions for the prevention and control of occupational diseases.

LEGISLATION FOR THE PREVENTION AND CONTROL OF OCCUPATIONAL DISEASES

One of the inherent weaknesses of nearly all occupational disease laws which have been enacted in the United States is the omission of any provision for the prevention and control of occupational diseases. In nearly every instance, the desire has been to provide compensation for occupational disease injuries, whereas the prevention and control

of such diseases should be one of the prime considerations. As a matter of fact, the prevention of occupational diseases should be definitely desirable to both employer and employee. This is an obvious fact of tremendous socio-economic implications.

At the present time only a few States have made specific provision for occupational disease prevention in the compensation laws themselves. Notable for such provisions are the laws enacted in the States of Maryland, North Carolina, and Arkansas. While in many States either the labor department or the industrial commission performs certain functions in this field in cooperation with health officials, several States (Montana, Idaho, Connecticut, Mississippi, Minnesota, and Rhode Island) have by special law placed exclusive industrial hygiene jurisdiction in the health department. The problem being primarily one of health, legislators have realized the necessity for charging State health departments with the supervision, regulation, and control of industrial health hazards. The public health administrators should realize that the enactment of such legislation carries certain responsibilities.

In many States the reporting of occupational diseases is mandatory, such reports as a rule being made to the State health department. Reporting of occupational diseases in this country has been very incomplete. There are many reasons for this, and it is not intended to dwell upon these now, except to indicate that a fair degree of success can be anticipated only when close contact is maintained between each reporting physician or management and the agency to which occupational disease reports are sent. This implies the necessity for an educational effort on the part of the public health administrator and a service in prompt follow-up of the cases reported. Physicians should be made to realize that they must adopt the same attitude toward the reporting of occupational diseases which now exists with regard to the reporting of communicable diseases. The recurrence of such diseases may be obviated by prompt investigation on the part of a State industrial hygiene service of those conditions in the plant which may be the causative agent. Once this has been established, prompt measures may be taken for the control of the environmental conditions responsible for the diseases.

Another responsibility to be assumed by public health administrators is that dealing with the formulation of reasonable rules and regulations designed to prevent and control occupational diseases. Even if the health agency is not charged by law to establish such rules, it should be in a position to render the necessary scientific consultation services to the State agency so charged. The Idaho law which established a bureau of industrial hygiene in the State health department specifically provides that such consultation services should be given by the industrial hygiene bureau to the industrial accident

commission. On the other hand, the Maryland compensation law specifically charges the State health department and Baltimore city health department with the duty of formulating, adopting, and administering rules and regulations designed to prevent and control occupational diseases.

It is unnecessary at this time to discuss one of the main functions of an industrial hygiene service, namely, the systematic and prompt investigation of industrial establishments for the purpose of evaluating and controlling hazards to health. Activities of this kind constitute the major function of divisions of industrial hygiene, and the correction of conditions inimical to health should be the main goal of public health administrators. However, there is one aspect of such investigations in need of clarification. There appears to be a belief among certain individuals and agencies that industrial hygiene divisions in health departments use their findings only for educational purposes, attempting to convince management by persuasion that it would be desirable to effect the necessary changes to correct hazardous plant conditions. This is true to a great extent, since experience has shown that often much more can be accomplished by persuasive tactics than by the use of force, yet one should not get the impression that health agencies do not resort to force when necessary. Every health department has sufficient power under its basic organic act to take drastic measures in the prevention and control of health hazards. Although the regulation of working conditions is usually a function of labor departments or industrial commissions by specific legislative enactment, health departments have more than sufficient authority in this connection and in certain recalcitrant cases have not hesitated to use this authority.

There is one other responsibility which should be assumed by public health administrators, namely, assistance to workmen's compensation agencies in the adjudication of claims. From time to time a compensation commission needs impartial facts which might throw light on a claim. The facts may vary from a health appraisal of the claimant to a study of the working environment where the alleged disease has been contracted. It is our firm belief that public health administrators should be prepared to render such services whenever called upon to do so, unless specific legislation prohibits the use in litigation of results of investigations. It is often claimed that the division of industrial hygiene will lose the confidence of the employer if it testifies to certain findings of a study made in the plant involved in litigation. This argument works both ways, since the facts may also tend to disprove the employee's claim for compensation. It has been our observation that an industrial commission can, in most instances, settle a claim on the evidence submitted and the number of times a commission calls upon a study of the workroom environment

or an examination of the worker is limited to a few cases a year. No intelligent employer or employee should have any fault to find with a clear and impartial statement of the facts, based upon scientific inquiry. The proponents for establishing industrial hygiene services within the very agency which adjudicates compensation claims for occupational diseases are on untenable ground, since such an agency is no longer unbiased, being in the unhappy role of judge and prosecutor. The employee, the employer, and the agency adjudicating a compensation claim should welcome the investigation and report of conditions by an impartial agency on an impartial basis.

SUMMARY

An attempt has been made to emphasize some of the responsibilities and opportunities confronting public health administrators in the development, enactment, and administration of occupational disease legislation. Some of these opportunities and responsibilities have been discussed and an example of certain procedures has been given by citing the study made in the State of Utah. The results of the Utah study materially helped to establish the extent and nature of the industrial health problem in that State, thereby furnishing basic information to the occupational disease commission on which to formulate a constructive compensation law for occupational disease injuries. In addition, the study yielded sufficient data on which to base a permanent program in industrial hygiene, one which is now in full progress. The foresight shown in the organization and development of an industrial hygiene service in the State of Utah in 1939 has made it possible for the State industrial hygiene division to meet the present demands made on it by those industries now engaged in the production of vital defense materials. The services this unit is now rendering to these industries should add greatly in eliminating one of the most serious bottlenecks in our defense program, namely, the time lost due to disabilities of all types, which even under normal conditions exact a heavy toll in health, wages, and production.

A STRAIN OF ROCKY MOUNTAIN SPOTTED FEVER VIRUS OF LOW VIRULENCE ISOLATED IN THE WESTERN UNITED STATES [1]

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Early in 1940 Topping and Dyer (*1*) reported the isolation of a highly virulent strain of Rocky Mountain spotted fever virus in the eastern United States. They stated, "It is, of course, possible that

[1] From the Division of Infectious Diseases, National Institute of Health.

there may be strains of virus in Montana which will produce in guinea pigs the picture usually associated with eastern strains, although reports of such are not found in the literature." It is the purpose of this paper to report, briefly, the isolation of such a strain from the western United States.

On May 23, 1940, a patient, "E. L.," was seen in a Denver, Colo., hospital. He had been in Wyoming near Lander,[3] having arrived in Denver on May 20. On this day a tick was found embedded in an old appendectomy scar. The tick was removed that evening by a local physician. On the evening of May 21 he had severe chills, headache, muscular pains, and, he believed, fever. The next morning he was admitted to the hospital. On May 23 the patient had a fever of 103.4° F., an early maculo-papular rash, most noticeable about the wrists and forearms, and on the inner surface of the heel and instep of the left foot. Blood was drawn and allowed to clot; this was macerated in sterile saline and the equivalent of about 4 cc. of whole blood was inoculated intraperitoneally into each of two guinea pigs. After a suitable incubation period one of these guinea pigs developed fever and from this pig the "L" strain of Rocky Mountain spotted fever was established. Other than for the early isolation, all of the observations have been made at the National Institute of Health, Washington, D. C.

The "L" strain has reacted in guinea pigs comparably in every way to the many strains isolated in the East. As pointed out by Topping and Dyer, Rocky Mountain spotted fever strains in guinea pigs can be compared on the basis of (1) incubation period, (2) scrotal involvement, and (3) fatality rates. The "L" strain has an incubation period appreciably longer than highly virulent strains, there has been no evidence of any consistent scrotal involvement in the infected guinea pigs, and there have been but very few deaths in the group. Since the original isolation, the strain has been passed through 25 generations of guinea pigs, a total of 191 having been used up to the time of this report. Of these, 56 were sacrificed either for transfer or pathological examination. There were 6 deaths in the remaining 135 guinea pigs, a fatality rate of 4.4 percent. This rate is considerably lower than that for the mildest strain so far isolated in the East and reported. That strain had a fatality rate of 8 percent (*2*).

Routine cross-immunity tests have been done and this "L" strain gives complete cross-immunity with the "B. R." strain of spotted fever and with our "W" strain reported previously (*1*). There is no cross-immunity to epidemic or endemic typhus, or to our passage strains of "Q" fever.

[3] Lander, Wyo., is located well within the so-called *D. andersoni* territory, and in a personal communication from R. A. Cooley, Entomologist, Rocky Mountain Laboratory, Hamilton, Mont., the statement is made, "We have no actual records of *D. variabilis* occurring in Wyoming."

The lengthened incubation period, lack of scrotal involvement, and a negligible fatality rate in the guinea pigs certainly places this strain of spotted fever in the group exhibiting a very low virulence for these animals. In these three most important differential characteristics, then, the "L" strain is indistinguishable from the usual strains isolated in the East.

DISCUSSION

It has long been the popular conception that Rocky Mountain spotted fever is a more virulent and, therefore, a more highly fatal disease in the West than in the East. Until comparatively recently observations in the laboratory lent support to this belief, because the isolated and reported western strains were more highly virulent for guinea pigs. Various reasons for this greater virulence have been propounded, one of the most popular being the vector in which the infectious agent resides, *D. andersoni* in the West and *D. variabilis* in the East. During the past year, however, some doubt has been cast upon this theory since a highly pathogenic strain of Rocky Mountain spotted fever has been isolated in *D. variabilis* territory in the East from which *D. andersoni* has never been reported; and now a strain of very low virulence has been recovered from a patient who acquired the tick in *D. andersoni* territory in the West, from which *D. variabilis* has never been reported.

In the East there are strains of spotted fever highly virulent for guinea pigs and strains of low virulence; in the West the same variations in virulence are to be found. There may, however, be a predominance of highly pathogenic strains in any given locality. This has been observed in the West, clinically, for years. In the East there may be areas in which the disease is more virulent with correspondingly higher fatality rates.

SUMMARY

A strain of Rocky Mountain spotted fever virus of low virulence isolated in the western United States is reported. It is suggested that the geographical classification (i. e., eastern or western type) be dropped. In the future, strains of Rocky Mountain spotted fever should be classified with reference to their virulence for guinea pigs.

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AN ELECTROSTATIC METHOD FOR COLLECTING BACTERIA FROM AIR

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Dust may be removed from air with more or less efficiency by such methods as filtration, settling, washing, impingement, centrifuging, thermal precipitation, and electrostatic precipitation. With the exception of thermal and electrostatic precipitation all of these methods have been used for collecting bacteria from air.

At the present time in this country the two instruments commonly used in the bacteriologic examination of air are the Wells air centrifuge (*7*) and the Hollaender and DallaValle "funnel device" (*4*). The latter instrument makes use of the impingement principle and employs a Petri dish for culturing. Hollaender and DallaValle state (*1*): "It has been found to be efficient and to compare favorably with the Wells centrifuge, giving slightly higher results when the bacteria density is low."

STATEMENT OF PROBLEM

The immediate problem concerned the application of the electrostatic principle to the removal of bacteria from the air in such a manner that the sampling instrument might have value in the bacteriologic examination of air. Second, an attempt was made to ascertain the relative efficiency of this electrostatic method as compared with one of the accepted instruments used in determining the bacterial contamination of air.

Of the instruments now being used in this field it appeared that the electrostatic method might best be applied to the Hollaender and DallaValle "funnel device." To the impingement effect utilized by this instrument would thus be added the additional forces attributable to the electrostatic principle and possibly a more efficient sampling device would be made available. A schematic drawing of the apparatus is shown in figure 1. Details of construction are given in the appendix.

Any particle which enters the funnel stem of the electrostatic device and reaches any point between the ionizer and the agar tends to be removed from the air and precipitated on the culture medium by the combined effects of impingement, electric wind, and electrostatic attraction.

The particle is first subjected to the impingement effect resulting from a lateral change in the direction of the air flow within the apparatus. Inertia does not permit a particle of perceptible mass to change directions as easily as a gas and it may strike upon the moist surface of the agar and be held.

Second, the particles are swept toward the agar with the electric wind whose direction is from the ionizer to the agar. This is the more important effect resulting from the use of the electrostatic method.

According to Gibbs (*2*) the ions that are formed at the ionizer move at high speed toward the oppositely charged surface. The stream of rapidly moving ions charges the suspended particles and also, by the impact, drives the particles to this oppositely charged surface. The ions, molecules, and suspended particles that are subjected to such an acceleration exert a frictional drag on the air molecules in this region of high potential and tend to carry them along, thus producing the electric wind.

Third, they are subjected to the accelerating effect experienced by any charged particle that is in a region of high potential difference.

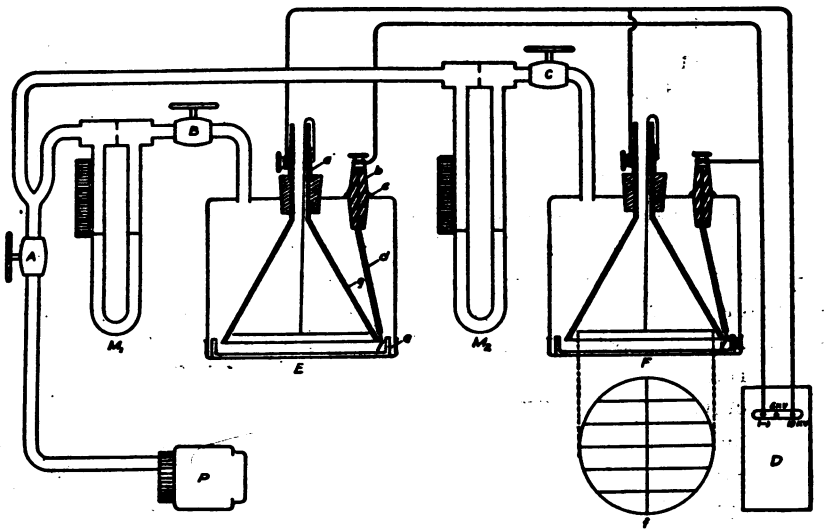

FIGURE 1.—"Funnel device" as modified for the electrostatic method. (a) Metallic collar and binding post. (b) Porcelain portion of automobile spark plug. (c) Soldered junction between spark plug and container. (d) Automobile high tension cable. (e) Petri dish. (f) Ionizer, end view. (g) Glass funnel. (A, B, C) Valves. (E) Funnel device, modified for electrostatic separation of bacteria from air. (F) Ionizer, side view. (M_1, M_2) Manometers. (P) Vacuum pump.

Gibbs considers the mobility of the charged particle in the field of high potential as being too small for effecting precipitation of the particles and concludes that the particles are deposited mainly by the electric wind that is set up between the two electrodes.

SAMPLING PROCEDURE

An artificially contaminated atmosphere has been used for testing the relative efficiency of this new principle. *Serratia marcescens* (*B. prodigiosus*) was used as the test organism. Forty-eight-hour cultures grown in nutrient broth were diluted with an equal quantity

of sterile normal saline and sprayed by compressed air into the air current produced by an electric fan. Such a procedure served to mix the air so that a homogeneous medium would be present at the time of sampling. After spraying, the fan was turned off and the room was left unoccupied and undisturbed for a settling period, allowing the larger droplets to be removed from the air by gravity. The settling time varied from several minutes to several hours. At the end of the settling period the fan was started and kept in operation during the sampling time in order to insure thorough mixing.

It was planned originally to use both the "funnel device" and the Wells air centrifuge to test the relative efficiency of the electrostatic can. However, it has been pointed out by Rooks, Cralley, and Barnes (*6*) that changes affecting the intake of the Wells air centrifuge make both the manometer and tube readings unreliable.

The relative efficiency of this new device was determined in terms of the "funnel device." In making this comparison and in order to develop maximum efficiency some of the factors considered were the depth that the funnel extends into the Petri dish, the polarity of the current, the distance of the ionizer from the agar, and the effect of humidity and ozone production.

DISCUSSION AND RESULTS

Hollaender and DallaValle reported the efficiency of their "funnel device" to be 80 percent (*4*). In determining this efficiency, four funnel devices were used in series. They found that of the total number of bacteria recovered 80 percent were in the first can, 15 percent in the second, and 5 percent in the third. The numbers caught on the fourth were negligible.

That the term "efficiency" used in the preceding paragraph must be considered as having a relative rather than an absolute value is indicated by the following experiment:

Three funnel devices were connected in series. An electrostatic can was attached to the exhaust of the *last* funnel device of the series. Forty-eight readings were taken, and in each instance more organisms were recovered by the electrostatic device than were recovered in the first funnel device of the series. On the basis of this comparison, the absolute efficiency of the first funnel device of the series cannot be greater than 50 percent.

Three electrostatic devices were next connected in a similar series. Of the total number of bacteria recovered, between 94 and 97 percent were found in the first electrostatic can. A "funnel device" attached to the exhaust of a single electrostatic can recovered less than 2 percent in the series of 12 samples that were taken.

These experiments indicate that the electrostatic device, either singly or in series, is more efficient that the unmodified funnel device.

It would appear, however, that the determination of the absolute efficiency of any such device for the sampling of air for bacteria is impractical. If a different device is used in testing it may be less effective than the one under test. If a number of the same devices are used in series, there is no valid reason for assuming that bacteria escaping the first will be caught by the succeeding ones.

Figure 2 shows the results of a further series of samples comparing the Hollaender and DallaValle "funnel device" with the electrostatic method. On the ordinate is given the time in minutes after the end of the spraying period. On the abscissa are the numbers of bacteria

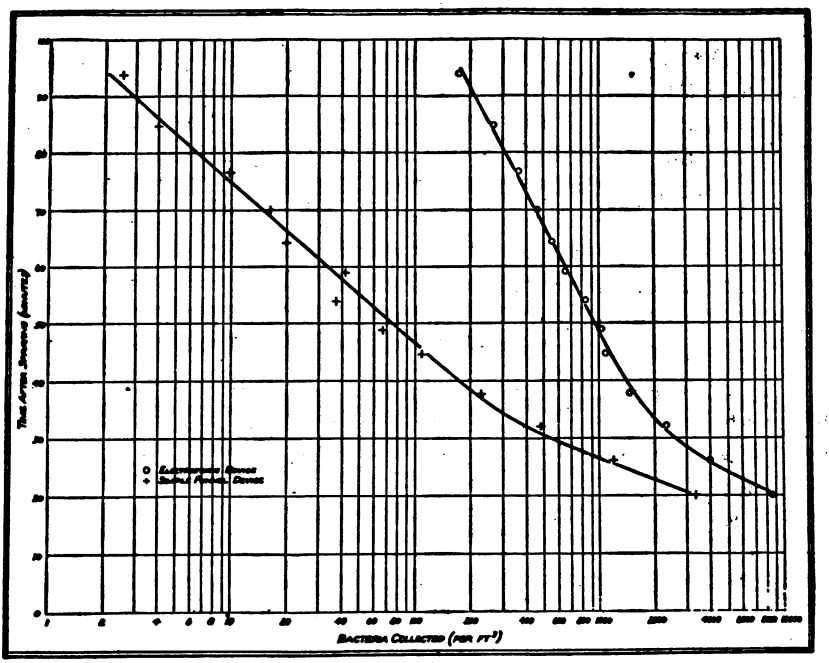

FIGURE 2.—Comparison of the electrostatic and impingement methods for collecting bacteria from air.

per cubic foot as determined by the two instruments. The graph demonstrates, first, that the separation is consistently greater with the use of the electrostatic set-up, and second, that this effectiveness assumes greater importance as the time after spraying increases. At 20 minutes after spraying the electrostatic device was about 3 times as effective as the simple funnel device and at 94 minutes it was more than 70 times as effective.

It is of interest to note that after 40 minutes both instruments demonstrate the straight line feature of the logarithmic death rate curve for bacteria.

The slope of the curve for the simple funnel device indicates that no bacteria, or at least very few, would be recovered by the device after

105 minutes. In the same way no bacteria would be expected to be recovered by the electrostatic device after 230 minutes.

Figure 2 shows the results of a single group of successive samples and is given as an illustration of the sampling differences which may occur with the use of the two instruments. During this sampling period the temperature was 82° F. and the relative humidity was 40 percent.

Obviously in no two such sampling series can the conditions be identical throughout. Initial bacterial load of the air cannot be exactly duplicated; nuclei size will vary with temperature and humidity, and the viability of the organisms may differ from culture to culture.

It has been found that the two main factors affecting the efficiency of the instrument are, first, the apparatus has been found to give slightly better results if the ionizer is kept at a positive potential, and second, at excessively high artificially produced humidities (over 85 percent) the current leakage from the electrostatic device is so great that its effectiveness is materially reduced.

The ionizer should be as close as possible to the agar without producing sparking. If the funnel is within the lip of the Petri dish, varying the distance of this funnel from the agar does not appear to change the efficiency. Kraus (*5*) found that voltages between 71,900 and 76,800 had no deleterious effect on liquid suspensions of Gram positive, Gram negative, spore-forming, or non-spore-forming bacteria. It seems unlikely, therefore, that 12,000 volts would be appreciably germicidal.

Ozone is produced in the operation of the electrostatic apparatus. At no time has the exhaust air reached an ozone concentration that is objectionable when breathed. Witheridge and Yaglou (*8*) have determined this objectionable concentration to be 0.10 part of ozone per million parts of air. Hartman (*3*) states that the ozone concentration must reach 6,500 parts per million to be germicidal to airborne organisms. We feel safe, therefore, in assuming that the concentration of ozone does not reach germicidal concentrations within the apparatus.

However, ozone production should be kept at a minimum at all times to limit the rate of oxidation of the metal portions of the apparatus and of the rubber connections. This oxidative process makes it necessary to use platinum or other nonoxidizable wires in the construction of the ionizer. In the initial experiments new copper wires were used in construction, and within a few weeks the effectiveness of the instrument had decreased by half owing to corrosion.

SUMMARY AND CONCLUSIONS

The electrostatic method has been applied to the Hollaender and DallaValle "funnel device" for the bacteriologic examination of air. Pertinent structural changes in the "funnel device" for the application of the electrostatic method are given in detail.

A series of 512 readings using *B. prodigiosus* as a test organism under varying test situations appears to justify the following conclusions:

1. Bacteria may be removed from air electrostatically to a solid medium where they may be cultured and counted by recognized laboratory techniques.

2. The electrostatic method when applied to the "funnel device" of Hollaender and DallaValle shows a greater relative sampling efficiency.

3. This relative efficiency becomes greater with the elapse of time after spraying.

4. The apparatus has been found to give slightly better results if the ionizer is kept at a positive potential.

5. At excessively high artificially produced humidities (over 85 percent) the current leakage from the electrostatic device is so great that its effectiveness is materially reduced.

A device such as the Mine Safety Appliances electrostatic precipitator might be adapted to make both current and suction available in a portable unit, as suggested in the appendix.

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Appendix

Construction.—The porcelain portion of an automobile spark plug (b) is fitted to the "funnel device" as follows: The upper and lower copper washers on the plug are fastened together by fine copper wire

(No. 36 gauge was found to be satisfactory). Copper wire of the same size is then wrapped in close spirals around the porcelain between the two washers. Solder may then be melted over this area, the net result being a metal band around the porcelain which may be soldered to the metal container and become an integral part of the apparatus. Opposite the exhaust outlet is the most convenient position. A 3-inch portion of automobile high tension cable is soldered to the bottom point of the spark plug and the junction wrapped with a small piece of electrician's linen high tension tape.

The ionizer (F and f) is made by constructing a circular framework 2¾ inches in diameter of heavy wire (No. 14 gauge copper). A short section of smaller copper wire (No. 36) is soldered across the diameter of the circular framework and a longer section of the same size wire is attached to the center of this cross wire and extends up the stem of the funnel, reverses direction, and is soldered to the metal collar (a). The collar fits the stem of the funnel closely but may be moved up or down and in this way the distance of the ionizer from the agar may be varied. A binding post on the collar provides facilities for connecting the ionizer to the source of current.

Trial experiments have shown that a centering device for the vertical wire of the ionizer is unnecessary. The use of such an arrangement insures exact vertical adjustment of the ionizer but at the same time it disturbs the uniform flow of air through the funnel stem. The effectiveness of the apparatus is not altered by the slight lateral displacement of the ionizer which occurs with a change in the position of the collar (a).

The parallel wires of the ionizer are of platinum, No. 64 gauge, and are placed across the circular framework perpendicular to the copper cross wire and approximately one-fourth inch apart. The glass funnel effectively insulates the ionizer at all points from the rest of the can.

Orifice meters are used to measure the rate of air flow. The connections are of rubber tubing. Valves A, B, and C are screw-type pinch cocks which permit individual as well as over-all adjustment of the rates of air flow.

Suction is provided by a suitable vacuum pump, capable of creating a constant air flow.

The power pack (D) produces direct current at 6,000 and 12,000 volts.

Suitable lengths of high tension automobile cable effectively handle the current from the power pack. The terminals at the pack are semi-permanent and enclosed; those to the can are of the flat, notched type that attach readily to the spark plug and ionizer binding post. Soldered construction has been used wherever possible in order to insure good electrical contact and mechanical stability.

Operation.—The first step in the operation of the device is to adjust valves A, B, and C to the desired rate of air flow. During this process the containers are closed and no plates are used. The electrical connections are made at this time.

The plates to be used are poured a little heavier than is the custom and they are allowed to harden completely before use. This insures good electrical contact, a better distribution of the colonies on the plate, and a reduced tendency toward sparking.

The lid is then removed from the can and the negative terminal (d) is inspected for cleanliness. A corroded terminal or one coated with dried agar will not make good electrical contact. A poured plate is set on the lid and the lid replaced.

The current is now turned on momentarily to test for sparking or short circuits. If sparking occurs the current is turned off and the ionizer (f) raised by lowering the collar (a). After the optimum distance of the ionizer has been determined it is rarely necessary to change its position. For maximum effectiveness it should be as close to the agar as is possible without sparking.

After the ionizer has been adjusted and the current conditions are satisfactory the motor is set into operation for a definite period of time and the air rate noted. The product of air rate and the time is the volume of air sampled.

When the desired amount of air has been sampled the current and motor are turned off and the plate removed. A fresh plate is then inserted as before and another sample taken.

It will be seen from the drawing that it is possible to operate both cans under identical conditions or to vary such items as the rate of air flow, the depth that the funnel extends into the Petri dish, the voltage used, the polarity of the current, or the distance of the ionizer from the agar.

A device such as the Mine Safety Appliances electrostatic precipitator might be adapted to make both current and suction available in a portable unit.

DISABLING MORBIDITY AMONG INDUSTRIAL WORKERS, SECOND QUARTER OF 1941, WITH A NOTE ON THE OCCURRENCE OF PNEUMONIA AMONG IRON AND STEEL WORKERS [1]

By W. M. GAFAFER, *Senior Statistician, United States Public Health Service*

The accompanying data are derived from periodic reports on sickness and nonindustrial injuries causing disability lasting more than 1 week among over 200,000 male members of industrial sick benefit associations, group insurance plans, and company relief departments.

Second quarter and first half of 1941.—Table 1 shows the frequency of disabilities per 1,000 male industrial workers for the second quarter and first half of the year 1941. While the frequencies for all sickness show no sensible changes for the second quarter and the first half of 1941 as compared with the corresponding frequencies for 1940, there are several causes for which increases in frequency are notable. For the second quarter these causes are bronchitis, diseases of the pharynx and tonsils, pneumonia, and infectious and parasitic diseases; for the first half the causes are influenza and grippe, reflecting the epidemic of the first quarter of 1941, and pneumonia. A review of the corresponding rates for the second quarter of each year since 1932 reveals that the rates for the second quarter of 1941 for bronchitis, diseases of the pharynx and tonsils, and pneumonia are the highest, the percentage excesses in relation to the corresponding 10-year means being, respectively, 36, 35, and 77 percent.

Pneumonia among iron and steel workers.—The magnitude of the pneumonia frequency indicates the desirability of further examination of the pneumonia experience. When the workers are separated into those engaged in iron and steel work and those not so engaged, it is found that the frequency of pneumonia per 1,000 iron and steel workers for the second quarter has increased from 3.4 in 1939 to 3.8 in 1940, and to 5.7 in 1941, the corresponding frequencies for workers not engaged in this work showing a tendency to decrease, as follows, 3.1 to 3.0 to 2.9.

The relatively large increase in the frequency of pneumonia among iron and steel workers shown by the rates for the second quarters of 1940 and 1941 may be attributable to the large influx of new employees, the population change for the two second quarters representing an increase of over 30 percent; among workers not employed in the iron and steel industry, on the other hand, the corresponding population change represents a decrease of 4 percent.

[1] From the Division of Industrial Hygiene, National Institute of Health. The preceding report of this series, "Frequency of disabling morbidity by cause, and duration, among male and female industrial workers during 1940, and by cause among males during the first quarter of 1941," by W. M. Gafafer, appeared in the Public Health Reports, vol. 56, pp. 1848-1852, September 12, 1941.

TABLE 1.—*Frequency of disabling cases of sickness and nonindustrial injuries lasting 8 consecutive calendar days or longer among MALE employees in various industries, by cause, the second quarter of 1941 compared with the second quarter of 1940, and the first half of 1941 compared with the first halves of the years 1936–40, inclusive*

Cause (numbers in parentheses are disease title numbers from the International List of Causes of Death, 1939)	Annual number of cases per 1,000 males				
	Second quarter		First half		
	1941	1940	1941	1940	1936–40
Sickness and nonindustrial injuries [1]	87.7	87.7	112.9	111.1	104.7
Nonindustrial injuries (169–195)	10.1	10.3	10.8	11.4	10.7
Sickness [1]	77.6	77.4	102.1	99.7	94.0
Respiratory diseases	33.2	30.6	55.7	50.1	45.7
Influenza and grippe (33)	10.3	11.8	30.1	25.5	24.0
Bronchitis, acute and chronic (106)	4.9	4.1	6.3	6.4	5.5
Diseases of the pharynx and tonsils (115b, 115c)	7.4	5.8	6.5	5.9	5.6
Pneumonia, all forms (107–109)	4.6	3.5	5.2	4.8	3.8
Tuberculosis of the respiratory system (13)	.7	.6	.6	.7	.8
Other respiratory diseases (104, 105, 110–114)	5.3	4.8	7.0	6.8	6.0
Nonrespiratory diseases	41.8	45.1	43.6	47.6	45.9
Digestive diseases	13.2	15.0	13.8	15.2	14.1
Diseases of the stomach, except cancer (117, 118)	3.3	3.8	3.6	3.9	3.9
Diarrhea and enteritis (120)	.9	1.3	1.0	1.3	1.1
Appendicitis (121)	4.7	5.3	4.9	5.4	4.6
Hernia (122a)	1.6	1.9	1.6	1.7	1.7
Other digestive diseases (115a, 115d, 116, 122b, 123–129)	2.7	2.7	2.7	2.9	2.8
Nondigestive diseases	28.6	30.1	29.8	32.4	31.8
Diseases of the heart and arteries, and nephritis (90–99, 102, 130–132)	3.8	4.2	4.2	4.7	4.5
Other genitourinary diseases (133–138)	2.2	2.6	2.2	2.8	2.5
Neuralgia, neuritis, sciatica (87b)	1.9	2.7	2.0	2.8	2.4
Neurasthenia and the like (part of 84d)	.9	1.3	.9	1.2	1.1
Other diseases of the nervous system (80–85, 87, except part of 84d and 87b)	1.1	1.1	1.1	1.1	1.1
Rheumatism, acute and chronic (58, 59)	3.5	4.4	4.1	4.5	4.4
Diseases of the organs of locomotion, except diseases of the joints (156b)	2.9	2.6	2.9	3.0	2.9
Diseases of the skin (151–153)	2.3	2.1	2.3	2.6	2.7
Infectious and parasitic diseases [2] (1–12, 14–24, 26–29, 31, 32, 34–44)	3.1	1.9	2.8	2.1	2.9
All other diseases (45–57, 60–79, 88, 89, 100, 101, 103, 154, 155, 156a, 157, 162)	6.9	7.2	7.3	7.6	7.3
Ill-defined and unknown causes (200)	2.6	1.7	2.8	2.0	2.4
Average number of males covered in the record	229,739	199,311	226,712	198,038	870,500
Number of organizations	24	26	26	26	

[1] Exclusive of disability from the venereal diseases and a few numerically unimportant causes of disability.
[2] Except influenza, respiratory tuberculosis, and the venereal diseases.

DEATHS DURING WEEK ENDED OCTOBER 4, 1941

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Oct. 4, 1941	Corresponding week, 1940
Data from 88 large cities of the United States:		
Total deaths	7,687	7,776
Average for 3 prior years	7,626	
Total deaths, first 40 weeks of year	336,370	357,467
Deaths per 1,000 population, first 40 weeks of year, annual rate	11.7	11.8
Deaths under 1 year of age	541	490
Average for 3 prior years	502	
Deaths under 1 year of age, first 40 weeks of year	20,998	20,067
Data from industrial insurance companies:		
Policies in force	64,506,975	64,812,208
Number of death claims	11,001	11,169
Death claims per 1,000 policies in force, annual rate	8.9	9.0
Death claims per 1,000 policies, first 40 weeks of year, annual rate	9.5	9.7

PREVALENCE OF DISEASE

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

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED OCTOBER 11, 1941

Summary

The incidence of poliomyelitis declined for the third consecutive week. A total of 429 cases was reported for the current week as compared with 456 for the preceding week and with 592 for the next earlier week. Slight increases were recorded in the North Central areas where the number of cases increased from 19 to 31 in Michigan, 18 to 25 in Illinois, 15 to 19 in Minnesota, and 0 to 6 in Kansas. The following named 9 States reported more than 15 cases (last week's figures in parentheses): New York, 79 (87); Pennsylvania, 42 (51); Michigan, 31 (19); New Jersey, 25 (22); Illinois, 25 (18); Ohio, 21 (32); Minnesota, 19 (15); Alabama, 17 (22); and Tennessee, 16 (27).

A total of 7,279 cases of poliomyelitis has been reported to date this year (first 41 weeks), as compared with a 5-year (1936–40) median of 5,664, and with 7,435 and 8,433 cases for the corresponding period in 1940 and 1937, respectively.

The current incidence of influenza, measles, poliomyelitis, and whooping cough is above the 5-year median, and the numbers of cases of these diseases reported to date this year exceed the 5-year cumulative medians for the same period.

Of 995 cases of influenza, 361 were reported in Texas, 200 in South Carolina, and 114 in Virginia.

Sixty-two cases of typhoid fever were reported in Virginia, as compared with 7 cases for the preceding week. Of 84 cases of endemic typhus fever, 31 cases occurred in Georgia, 15 in Texas, and 11 in Louisiana.

The crude death rate for the current week for 88 large cities in the United States is 10.9 per 1,000 population, the same as the 3-year (1938–40) average for the corresponding week. The rate for the preceding week was 10.7 and for the next earlier week, 10.3. The cumulative rate to date is 11.7 as compared with 11.8 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended October 11, 1941, and comparison with corresponding week of 1940 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1936–40	Week ended		Median 1936–40	Week ended		Median 1936–40	Week ended		Median 1936–40
	Oct. 11, 1941	Oct. 12, 1940		Oct. 11, 1941	Oct. 12, 1940		Oct. 11, 1941	Oct. 12, 1940		Oct. 11, 1941	Oct. 12, 1940	
NEW ENG.												
Maine	0	2	1	------	------	------	50	24	8	0	0	0
New Hampshire	0	0	0	------	------	------	1	0	2	0	0	0
Vermont	0	0	0	------	------	------	0	5	5	0	0	0
Massachusetts	2	2	2	------	------	------	57	107	43	2	2	2
Rhode Island	1	0	0	------	------	------	5	0	2	0	0	0
Connecticut	0	1	2	6	1	------	24	8	6	0	0	0
MID. ATL.												
New York	17	12	18	[1] 3	[1] 7	[1] 7	76	99	68	3	2	4
New Jersey	2	12	10	12	1	8	24	60	19	0	0	0
Pennsylvania [2]	12	16	30	1	------	------	86	93	66	2	1	3
E. NO. CEN.												
Ohio [3]	11	15	30	6	9	9	23	6	10	0	2	2
Indiana	11	5	21	6	2	13	5	9	11	1	2	2
Illinois	20	12	35	8	3	3	13	61	19	1	0	2
Michigan [4]	7	10	14	------	12	2	57	113	26	1	0	2
Wisconsin	0	3	3	19	27	25	40	105	21	0	1	1
W. NO. CEN.												
Minnesota	3	4	4	2	2	2	3	4	8	0	0	0
Iowa	2	3	7	------	------	------	8	11	7	0	0	1
Missouri	7	6	14	1	------	20	14	2	8	0	0	0
North Dakota	2	3	2	7	1	1	18	4	2	0	0	0
South Dakota	12	2	2	------	------	------	2	2	2	1	1	0
Nebraska	2	1	1	------	2	------	2	16	4	0	0	0
Kansas	2	5	5	1	3	2	4	7	4	0	1	1
SO. ATL.												
Delaware	1	0	1	------	------	------	2	4	2	0	0	0
Maryland [2 4]	7	4	7	3	2	7	10	5	5	2	0	1
Dist. of Col	2	2	6	2	------	------	7	2	2	0	0	0
Virginia [2]	37	31	61	114	45	45	24	22	11	1	2	2
West Virginia	5	7	19	11	2	9	49	5	2	0	0	2
North Carolina [2]	59	71	124	------	------	1	34	4	32	1	0	1
South Carolina [2]	50	20	24	200	168	168	76	2	3	3	0	1
Georgia [2]	45	28	48	13	14	14	14	3	3	0	1	1
Florida [2]	5	3	8	10	------	------	1	1	1	1	0	1
E. SO. CEN.												
Kentucky	16	7	24	------	2	3	7	12	14	2	1	1
Tennessee [2]	23	8	34	8	6	10	28	15	6	1	1	3
Alabama [2]	28	29	43	10	13	23	25	2	3	0	2	2
Mississippi [2 4]	17	11	18	------	------	------	------	------	------	0	0	0
W. SO. CEN.												
Arkansas [2]	16	16	19	8	14	14	31	2	1	1	0	0
Louisiana [2]	10	14	17	3	------	5	1	5	2	2	1	1
Oklahoma	14	16	16	44	38	28	7	5	1	0	1	1
Texas [2]	43	22	34	361	195	140	11	11	15	0	0	1
MOUNTAIN												
Montana	2	1	1	------	20	20	11	17	22	0	0	0
Idaho	0	0	0	------	5	5	1	3	7	0	0	0
Wyoming	2	1	0	1	------	------	4	1	1	0	0	0
Colorado	9	3	9	50	13	6	18	9	6	0	0	0
New Mexico	0	0	2	2	------	------	4	9	9	0	1	0
Arizona	0	1	4	47	65	27	35	21	2	0	0	0
Utah [4]	0	2	1	1	2	1	8	3	6	0	0	0
Nevada	0	0	------	------	------	------	0	0	------	0	1	------
PACIFIC												
Washington	0	0	0	------	------	------	9	2	15	0	0	0
Oregon	1	6	0	7	15	13	9	11	5	1	0	0
California	12	16	22	28	16	16	101	57	42	0	0	1
Total	517	433	753	995	705	687	1,039	964	964	27	24	42
41 weeks	10,705	11,215	18,650	573,309	173,317	156,313	837,282	234,393	272,877	1,645	1,366	2,405

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended October 11, 1941, and comparison with corresponding week of 1940 and 5-year median—Continued

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1936–40	Week ended		Median 1936–40	Week ended		Median 1936–40	Week ended		Median 1936–40
	Oct. 11, 1941	Oct. 12, 1940		Oct. 11, 1941	Oct. 12, 1940		Oct. 11, 1941	Oct. 12, 1940		Oct. 11, 1941	Oct. 12, 1940	
NEW ENG.												
Maine	4	0	0	10	0	7	0	0	0	3	2	2
New Hampshire	1	1	0	2	2	2	0	0	0	0	0	0
Vermont	0	1	0	1	7	7	0	0	0	0	0	0
Massachusetts	13	3	3	92	45	60	0	0	0	5	0	0
Rhode Island	2	1	0	7	2	5	0	0	0	0	0	0
Connecticut	5	0	2	18	10	19	0	0	0	1	0	1
MID. ATL.												
New York	79	8	9	90	107	121	0	0	0	16	14	20
New Jersey	25	2	4	39	38	38	0	0	0	7	5	4
Pennsylvania [2]	42	13	7	94	85	165	0	0	0	13	14	26
E. NO. CEN.												
Ohio [2]	21	38	18	100	93	171	0	0	0	12	7	8
Indiana	2	31	5	52	33	75	0	2	2	3	4	4
Illinois	25	43	16	75	159	192	0	3	2	8	17	19
Michigan [4]	31	64	18	74	80	156	1	0	0	5	4	7
Wisconsin	5	25	9	68	89	89	0	0	0	0	0	1
W. NO. CEN.												
Minnesota	19	20	20	43	57	57	0	0	0	0	2	2
Iowa	0	75	11	33	24	56	0	1	1	3	2	6
Missouri	2	26	5	25	32	45	2	0	0	11	10	16
North Dakota	1	0	0	18	12	23	0	0	0	0	1	1
South Dakota	1	1	1	13	9	14	0	0	0	3	0	0
Nebraska	0	20	2	16	4	8	0	0	0	1	1	1
Kansas	6	24	6	37	62	62	0	1	0	2	2	4
SO. ATL.												
Delaware	5	0	0	8	2	7	0	0	0	2	0	1
Maryland [3] [4]	9	0	2	25	27	27	0	0	0	9	5	5
Dist. of Col.	3	0	1	11	5	7	0	0	0	0	1	2
Virginia [3]	11	15	1	39	25	35	0	0	0	62	7	10
West Virginia	5	37	1	38	31	63	0	0	0	10	5	9
North Carolina [3]	8	1	1	57	118	80	0	0	0	5	12	12
South Carolina [3]	8	0	0	13	54	10	0	0	0	3	5	10
Georgia [3]	6	1	1	23	42	32	0	0	0	16	11	11
Florida [3]	6	1	1	6	8	8	0	0	0	1	0	2
E. SO. CEN.												
Kentucky	8	6	4	53	55	55	0	0	0	17	15	15
Tennessee [3]	16	3	3	42	53	48	0	0	0	12	14	14
Alabama [3]	17	3	2	32	20	20	0	0	0	3	3	4
Mississippi [3] [4]	6	2	2	17	8	13	0	0	0	4	1	5
W. SO. CEN.												
Arkansas [3]	1	1	1	13	15	15	1	0	0	6	15	11
Louisiana [3]	7	3	1	8	7	8	0	0	0	15	8	8
Oklahoma	2	4	2	13	28	27	1	0	1	4	5	8
Texas [3]	5	4	4	29	32	32	0	1	0	------	17	27
MOUNTAIN												
Montana	0	3	2	8	12	22	0	1	4	0	1	3
Idaho	0	2	0	12	13	16	0	0	0	0	10	3
Wyoming	1	0	0	9	4	5	0	0	0	0	1	1
Colorado	0	0	3	5	11	16	0	0	0	4	0	6
New Mexico	0	0	2	8	3	8	0	0	0	2	3	7
Arizona	0	2	2	3	4	4	0	0	0	1	1	3
Utah [4]	2	3	3	8	3	10	0	0	0	0	0	0
Nevada	0	1	------	0	0	------	0	0	------	7	0	------
PACIFIC												
Washington	6	18	4	12	28	30	0	0	1	2	3	3
Oregon	5	1	2	3	7	20	0	1	1	0	2	1
California	8	10	10	84	89	98	0	0	1	5	6	9
Total	429	517	306	1,466	1,654	1,990	5	10	23	283	236	341
41 weeks	7,279	7,435	5,664	99,490	127,266	148,754	1,221	2,046	8,456	7,014	7,929	11,436

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended October 11, 1941, and comparison with corresponding week of 1940—Continued

Division and State	Whooping cough	
	Week ended	
	Oct. 11, 1941	Oct. 12, 1940
NEW ENG.		
Maine	4	5
New Hampshire	13	0
Vermont	12	4
Massachusetts	99	110
Rhode Island	19	3
Connecticut	37	65
MID. ATL.		
New York	297	281
New Jersey	89	78
Pennsylvania [3]	239	381
E. NO. CEN.		
Ohio [3]	176	206
Indiana	6	12
Illinois	176	139
Michigan [4]	434	348
Wisconsin	191	95
W. NO. CEN.		
Minnesota	56	36
Iowa	31	11
Missouri	6	26
North Dakota	13	23
South Dakota	22	2
Nebraska	5	2
Kansas	29	30
SO. ATL.		
Delaware	3	14
Maryland [3] [4]	36	51
Dist. of Col.	17	4
Virginia [3]	29	40
West Virginia	30	25
North Carolina [3]	69	65
SO. ATL.—continued		
South Carolina [3]	60	12
Georgia [3]	10	8
Florida [3]	5	9
E. SO. CEN.		
Kentucky	91	37
Tennessee [3]	49	32
Alabama [3]	6	12
Mississippi [3] [4]	----	----
W. SO. CEN.		
Arkansas [3]	2	29
Louisiana [3]	3	2
Oklahoma	4	15
Texas [3]	52	90
MOUNTAIN		
Montana	8	0
Idaho	2	1
Wyoming	4	2
Colorado	40	19
New Mexico	24	4
Arizona	16	2
Utah [4]	28	8
Nevada	6	0
PACIFIC		
Washington	42	12
Oregon	45	2
California	197	248
Total	2,832	2,600
41 weeks	171,713	128,172

[1] New York City only.
[2] Typhus fever, week ended Oct. 11, 1941, 84 cases, as follows: Pennsylvania, 1; Maryland, 1; Virginia, 1; North Carolina, 2; South Carolina, 4; Georgia, 31; Florida, 3; Tennessee, 4; Alabama, 7; Mississippi, 2; Arkansas, 2; Louisiana, 11; Texas, 15.
[3] Rocky Mountain spotted fever, week ended Oct. 11, 1941, Ohio, 1 case.
[4] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended September 27, 1941

This table lists the reports from 134 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	0	5	0	0	0	0	6	20
New Hampshire:											
Concord	0	------	0	0	0	2	0	0	0	0	9
Manchester	0	------	0	0	0	0	0	0	0	0	5
Nashua	0	0	0	0	1	0	0	0	0	5	9
Vermont:											
Barre	0	------	------	1	------	0	0	------	0	0	------
Burlington	0	------	0	0	0	0	0	0	0	0	10
Rutland	0	------	0	0	0	0	0	0	0	0	4
Massachusetts:											
Boston	0	------	0	4	6	16	0	5	2	27	140
Fall River	2	------	0	0	0	7	0	1	1	0	23
Springfield	0	------	0	13	2	8	0	0	0	8	43
Worcester	0	------	0	0	4	3	0	1	0	15	45
Rhode Island:											
Pawtucket	0	------	------	0	------	0	0	------	0	0	------
Providence	2	------	0	1	0	1	0	1	0	30	44
Connecticut:											
Bridgeport	0	1	1	1	1	1	0	1	1	0	34
Hartford	0	------	0	1	0	2	0	0	0	3	26
New Haven	1	------	0	2	0	1	0	0	0	7	39
New York:											
Buffalo	0	------	0	1	6	9	0	6	0	11	105
New York	5	------	0	14	44	30	0	59	5	214	1,253
Rochester	0	------	0	1	2	0	0	0	0	3	54
Syracuse	0	------	0	0	2	0	0	0	0	18	40
New Jersey:											
Camden	1	------	0	0	0	1	0	0	3	3	25
Newark	0	1	0	4	1	6	0	13	0	40	98
Trenton	0	------	0	0	4	2	0	1	0	0	32
Pennsylvania:											
Philadelphia	4	2	0	2	11	7	0	18	3	41	379
Pittsburgh	3	------	0	1	6	7	0	7	0	25	165
Reading	0	------	0	0	1	1	0	0	0	1	35
Scranton	0	------	------	0	------	0	0	------	0	0	------
Ohio:											
Cleveland	0	1	0	1	5	8	0	8	0	45	158
Columbus	9	------	0	1	2	4	0	3	0	9	75
Toledo	0	------	0	1	2	2	0	3	0	29	63
Indiana:											
Anderson	0	------	0	0	0	0	0	0	0	0	9
Fort Wayne	0	------	0	0	2	4	0	0	0	0	16
Indianapolis	1	------	0	1	11	1	0	1	0	13	93
Muncie	0	------	0	0	0	0	0	0	0	4	7
South Bend	0	------	0	0	2	0	0	0	0	0	17
Terre Haute	1	------	0	0	1	0	0	0	0	0	14
Illinois:											
Alton	0	------	0	0	1	1	0	0	2	3	4
Chicago	6	1	0	9	18	32	0	31	1	110	633
Elgin	0	------	0	1	0	0	0	0	0	3	4
Moline	0	------	0	1	0	0	0	0	1	2	12
Michigan:											
Detroit	1	------	0	6	5	18	0	8	0	122	222
Flint	0	------	0	0	3	2	0	0	0	9	24
Grand Rapids	0	------	0	0	4	1	0	0	1	13	29
Wisconsin:											
Kenosha	0	------	0	0	0	3	0	0	0	2	6
Madison	0	------	0	3	0	2	0	0	0	4	6
Milwaukee	0	------	0	3	3	10	0	0	0	136	84
Racine	0	------	0	1	0	3	0	0	0	5	13
Superior	0	------	0	0	0	0	0	0	0	9	6
Minnesota:											
Duluth	0	------	0	0	0	0	0	1	0	4	25
Minneapolis	0	------	0	1	0	5	0	1	0	30	91
St. Paul	0	------	0	2	2	4	0	1	0	27	42
Iowa:											
Cedar Rapids	0	------	------	0	------	0	0	------	0	0	------
Davenport	0	------	------	0	------	2	0	------	0	0	------
Des Moines	0	------	0	1	0	5	0	0	0	0	34
Sioux City	0	------	------	0	------	0	0	------	0	1	------
Waterloo	0	------	------	0	------	2	0	------	0	0	------

City reports for week ended September 27, 1941—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Missouri:											
Kansas City	0	------	0	0	4	2	0	3	2	0	97
St. Joseph	0	------	0	0	3	0	0	0	0	2	22
St. Louis	3	------	0	1	6	6	0	6	2	9	176
North Dakota:											
Fargo	0	------	0	0	1	0	0	0	0	4	13
Grand Forks	0	------	------	0	------	0	0	------	0	5	------
Minot	0	------	0	1	0	0	0	0	0	3	4
South Dakota:											
Aberdeen	0	------	------	0	------	0	0	------	0	2	------
Sioux Falls	0	------	0	0	0	0	0	0	0	0	6
Nebraska:											
Lincoln	0	------	------	2	------	1	0	------	0	1	------
Omaha	1	------	0	0	2	1	0	0	0	1	63
Kansas:											
Lawrence	0	4	0	0	1	0	0	0	0	2	5
Topeka	0	------	0	1	2	8	0	0	0	3	12
Wichita	0	------	0	0	2	2	0	2	0	0	24
Delaware:											
Wilmington	0	------	0	2	1	3	0	0	0	0	20
Maryland:											
Baltimore	1	1	0	3	8	10	0	12	1	24	194
Cumberland	0	------	0	0	0	0	0	1	1	0	15
Frederick	0	------	0	0	1	0	0	0	0	0	4
Dist. of Col.:											
Washington	0	------	0	3	5	6	0	12	4	24	206
Virginia:											
Lynchburg	3	------	0	0	4	0	0	1	1	1	9
Norfolk	0	------	0	0	2	1	0	1	1	2	37
Richmond	1	------	1	0	2	2	0	0	0	0	40
Roanoke	1	------	0	0	0	2	0	0	1	0	13
West Virginia:											
Charleston	0	------	0	0	0	2	0	0	0	1	7
Huntington	0	------	------	0	------	1	0	------	3	1	------
Wheeling	0	------	0	1	0	1	0	0	0	0	16
North Carolina:											
Gastonia	0	------	------	0	------	0	0	------	0	0	------
Raleigh	1	------	0	0	0	0	0	0	1	3	12
Wilmington	0	------	0	1	4	1	0	1	0	10	15
Winston-Salem	4	------	0	1	0	0	0	3	0	0	19
South Carolina:											
Charleston	0	10	0	0	2	0	0	0	3	1	22
Florence	3	------	0	0	1	0	0	0	0	0	10
Greenville	0	------	0	0	0	0	0	0	2	0	4
Georgia:											
Atlanta	0	6	0	0	0	8	0	2	0	0	57
Brunswick	0	------	0	0	0	0	0	0	0	0	4
Savannah	0	2	0	1	0	2	0	2	1	0	35
Florida:											
Miami	0	------	0	0	0	0	0	2	1	0	17
St. Petersburg	0	------	0	0	3	0	0	0	0	6	18
Tampa	0	------	0	0	0	0	0	1	0	3	18
Kentucky:											
Ashland	0	------	0	0	0	0	0	0	1	0	5
Covington	0	------	0	2	2	0	0	0	0	0	19
Lexington	0	------	0	0	0	1	0	0	0	1	12
Louisville	0	------	0	1	2	11	0	3	0	51	66
Tennessee:											
Knoxville	0	------	0	0	0	0	0	2	1	0	21
Memphis	0	------	0	0	1	2	0	3	1	7	80
Nashville	0	------	0	1	1	4	0	3	0	8	38
Alabama:											
Birmingham	2	3	0	0	5	4	0	1	2	1	66
Mobile	1	------	0	0	0	0	0	1	1	0	25
Montgomery	0	------	------	0	------	0	0	------	0	0	------
Arkansas:											
Fort Smith	0	------	------	0	------	0	0	------	0	0	------
Little Rock	0	1	0	0	0	0	0	4	0	3	28
Louisiana:											
Lake Charles	0	------	0	0	0	0	0	1	0	0	5
New Orleans	2	------	0	0	7	1	0	8	1	2	120
Shreveport	0	------	0	0	6	1	0	6	1	0	48
Oklahoma:											
Oklahoma City	0	------	0	0	3	0	0	2	1	1	32
Tulsa	0	------	0	1	2	1	0	1	0	4	23

City reports for week ended September 27, 1941—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Texas:											
Dallas	3	------	0	0	1	4	0	0	0	0	52
Fort Worth	5	------	0	0	2	1	0	1	0	7	38
Galveston	0	------	0	0	1	0	0	2	0	0	16
Houston	1	------	0	0	3	1	0	4	0	2	61
San Antonio	1	2	0	1	8	1	0	15	1	1	48
Montana:											
Billings	0	------	0	0	0	0	0	0	0	0	5
Great Falls	0	------	0	0	3	0	0	0	0	1	11
Helena	0	------	0	0	0	0	0	0	0	1	6
Missoula	0	------	0	0	1	0	0	0	0	0	8
Colorado:											
Colorado Springs	0	------	1	0	0	0	0	1	0	0	10
Denver	3	9	0	1	4	1	0	2	0	41	95
Pueblo	0	------	0	5	3	0	0	2	0	0	11
New Mexico:											
Albuquerque	0	------	0	0	0	0	0	1	0	2	11
Arizona:											
Phoenix	0	16	--------	2	-------	0	0	--------	0	6	--------
Utah:											
Salt Lake City	0	------	0	1	4	2	0	0	1	9	40
Washington:											
Seattle	0	------	0	2	2	3	0	5	0	17	87
Spokane	0	------	0	0	4	2	0	0	0	1	30
Tacoma	0	------	0	0	1	3	0	0	0	3	28
Oregon:											
Portland	0	------	0	0	2	3	0	2	0	2	79
Salem	0	------	--------	0	-------	0	0	--------	0	0	--------
California:											
Los Angeles	4	5	0	4	4	16	0	10	1	21	331
Sacramento	3	------	0	1	4	0	0	0	0	2	32
San Francisco	0	------	1	2	5	4	0	9	1	13	153

State and city	Meningitis, meningococcus		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	0	0	6
Springfield	0	0	1
Rhode Island:			
Providence	0	0	1
Connecticut:			
Hartford	0	0	2
New York:			
Buffalo	0	0	2
New York	1	0	42
Rochester	0	0	9
Syracuse	0	0	3
New Jersey:			
Camden	0	0	4
Pennsylvania:			
Philadelphia	0	0	12
Pittsburgh	1	0	5
Reading	0	0	3
Scranton	0	0	1
Ohio:			
Cleveland	0	0	13
Toledo	0	0	2
Illinois:			
Chicago	0	0	17
Elgin	0	0	1
Michigan:			
Detroit	0	0	9
Grand Rapids	0	0	1
Minnesota:			
Minneapolis	0	0	4
St. Paul	0	0	6
Missouri:			
Kansas City	0	0	1

State and city	Meningitis, meningococcus		Poliomyelitis cases
	Cases	Deaths	
Delaware:			
Wilmington	0	0	1
Maryland:			
Baltimore	0	0	2
District of Columbia:			
Washington	0	0	3
Virginia:			
Roanoke	0	0	1
South Carolina:			
Greenville	0	0	1
Georgia:			
Atlanta	1	0	0
Savannah	0	0	1
Kentucky:			
Louisville	0	0	1
Tennessee:			
Knoxville	0	0	1
Nashville	0	0	5
Alabama:			
Birmingham	0	0	6
Louisiana:			
Shreveport	1	1	0
Texas:			
Fort Worth	0	0	2
Colorado:			
Denver	1	1	0
Pueblo	0	0	1
Utah:			
Salt Lake City	0	0	3
California:			
Los Angeles	0	0	2

Encephalitis, epidemic or lethargic.—Cases: Minneapolis, 3; St. Paul, 1; Washington, 1; Mobile, 1. Deaths: New York, 3; Minneapolis, 1.

Pellagra.—Cases: Wilmington, N. C., 1; Savannah, 4; Phoenix, 1.

Typhus fever.—Cases: Norfolk, 1; Charleston, S. C., 1; Atlanta, 1; Savannah, 4; Miami, 1; Birmingham, 1; New Orleans, 1; Fort Worth, 1; San Antonio, 1; Los Angeles, 1. Deaths: Birmingham, 1; Shreveport, 1.

Rates (annual basis) per 100,000 population for a group of 87 selected cities (population, 1940, 33,371,869)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet-fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases
		Cases	Deaths							
Week ended Sept. 27, 1941	9.69	7.03	0.47	16.09	41.87	48.44	0.00	45.00	6.87	189.84
Average for week, 1936–40	15.17	7.58	2.37	29.23	48.66	60.50	.32	49.45	9.16	157.03

PLAGUE INFECTION IN GROUND SQUIRRELS AND IN FLEAS FROM GROUND SQUIRRELS IN SISKIYOU COUNTY, CALIF.

Under date of September 29, 1941, Dr. Bertram P. Brown, Director of Public Health of California, reported plague infection proved, by animal inoculation and cultures, in 3 pools of fleas from ground squirrels, *C. douglasii*, found in Siskiyou County, Calif., as follows: One a pool of 113 fleas from 5 ground squirrels, another of 22 fleas from 1 ground squirrel, and a third of 165 fleas from 6 ground squirrels. Two of these specimens were submitted to the laboratory on August 21 and 22, from locations, respectively, about ½ mile north and 1½ miles northwest of Mount Shasta City, and the third, submitted to the laboratory on August 29, was from a ranch 4 miles south and 2 miles west of Weed.

Under date of September 30, Dr. Brown also reported plague infection proved in organs from one ground squirrel, *C. douglasii*, submitted to the laboratory on July 11 from a ranch 8 miles east and 3 miles south of Montague, Siskiyou County.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended September 6, 1941.—During the week ended September 6, 1941, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		1		7	5			1		14
Chickenpox			2	9	31	12	1	11	15	81
Diphtheria		4		23	4	3	4			38
Dysentery				15	2					17
Influenza	1	4			2	2				9
Lethargic encephalitis					2	31	[1] 101	12		146
Measles				105	22	5	1	6	20	159
Mumps				10	29	15	4		26	84
Pneumonia					2				6	8
Poliomyelitis			37	3	7	52	1	24	3	127
Scarlet fever		3	2	54	53	3	4	6	5	130
Tuberculosis		3	4	77	40	55	37	1		217
Typhoid and paratyphoid fever				39	1	1	7	3	5	56
Whooping cough			2	88	124	3	1		19	237

[1] Encephalomyelitis.

COSTA RICA

Communicable diseases—August 1941.—During the month of August 1941, certain communicable diseases were reported in Costa Rica as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	38	1	Poliomyelitis	4	
Influenza	200	1	Scarlet fever	25	
Measles	46		Typhoid and paratyphoid fever	8	

FINLAND

Communicable diseases—July 1941.—During the month of July 1941, cases of certain communicable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Diphtheria	107	Poliomyelitis	6
Dysentery	4	Scarlet fever	165
Influenza	298	Typhoid fever	48
Paratyphoid fever	94		

SWEDEN

Communicable diseases—July 1941.—During the month of July 1941, cases of certain communicable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	5	Scarlet fever	676
Diphtheria	8	Syphilis	19
Dysentery	14	Typhoid fever	1
Gonorrhea	1,117	Undulant fever	7
Paratyphoid fever	73	Weil's disease	6
Poliomyelitis	17		

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Only those places are included which had not previously reported any of the above-named diseases, except yellow fever, during the current year. All reports of yellow fever are published currently. A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday of each month.

Cholera

Ceylon—Trincomalie.—During the week ended August 23, 1941, 1 case of cholera was reported in Trincomalie, Ceylon.

* * *

COURT DECISION ON PUBLIC HEALTH

Creation of sanitary districts.—(North Carolina Supreme Court; *Idol et al.* v. *Hanes et al.*, 14 S.E.2d 801; decided May 31, 1941.) A statute of North Carolina relating to the creation of sanitary districts provided that 51 percent or more of the resident freeholders within a proposed district could petition the board of county commissioners of the appropriate county, setting forth the boundaries of the proposed district and the objects to be accomplished. Such board, if it approved the petition, was required to transmit the same to the State board of health, but before passing upon the petition the board of county commissioners had to hold a public hearing. Prior notice of such hearing was required to be given in the manner prescribed by the statute.

A petition containing the signatures of the required 51 percent of the resident freeholders was filed with a board of county commissioners and notice of a hearing by the board was given. However, before the hearing was had and before any action toward approval was taken by the commissioners, a number of signers of the petition signified their desire to withdraw their names from the petition. The board of county commissioners at a hearing proceeded to approve the petition notwithstanding the requested withdrawals and prepared to forward such approval to the State board of health. However, a

suit was brought to enjoin the commissioners from any further action in the proceeding, and on appeal to the State supreme court it was stipulated that, if the persons who requested the withdrawal of their names had the right to withdraw and could not be counted as signers by the board of county commissioners at its meeting, then the petition did not contain the signatures of 51 percent of the resident freeholders of the proposed sanitary district.

The appellate court took the view that an individual petitioner could, as of right, withdraw his name from the petition at any time before final action by the board of county commissioners on the question of approval, and that the withdrawal of the petitioners, conceded in the stipulation to reduce the number to less than 51 percent of the resident freeholders, was fatal to the jurisdiction of the defendant board of county commissioners and abated its authority to act in the premises.

x