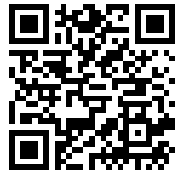


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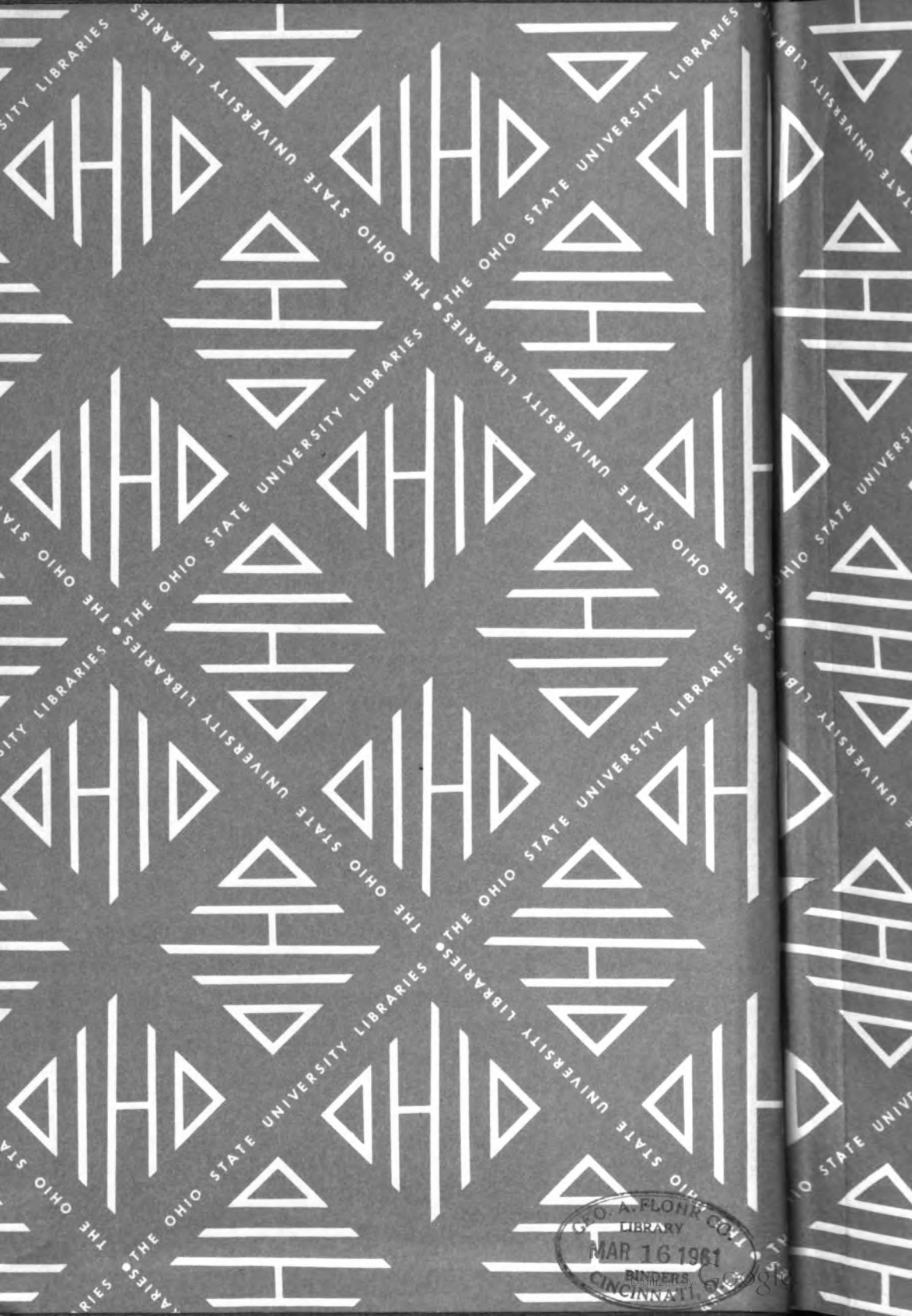
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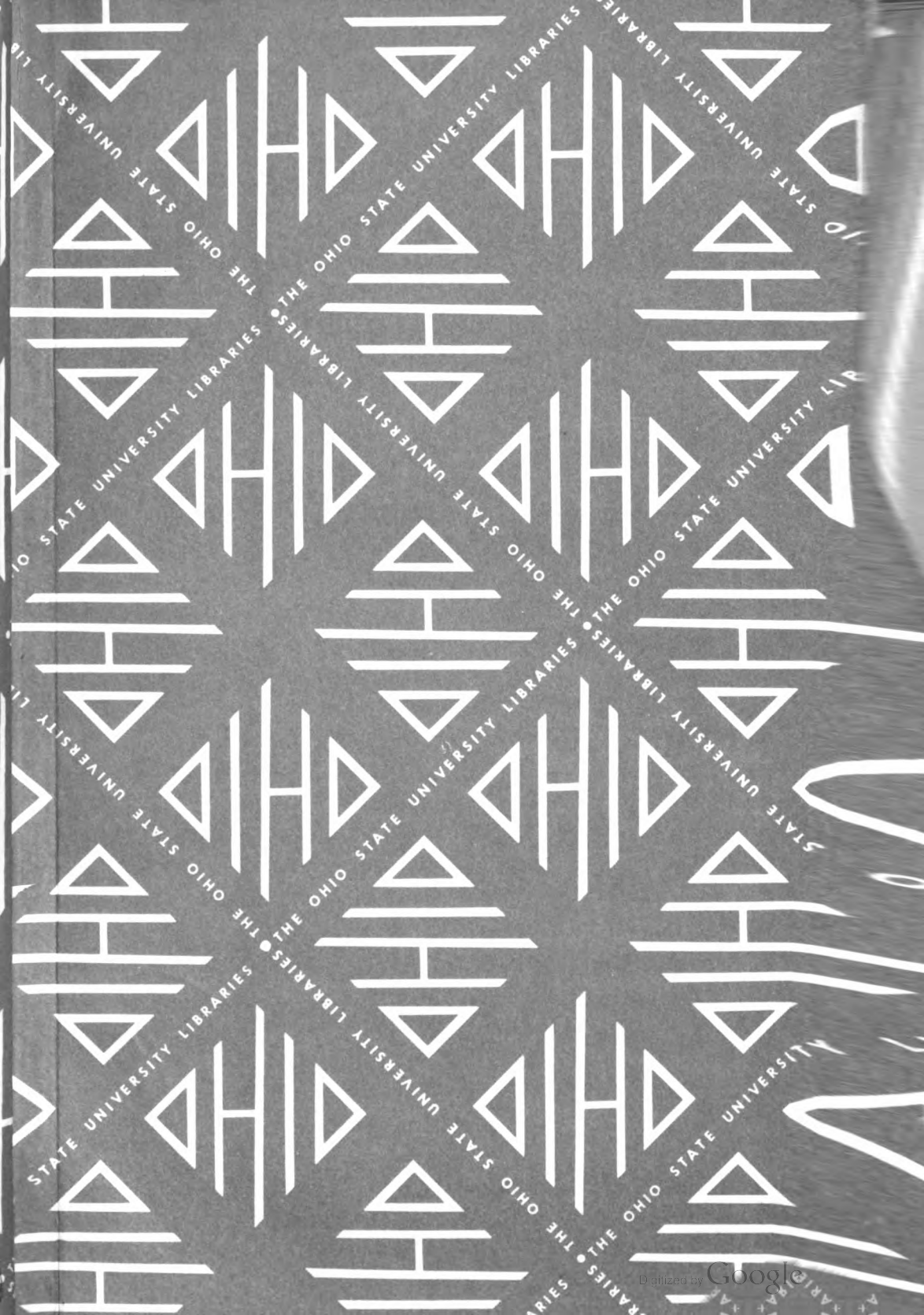






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ACUTE ANTERIOR POLIOMYELITIS

(*Infantile paralysis*)

A PRÉCIS

BY

WADE H. FROST

*Passed Assistant Surgeon*

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PREPARED BY DIRECTION OF THE SURGEON GENERAL



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# ACUTE ANTERIOR POLIOMYELITIS. (INFANTILE PARALYSIS.)

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By WADE H. FROST,

*Passed Assistant Surgeon United States Public Health and Marine-Hospital Service.*

[From the Hygienic Laboratory.]

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## INTRODUCTION.

Few diseases present a more complex problem than does acute anterior poliomyelitis. Eminent specialists in diseases of the nervous system, general pathology, experimental biology, orthopedic surgery, pediatrics, and epidemiology have all found in this disease special problems in their respective fields of research. The record of their special researches makes an extensive and exhaustive literature, dealing with the problem from many points of view. This literature is, however, widely scattered at present, partly because much of it is too technical to be of interest except to those engaged in some special field, partly because the bulk of the best of it is still too recent to have found its way into reference books in general use.

The object of this paper is to present, in abstract, such essential facts of the disease as may be of use, especially to the busy general practitioner to whom much of the recent literature is unavailable, to give him a general idea of the problem, and more specifically to aid him in his all-important rôle in the campaign of prevention, viz, the early recognition of cases. For those who care to go more deeply into the subject a classified bibliography is appended, referring to such of the more important special articles on various aspects of the disease as are most easily available.

For obvious reasons no attempt is made here to give a review of all the literature on the subject. Only such articles have been selected as seemed best suited, by reason of their originality, accuracy, or comprehensiveness, to the purpose of this paper.

Free use has been made of the report of the Collective Investigation Committee of New York on the epidemic of 1907,<sup>1</sup> the report of special investigators to the Massachusetts State Board of Health,<sup>2</sup> the works of Flexner and Lewis, and various other articles. I am especially indebted to Wickman's<sup>3</sup> extensive work, which, although written before the experimental demonstration of the infectious nature of acute anterior poliomyelitis, remains in many respects, especially in its clinical descriptions, the most comprehensive and satisfactory treatise on the subject. This work has been freely quoted and given preference over other clinical works because it is the result of the most extensive study of the disease ever made by an individual. In fact, it is doubtful if anything essential to our clinical knowledge of the disease, except statistical data and occasional reports of rare cases, has been added to Wickman's observations. Most of the reports made since his writing have been confirmations of his accuracy and comprehensiveness. A translation of Wickman's work, especially the clinical section, would be of great benefit to the physicians of the country.

#### SYNONYMS.

The term "acute anterior poliomyelitis," indicating as it does an acute inflammation characteristically localized in the *anterior cornua of the gray matter* of the spinal cord, is not an altogether satisfactory designation for the disease under consideration, for it has been amply demonstrated that the lesions are not confined to that area of the cord, and not necessarily confined even to the spinal cord. It is desirable, however, for the sake of uniformity and precision in mortality and morbidity reports to have one term in general use. The Bureau of the Census has experienced considerable difficulty in the compilation of mortality statistics for this disease by reason of the numerous designations employed. The returns for 1909 were received under 24 different designations.<sup>4</sup> The Bureau of the Census urges, therefore, with good reason, the uniform adoption of the term "acute anterior poliomyelitis." The term "infantile paralysis" is objectionable, because it is hardly applicable to adult cases; also, because it is likely to be confused with other infantile paralyses of altogether different etiology. Other terms in general use are "acute

<sup>1</sup> Epidemic poliomyelitis: Report of the Collective Investigation Committee on the New York Epidemic of 1907. Nervous and Mental Diseases, monograph, series No. 6, New York, 1910.

<sup>2</sup> Lovett, Robt. W.: The Occurrence of Infantile Paralysis in Massachusetts in 1909. Boston Med. and Surg. Jour., 1910, vol. 163, pp. 37-55.

<sup>3</sup> Wickman, Ivar: Beiträge zur Kenntniss der Heine-Medinischen Krankheit (Poliomyelitis acuta und verwandter Erkrankungen). Berlin, 1907. S. Karger.

<sup>4</sup> Mortality statistics, 1909. Department of Commerce and Labor, Bureau of the Census, Bull. 108, Washington, 1910, p. 25.

poliomyelitis," "epidemic poliomyelitis," "acute spinal paralysis," "acute atrophic spinal paralysis," "essential paralysis," and a number of other variations.

#### HISTORICAL.

Acute anterior poliomyelitis is not, in any sense, a "new disease." Mitchell<sup>1</sup> found in the skeleton of an Egyptian mummy, dating back to 3700 B. C., evidence of probable poliomyelitis. Jacob von Heine<sup>2</sup> is generally credited with having given, in 1840, the first clear clinical description and differentiation of the affection. He was not, however, the first to mention the disease. Underwood,<sup>3</sup> in 1774, gave a recognizable, though by no means clear-cut, description; and doubtless still other references may be found in early medical literature.

#### EPIDEMIC PREVALENCE.

The epidemic occurrence of poliomyelitis has been recognized more recently. Colmer<sup>4</sup> records the occurrence of an epidemic of paralysis among teething infants in Louisiana in 1841. He did not identify the epidemic with the disease described by Von Heine. Bergenholz<sup>5</sup> is credited with being the first to recognize an epidemic of poliomyelitis, in 1881; his observations, however, were not published until 1890, when Medin made them known. Oxholm<sup>6</sup> and Cordier<sup>7</sup> had each in the meantime observed a small epidemic, but their publications attracted little attention until Medin<sup>8</sup> brought them to light in 1890, at the same time reporting his own observations on an epidemic of 43 cases which occurred in and around Stockholm in 1887. Since that time epidemics have been observed with increasing frequency in various parts of the world. The largest epidemics recorded have been as follows: In Vermont, 1894; 126 cases; Norway and Sweden, 1905, about 1,500 cases; New York City and vicinity, 1907, about 2,500 cases.

From 1907 to 1910 outbreaks have occurred in the following States in this country: Connecticut, 1910; District of Columbia, 1910; Florida, 1907; Illinois, 1909; Iowa, 1908-1910; Kansas, 1909-10; Massachusetts, 1907, 1908, 1909, 1910; Michigan, 1907-8, Minnesota, 1908, 1909, 1910; Missouri (?), 1908; Nebraska, 1909; New York,

<sup>1</sup> Mitchell, J. K., *Trans. Assn. Am. Physicians*, vol. 15, 1900, pp. 134-136.

<sup>2</sup> Von Heine, Jacob, *Spinale Kinderlähmung*, II Aufl., Stuttgart, 1880, J. G. Cotta. (First ed. pub. in 1840.)

<sup>3</sup> Underwood, Michael: *Treatise on the diseases of children*. Phila., 1893, F. Dobson.

<sup>4</sup> Colmer, George: *Medical Notes: Paralysis in teething children*. *Am. Jour. Med. Sci.*, 1843, vol. 5, p. 248.

<sup>5</sup> Cited by Medin. *Verhandl. d. X. internat. med. Kongr.*, Berlin, 1890. II Abt., VI, 1891.

<sup>6</sup> Cited by Leegard. *Neurol. Centralblatt*, 1890, p. 760.

<sup>7</sup> *Lyon Méd.*, 1888, vol. 57, 5; 48.

<sup>8</sup> *Medin. Verhandl. d. X. internat. med. Kongr.*, 1890. II Abt., VI, Berlin, 1891.



1907, 1910; Oregon, 1910; Pennsylvania, 1910; South Dakota, 1910; Virginia, 1908-1910; Washington, 1910; Wisconsin, 1908. Since 1907 epidemics have also occurred in Canada, in various parts of Germany and Austria, in Cuba, and in the island of Nauru, in Melanesia (1910).

Since the severe outbreak in Norway and Sweden in 1905, epidemic poliomyelitis has prevailed more widely than ever before. Whether or not this pandemic may be attributed to a spread of infection from Scandinavia is a question still open to dispute, the discussion of which is beyond the scope of this paper. Lovett's<sup>1</sup> compilation of the reported epidemics since 1881, is as follows:

Years.	Cases.	Outbreaks.	Average number of cases.
1880-1884.....	23	2	11.5
1885-1889.....	93	7	13
1890-1894.....	151	4	38
1895-1899.....	345	23	15
1900-1904.....	349	9	39
1905-1909.....	8,054	25	322

These figures show very strikingly the enormous increase in the epidemic prevalence of poliomyelitis from 1905 to 1909. There is good reason to believe that there has been a corresponding increase during the same period, in so-called "sporadic" cases—cases which are not recognized as occurring in connection with any well-defined epidemic. This is inferred from hospital reports, showing a large increase in the number of patients admitted for treatment for the resulting paralysis, in districts where no epidemic has been reported.

Lovett calls attention to the fact that the United States has suffered more severely than any other country, being credited with some 5,500 of the 8,000 cases reported from 1905 to 1909. It will be noted, too, that the great majority of epidemics in the United States have occurred in the northern States, east of the Dakotas. While reports for 1910 are as yet incomplete, it may safely be asserted that the prevalence of the disease has very considerably increased during this year, in respect both to the number of persons attacked and the area over which the epidemics have occurred.

According to the statistics of the Census Bureau,<sup>2</sup> there were 569 deaths from acute anterior poliomyelitis in the registration area of the United States in 1909. The population from which these statistics are collected represents 55.3 per cent of the total population of the United States. The 569 deaths reported are from 33 States, and do not include a considerable number of deaths in nonregistration States, notably in Minnesota and Nebraska.

<sup>1</sup> Lovett, Robt. W., *Bost. Med. and Surg. Jour.*, July 14, 1910, vol. 163, No. 2, pp. 37-55.

<sup>2</sup> Mortality statistics, 1909. Department of Commerce and Labor, Bureau of the Census, *Bull.* 108, Washington, 1910, pp. 24-26.

## DEVELOPMENT OF KNOWLEDGE CONCERNING EPIDEMIC POLIOMYELITIS.

It naturally follows that the increased prevalence of epidemic poliomyelitis, with the consequent stimulation of interest therein, should have resulted in many valuable additions to our knowledge of the subject.

*Pathology.*—Jacob von Heine,<sup>1</sup> as above stated, first gave a clear-cut clinical description of acute anterior poliomyelitis in 1840. Prevost and Vulpian,<sup>2</sup> in 1865, are credited with having given the first anatomical demonstration of the destruction of the ganglion cells of the anterior cornu in poliomyelitis. The clinical studies of Von Heine and the pathological studies of Prevost and Vulpian both dealt with the late manifestations of the disease as seen subsequent to the acute stage. Roger and Damaschino,<sup>3</sup> in 1871, reported the first pathological study of a cord from a case in the acute stage; and first recognized interstitial changes as the *primary* lesions of acute poliomyelitis. From that time ensued a running fight among pathologists in regard to pathogenesis, one school holding the essential acute lesion to be specific intoxication of the motor cells of the anterior cornu, the interstitial changes being of secondary importance. The other school deemed the primary essential lesion in the acute stage to be a diffuse myelitis, resulting secondarily in degenerative changes of the motor ganglion cells. With the increase of the epidemic prevalence of poliomyelitis and the increased opportunities for the study of material obtained from recent acute cases, it has become more and more evident that the views of the latter school were correct; and it is now generally recognized that the acute nervous lesions of poliomyelitis are interstitial and widespread throughout the cerebrospinal axis. While many pathologists have had a part in this demonstration, special credit should be given to Wickman<sup>4</sup> and to Harbitz and Scheel.<sup>5</sup>

*Symptomatology.*—Parallel with the development of knowledge of the pathology of the disease has been the development of the knowledge of its clinical manifestations. Medin,<sup>6</sup> in 1890, gave the first comprehensive account of the symptoms of the acute stage from observations of an epidemic in Stockholm in 1887. He was the first to call attention forcibly to the varied clinical manifestations of the acute stage, indicative of changes in all parts of the nervous system,

<sup>1</sup> Von Heine, Jacob. *Spinale Kinderlähmung.*

<sup>2</sup> Prevost and Vulpian: *Observation de la paralysie infantile.* C. R. de la Soc. de Biol., 1865. Paris, 1866, 4 s., II, pp. 215–218.

<sup>3</sup> Roger and Damaschino: *Recherches anatomo-pathologiques sur la paralysie spinale de l'enfance.* C. R. de la Soc. de Biol., 1871. Paris, 1873, 5 s., III, pt. 2, pp. 49–93.

<sup>4</sup> Wickman, I.: *Studien über Poliomyelitis actua.* Arb. aus d. Path. Inst. d. Univ. Hel싱fors, 1905–1907. Berlin, 1907, S. Karger, pub.

<sup>5</sup> Harbitz u. Scheel: *Pathologisch-anatomische Untersuchungen über akute Poliomyelitis u. verwandter Erkrankungen.* Christiania, 1907, A. W. Broeggers, pub.

<sup>6</sup> Medin, loc. cit.

although Strümpell<sup>1</sup> and Pierre-Marie<sup>2</sup> had previously noted the occurrence of encephalitis in acute poliomyelitis, and others had, in a less comprehensive manner than Medin, noted many of the facts which he first put together so clearly. In view of the pioneer services of von Heine in describing the later stages and of Medin in describing accurately the acute stage, Wickman has suggested the name "Heine-Medin disease" for acute poliomyelitis, since pathological designations (acute anterior poliomyelitis, acute poliomyelitis, epidemic poliomyelitis, epidemic spinal paralysis, infantile paralysis, poliomyelomeningo-encephalitis) are either misnomers or overcumbersome. The most valuable clinical contribution since Medin's has been made by Wickman, whose special service in this respect has been the recognition of abortive forms of the disease, and the presentation of the whole subject from a broader, more comprehensive point of view than any of his predecessors.

*Epidemiology.*—The recognition of the epidemic occurrence of the disease has already been referred to as dating from the observations of Bergenholz, in 1881. While many observers since Bergenholz have reported epidemics of acute poliomyelitis, and in many cases have gone more or less into the question of the origin and transmission of the epidemics, the first systematic study from an epidemiologic point of view was undertaken by Wickman in Sweden in 1905–6. He personally investigated over 1,000 cases, attempting to trace the routes by which the disease spread. He found abundant evidence to show that it was contagious, though usually slightly so. He directed especial attention to several factors in its spread—routes of travel, public gatherings of children (schools), abortive (ambulant) cases, and healthy intermediate carriers. Since that time systematic epidemiologic investigations have been undertaken by the Governments of several foreign countries; and in this country by several States, notably Massachusetts, Minnesota, Nebraska, Kansas, and Iowa. A committee of the New York Neurological Society investigated and has recently reported upon the New York epidemic of 1907. The reports of the New York investigation committee and of the Massachusetts State Board of Health are especially valuable, on account of their comprehensiveness and thoroughness.

*Experimental poliomyelitis.*—The most recent development of knowledge concerning epidemic poliomyelitis is derived from the study of the disease experimentally produced in monkeys. It had been recognized for some years prior to 1909 that acute poliomyelitis must be due to some specific infection; and quite a number of observers had isolated from the nervous system of patients suffering from the disease bacteria which they believed to be the specific causa-

<sup>1</sup> Strümpell, *Jahrb. f. Kinderheilk.*, 1885.

<sup>2</sup> Pierre-Marie, *Progrès méd.*, 1885, II, s., II, 167–169.

tive agent. Some observers claimed to have reproduced the disease in lower animals by injections of pure cultures of such bacteria. However, the bacteria found by different observers belonged to different species; many competent bacteriologists constantly failed to find any bacteria whatsoever, and the lesions occasionally produced in lower animals did not correspond to the lesions of human poliomyelitis. Consequently, none of the above claims were generally accepted. In the spring of 1909, Landsteiner and Popper<sup>1</sup> succeeded in transmitting the disease to two monkeys by inoculation with the spinal cord of a child which had died of acute poliomyelitis. The lesions found in the cords of these monkeys were typical, but Landsteiner and Popper failed in their attempts to transmit the disease from these to other monkeys. Later in the year Flexner and Lewis<sup>2</sup> succeeded in confirming the work of Landsteiner and Popper, and further succeeded in transmitting the infection from monkey to monkey through an indefinite number of passages. Since then a great deal of very brilliant experimental work has been done upon this subject by Flexner and Lewis, Römer and Joseph, Landsteiner and Levaditi, Leiner and Weisner, Krause and Meinecke, R. Kraus, and others.<sup>3</sup>

#### ETIOLOGY.

##### THE SPECIFIC ORGANISM.

The proof that the causative agent of epidemic poliomyelitis is a *living organism* is furnished by its demonstrable multiplication or *reproduction* in the body of an inoculated animal, reproduction being a property confined to living organisms. A comparatively small amount (0.5 c. c. of a 5 per cent emulsion) of the spinal cord of a person who has died of epidemic poliomyelitis, injected into the brain of a monkey, is sufficient to produce the disease in this animal after an incubation period of 5 to 46 days. This effect might be ascribed to the action of either a living organism, capable of multiplication or a chemical poison (toxin). In the latter case, the toxin must undergo great dilution, since portions of the central nervous system of this animal, remote from the site of inoculation, have been found capable of reproducing the disease in other monkeys. After a very few such passages the amount of toxin contained in, say, 1 gram of the spinal cord would be inconceivably small, and the potency of the cord in causing the disease proportionately diminished. As a matter of fact, Flexner and Lewis<sup>4</sup> have succeeded in transmit-

<sup>1</sup> Landsteiner, K., and Popper, E. *Zeltschr., f. Immunitätsforsch, usw.*, Orig., 1909, vol. 2, p. 377.

<sup>2</sup> Flexner, S., and Lewis, Paul A., *Jour. Am. Med. Assn.*, 1909, vol. 53, p. 1639.

<sup>3</sup> The more important works of all these authors are cited by Lovett in *Boston Med. and Surg. Jour.*, vol. 163, 1910, pp. 37-55, and by Landsteiner and Levaditi in *Ann. de l'Inst. Pasteur*, vol. 24, 1910, pp. 833-876.

<sup>4</sup> Flexner, S., *Journ. Am. Med. Assn.*, vol. 55, pp. 1105-1113.

ting the disease through a series of at least 25 monkeys, using at times quantities of the virus as small as 0.01 c. c. to 0.001 c. c.

From one monkey, inoculated with a minimal dose of the virus, enough virus can be obtained to reproduce the disease in *several hundred* monkeys. The multiplication of the virus in 25 passages is, therefore, enormous.

In spite of the fact that this organism can not be isolated in pure culture, as can the bacteria, a great deal of quite definite knowledge concerning it has already been acquired by the work of the above-mentioned observers.

It is known to be an exceedingly small organism, because emulsions of virulent spinal cord are still infective after filtration through very dense porcelain (Chamberland) filters, the pores of which are so small that even very minute *bacteria* can not pass through. The organism belongs, therefore, to the class of so-called "filterable viruses," other examples of which are the organisms of yellow fever, rabies, the foot-and-mouth disease of cattle, probably hog cholera, and others.

It is not visible in preparations made by the usual bacteriologic methods, but is thought to have been seen with high-power lenses in preparations very carefully stained; also unstained, by the use of dark-background illumination. It will not grow upon the ordinary culture media in general use for cultivating bacteria, but will probably multiply to a slight extent in ascitic bouillon. Such cultures have been successfully transplanted, but are not virulent and are of little practical value in experimental studies.

The virus of poliomyelitis is killed by a temperature of 45°-50° C. in half an hour; also, by comparatively weak disinfectants, such as 1:500 solution of permanganate of potash;<sup>1</sup> 1 per cent menthol in oil;<sup>2</sup> a powder containing menthol 0.5, salol 5, and boric acid 20;<sup>3</sup> a dilution of perhydrol (Merck) equivalent to 1 per cent of peroxide of Hydrogen.<sup>2, 3</sup>

It is not destroyed by very low temperatures nor by drying over caustic potash or in vacuo for a considerable period. A virulent cord has been kept for almost five months in pure glycerin without losing its virulence, resembling in this respect the virus of rabies, vaccine, etc., and differing from nonspore-bearing pathogenic *bacteria*, which are, for the most part, killed by pure glycerin in a short while.

As is to be expected, the organism is present in greatest abundance in the spinal cord of infected persons and animals, as shown by the extremely small amounts of these organs necessary to infect a monkey

<sup>1</sup> Landsteiner, K., and Levaditi, C., *Ann. de l'Inst. Pasteur*, 1910, vol. 24; pp. 833-876.

<sup>2</sup> Flexner, S., and Lewis, Paul A., *Journ. Am. Med. Assn.*, vol. 56, 1910, p. 1782.

<sup>3</sup> The ordinary commercial preparation of hydrogen peroxide contains about 3 per cent of the peroxide ( $H_2O_2$ ). Perhydrol (Merck) contains about 30 per cent  $H_2O_2$ .

by inoculation (0.001 c. c. to 0.01 c. c. of an emulsion of cord—Flexner). It is also, however, quite constantly present in the brain and has been demonstrated in various other organs of infected animals, viz, in the mucous membrane of the nose and pharynx, the salivary glands, the mesenteric glands, the regional (axillary or inguinal) lymph glands after subcutaneous inoculation, in the blood, and in the cerebro-spinal fluid. In the blood, however, the virus appears to be present in small quantity and only in the early stages of the disease, and the same may be said of the cerebro-spinal fluid. No one has yet succeeded in demonstrating the presence of the virus in the urine or feces, though it is suspected, from the pathology of the disease, that the feces may be infectious, and technical difficulties may explain the failure to demonstrate this.

The most uniformly successful method of inoculating monkeys is by injecting an emulsion of infectious material directly into the central nervous system, preferably into the brain. Monkeys may also be infected by subcutaneous, intraperitoneal and intravenous inoculation, by rubbing virulent material into the scarified mucous membrane of the nose, by transplantation of infectious tissue into the trachea, and by introducing the virus into the stomach along with an opiate to restrain peristalsis. Leiner and Weisner<sup>1</sup> have infected monkeys through the *uninjured* nasal mucous membrane. This is, however, an uncertain method of inoculation, as other observers have failed in their attempts to reproduce the disease in this way. Monkeys have so far never been known to contract the disease spontaneously from intimate association with infected monkeys.

Numerous attempts have been made to transmit the disease to lower animals other than the monkey, viz, to guinea pigs, rabbits, horses, sheep, hogs, dogs, cats, chickens, ducks, and pigeons. These animals have all been found insusceptible, with the exception of certain breeds of rabbits. Krause and Meinicke<sup>2</sup> were the first to report the successful inoculation of rabbits from human material, and subsequent transmission from rabbits to other rabbits and to monkeys. Their results have been confirmed to some extent by other workers<sup>3</sup> who have succeeded in producing in a comparatively small proportion of rabbits inoculated, a disease which has more or less clinical resemblance to acute poliomyelitis. Landsteiner and Levaditi<sup>3</sup> found in the cord of one of their rabbits lesions similar to those found in man and in the monkey. Others have failed to find such

<sup>1</sup> Leiner, C., and Weisner, R. v., Wien. klin. Wochenschr., 1910, vol. 23, p. 323.

<sup>2</sup> Krause, R., and Meinicke, E., Deutsche med. Wochenschr., 1910, vol. 35, p. 647; *ibid.*, 1910, vol. 35, p. 1825.

<sup>3</sup> Beneke, Münch. med. Woch., 1910, vol. 57, pp. 176-178; Kraus, R., Med. Klin., 1910, vol. 8, pp. 470-472; Landsteiner, K. and Levaditi, C., Ann. de l'Inst. Past., 1910, vol. 24, pp. 833-876; Bonhof, Münch. med. Woch., 1910, vol. 57, p. 105; Dahm, Münch. med. Woch., 1909, vol. 56, p. 2553; Lentz and Hüntemüller, Tag. der fr. Verein. Mikrobiol., Berlin, 1910 (cited by Landsteiner and Levaditi, *supra*).

lesions; and indeed the great majority of attempts to inoculate rabbits have proved unsuccessful. The question of the susceptibility of rabbits to human infection has not been sufficiently cleared up to warrant very definite conclusions. It appears, however, that they are at least very much less susceptible than monkeys.

#### IMMUNITY.

Monkeys which have recovered from the infection of poliomyelitis show a definite immunity, demonstrable in two ways: (1) They are not susceptible to infection by reinoculation, and (2) their blood serum, when mixed in suitable proportions with an emulsion of virulent spinal cord and allowed to stand for several hours, renders the virus harmless. This property has also been demonstrated in the blood of persons who have recovered from poliomyelitis, but is not shown by the blood of normal persons and of normal monkeys.

The immunity is probably very lasting. The neutralizing power of the blood has been shown to last for 3 years after an attack of poliomyelitis, but was found absent in one case tested 11 years after the acute attack.<sup>1</sup> A second attack of the disease is rare, but a few instances have been reported of recurrence after the lapse of several years.

It has not been found possible as yet to obtain from immunized animals a serum which will arrest the progress of the disease after it has developed. While the hope of such a serum may still be held out as a possibility, its usefulness would necessarily be limited to the treatment of the early stages of the disease, before destruction of nerve centers had taken place. Attempts to actively immunize (vaccinate) monkeys have, in some instances, been successful, but no method has yet been developed which may safely be applied to human beings.

#### CONTAGIOUSNESS.

It has been experimentally demonstrated that the *mucous membrane* of the nose of infected monkeys is infectious, and in one case the salivary glands;<sup>2</sup> and it has been quite reasonably inferred therefrom that the *secretions* of the nose and mouth are infectious, although experiments aiming to demonstrate the latter have failed.<sup>3</sup> It has also been shown that infection may take place through the mucous membrane of the respiratory and digestive tracts.

These facts indicate very strongly that the disease is transmissible directly from person to person by direct contact, a conclusion which

<sup>1</sup> Netter, A., and Levaditi, C., *Comp. rend. de la Soc. de Biol.* 1910, vol. 68, pp. 855-857.

<sup>2</sup> Landsteiner, K., and Levaditi, C., *Comp. rend. de la Soc. de Biol.* 1909, vol. 67, p. 788.

<sup>3</sup> Landsteiner, K., and Levaditi, C., *Comp. rend. de la Soc. de Biol.* 1909, vol. 67, p. 788.  
833-876.

Wickman had already reached from his epidemiologic studies. Others have reached varying conclusions from the study of epidemics, some asserting that there was no evidence that contact with the sick played any rôle in the transmission of the disease, some considering its contagiousness established. While it is beyond the scope of this paper to discuss in detail the evidence for and against the contagiousness of epidemic poliomyelitis, it may be said that the best evidence at present available indicates that the disease is *transmissible* from person to person, probably by direct contact. It must be usually rather slightly transmissible, since only a small proportion of persons in intimate contact with cases contract the disease. Under some circumstances, however, it appears to be rather highly contagious, affecting a very considerable proportion of the population of a limited area. Examples of seemingly quite contagious epidemics are reported by Wickman, from Traestena, Sweden; by Shidler,<sup>1</sup> from Polk County, Nebr.; and by Armstrong,<sup>2</sup> from North St. Paul, Minn. The writer investigated a small, apparently highly contagious outbreak among the attendants of a rural school in Hancock County, Iowa, in the summer of 1910, details of which will be given in a later publication.

#### OTHER ETIOLOGICAL FACTORS.

It is evident that certain predisposing factors are operative in causing infection, either by increasing the susceptibility of persons exposed, by increasing the virulence of the infecting organism, or by facilitating its transmission.

*Geographic distribution.*—Epidemics of poliomyelitis have been most prevalent in the northern parts of Europe and of the United States, and, more recently, also in Canada. The disease has not been confined to these countries, however. Epidemics have occurred in southern Europe (Italy) and in the southern part of the United States (Alabama, South Carolina, and Virginia); a considerable epidemic occurred in Cuba in 1909. There have been several epidemics in Australia, and during January, 1910, a very remarkable epidemic on the little island of Nauru, situated near the Equator, north of Australia. There are, therefore, no well-defined geographic limits to the area within which acute poliomyelitis has been known to become epidemic. Sporadic cases, not known to be connected with epidemic outbreaks, have occurred over a still wider area.

The occurrence of epidemics in various places has not been proportional to their geographic proximity to recognized previous epidemic foci, nor has it apparently been proportional to the amount of travel from such foci. It appears, however, that sporadic cases

<sup>1</sup> Shidler, G. P., *Pediatrics*, vol. 22, 1910, pp. 539-543.

<sup>2</sup> Armstrong, J. M., *Pediatrics*, vol. 22, 1910, pp. 480-501.



are unusually prevalent along routes of travel leading from epidemic foci.

*Density of population.*—The occurrence and spread of epidemic poliomyelitis is not proportional to the density of population. On the contrary, epidemics have been more severe and the case rates have been higher in small towns and rural districts than in the more densely populated cities, and in cities the disease has not been found more prevalent in the crowded districts.

*Climate.*—The countries which have suffered most have been those with a cold climate, showing marked seasonal variations in temperature, but striking exceptions to this have been noted above.

*Season.*—Epidemics of acute poliomyelitis occur almost invariably in the warm, dry months—in the Northern Hemisphere from May to November; in the Southern Hemisphere from November to May. Sporadic cases occur, however, throughout the year, and warm weather need not therefore be considered a *necessary* factor in infection.

*Age.*—The proportion of cases decreases progressively in each decade after the first. The proportion of adult cases, however, may be considerable in epidemics. The great variations in the age incidence in different epidemics are illustrated in the following tables, the first of which is arranged in three-year periods, in order to include Wickman's statistics, while the second is arranged in the more usual five-year periods. The majority of cases are in children between 1 and 5 years of age.

## THREE-YEAR PERIODS.

Ages.	Reported by—							
	Collective investigation committee, New York (1907).		Lovett, Massachusetts (1909).		Hill, Minnesota (1909).		Wickman, Sweden (1905).	
	No. of cases.	Per cent of total.	No. of cases.	Per cent of total.	No. of cases.	Per cent of total.	No. of cases.	Per cent of total.
0-2, inclusive.....	463	63.5	258	41.9	89	27.4	169	19.5
3-5, inclusive.....	197	27.0	182	29.6	90	27.7	181	21.1
6-8, inclusive.....	40	5.5	70	11.4	53	16.3	154	17.6
9-14, inclusive.....	21	2.9	57	9.3	47	14.5	165	19.0
15 and over.....	8	1.1	48	7.8	46	14.2	199	22.9
Total cases.....	729		615		325		868	

## FIVE-YEAR PERIODS.

Under 1 year.....	62	8.5	44	7.2	21	6.5		
1-5 years.....	598	82.0	396	64.5	158	48.6		
6-10 years.....	47	6.4	98	15.9	77	23.7		
11-15 years.....	14	1.9	31	5.0	25	7.7		
16-20 years.....	5	.68	15	2.4	21	6.5		
Over 20 years.....	3	.40	31	5.0	23	7.0	187	10.0
Total cases.....	729		615		325		868	

1 Wickman's figures are given only in three-year periods and are therefore available only for the last column of this table.

The New York epidemic of 1907 is characterized by the large percentage of cases occurring in childhood (90.5 per cent in the first six years) while the Swedish epidemic of 1905 stands at the other extreme, with only 40.6 per cent of cases in the first six years, and 10 per cent among *adults*. The epidemics in Massachusetts and Minnesota are intermediate between these two extremes, the Minnesota statistics approximating more closely those from Sweden.

The generalization seems warranted that in epidemics affecting a comparatively large proportion of the population in a given area the proportion of adult cases is high. In the very remarkable epidemic of 1910 on the island of Nauru, where 700 cases occurred within a few weeks in a population of little over 2,500, the majority of cases were in adults.<sup>1</sup>

*Sex.*—More males are affected than females. In Massachusetts in 1909, the ratio was males, 363; females, 263; in Minnesota in 1909, males, 193; females, 139. As shown by Hill<sup>2</sup> in his analysis of the Minnesota cases, the proportion of males and females affected is more nearly equal in the first decade of life, while after 10 years of age males are affected in much greater proportion than females.

*Race.*—There is little to indicate that nationality has any influence upon susceptibility. In the New York epidemic of 1907, there were proportionately fewer cases among the negroes than among white races. Upon the island of Nauru the population and attack rate are given as follows:

	Number of persons.	Number of cases.	Number of cases per 1,000.
Natives.....	1,250	470	376
Imported laborers <sup>1</sup> .....	1,000	220	220
Whites.....	80	3	37.5

<sup>1</sup> Partly Chinese and partly Caroline Islanders.

The death rate among the natives was 7.8 per cent, while among the imported laborers it was 0.45 per cent, and among the whites (3 cases) there was no mortality. There was, therefore, in this instance, apparently a very marked difference in racial susceptibility; but this epidemic was so remarkable in many other respects that it can not be taken as illustrative of epidemic poliomyelitis in general.

The high death rate and large proportion of adult cases in Norway and Sweden arouse a suspicion that the Scandinavians may be peculiarly susceptible. In this connection it may be noted that in the

<sup>1</sup> Müller, A., Arch. f. Schiffs- u. Trop.-Hyg., 1910, vol. 14, No. 17.

<sup>2</sup> Hill, H. W.: Epidemiologic study of anterior poliomyelitis in Minnesota, Trans. Section on Preventive Med., Amer. Med. Assn., 1910.

United States the most fatal and most infective epidemics have occurred in the Middle West and Northwest, where a large proportion of the population is of Scandinavian descent. On the other hand, it has not been shown that an undue proportion of Scandinavians have been attacked, even in the Northwest. The question of difference in racial susceptibility is therefore still an open one.

*Social and hygienic conditions.*—Poverty and insanitary conditions of life seem to have little, if any, influence in determining infection. All classes are affected in about equal proportions.

#### PATHOLOGY.

A widespread misunderstanding of the pathologic anatomy of acute poliomyelitis has contributed largely to a very prevalent misconception of its symptoms. The earlier pathologic studies were made chiefly on cases that had long since passed the acute stage. The most characteristic lesion observed in such cases is degeneration of the motor cells in the anterior cornua of the cord, and this was therefore naturally regarded as the essential *primary* lesion of the disease. Although for the past 20 years there has been ample evidence, both clinical and anatomical, that in the acute stage the characteristic lesion is an *interstitial inflammation, not confined to the motor area of the cord*, and although these facts have been published in many reference books, still the conception of the disease as essentially an inflammatory degeneration of the motor cells of the cord, has remained fixed in the minds of many of the medical profession, and statements to this effect remain in a considerable proportion of recent textbooks on the practice of medicine. The result is that those who are without experience in epidemics of the disease are unprepared to recognize as characteristic of it such nervous symptoms as are not referable to damage of the *motor cells* of the cord. In order to understand the symptoms observed, it is necessary to have at least a general knowledge of the anatomic lesions to which the symptoms are due.

Acute anterior poliomyelitis must be recognized as a general infection producing characteristic lesions in the central nervous symptoms, viz, *congestion, infiltration and edema of the cord, brain, and leptomeninges.*

#### MENINGES.

The dura mater is practically unchanged. The pia-arachnoid throughout the cerebrospinal axis shows quite constant and characteristic changes in the acute stage. The vessels are congested and their sheaths infiltrated with round cells. Between the vessels the infiltration is more diffuse. The round cells are mostly mononuclear.

No exudate is found on the surface of the meninges, which to the naked eye appear normal or simply congested. The infiltration of the pia mater varies at different levels; it is most intense in the lumbar region, where it is equally marked around the whole circumference of the cord. In the higher segments the infiltration of the pia mater is most marked over the anterior surface of the cord, and may be quite irregular in its distribution.

It is believed that the meninges are the seat of the earliest changes in the central nervous system; that the virus first invades the leptomeninges, and extends thence, following the vascular prolongations of the pia, into the substance of the brain and cord.

#### CEREBRO-SPINAL FLUID.

Corresponding to the changes in the meninges, there are characteristic changes in the cerebro-spinal fluid. It is increased in quantity quite early, before the onset of definite symptoms. At this time the fluid is opalescent, due to an increase in the number of cells; the protein is increased, and the fluid may coagulate spontaneously. The cellular elements are chiefly lymphocytes, although in the earlier stages there may be a large proportion of polymorphonuclear leucocytes. By the time paralysis has developed the cerebro-spinal fluid has returned more nearly to the normal; it is now clear, but still more or less increased in quantity, and still contains an abnormal number of lymphocytes.

#### CORD.

The early changes in the cord are congestion, round-cell infiltration, and edema. All the vessels of the cord are congested, and their sheaths show an infiltration of round cells similar to and continuous with the perivascular infiltration of the pia mater. In the gray matter, more especially in the anterior cornua, at the level of the cervical and dorsal enlargements, in addition to the infiltration immediately around the vessels, there is a more diffuse infiltration, with here and there foci of closely packed round cells. Hemorrhages, due to the rupture of small blood vessels, are quite commonly found in the gray matter and less frequently in the white substance. The infiltration is all of vascular origin, and its distribution in various areas of the cord is proportional to the vascularity of these areas. Because of a richer blood supply, the gray matter is more affected than the white, the anterior cornua more than the posterior, and the cervical and lumbar enlargements more than the other segments of the cord. The irregular distribution of the paralysis probably depends to some extent upon irregularities in the blood supply of the cord.

The ganglion cells of the cord suffer more or less secondary damage, which is generally proportionate to the infiltration around them.

The most common and extensive damage occurs in the motor nerve cells situated in the anterior cornua, especially in the lumbar and cervical enlargements, where, as already noted, the infiltration is most intense; but considerable damage, and even destruction, of some of the ganglion cells in the posterior horn, especially in Clark's column, is not uncommon. In the lumbar cord, according to Wickman, the posterior cornua show quite as extensive lesions as the anterior cornua. The damage to the ganglion cells may result in temporary loss of function, perhaps due to edema, without demonstrable changes in the cell; in partial but not permanent degeneration of the cells, or in the complete destruction of a part or all of the cells in a given area of the cord. Complete destruction of the ganglion cells of the anterior cornua in a segment of the cord results in permanent motor paralysis and atrophy of the muscles *supplied* by these neurons. The less severe cell changes result in paresis or temporary paralysis of the corresponding muscles.

The *white substance* of the cord undergoes less severe changes than the gray matter, but constantly shows infiltration of the vessel walls, edema, occasional small hemorrhages and rarely definite foci of round-cell infiltration. The acute inflammatory lesions of the white substance of the cord are important to bear in mind as explanatory of some of the symptoms in the acute stage. The rarer, more permanent lesions found here may explain some unusual motor disturbances (ataxia, exaggerated reflexes, spasticity) occasionally encountered.

#### SPINAL GANGLIA.

The intervertebral ganglia have been found to show changes similar to those in the cord, viz., infiltration, and degeneration of ganglion cells and nerve fibers (Straus, Flexner).

#### PERIPHERAL NERVES.

The peripheral nerves have not been examined as carefully as the spinal cord, but it is believed that they show no acute inflammation, except perhaps near their emergence from the spinal cord.

#### MEDULLA.

In the medulla oblongata and pons cerebri there are found edema and perivascular infiltration as in the spinal cord; and also, not infrequently, foci of round cells. Infiltration around the nuclei of the cranial nerves explains the cranial-nerve paralysis often noted in acute poliomyelitis. The ganglion cells in the foci of infiltration are more or less damaged; but as the foci are usually small, the complete destruction of a bulbar nerve center is rather rare.

## CEREBRUM.

Changes in the brain similar to those in the cord, but less intense, are a constant characteristic of acute poliomyelitis. Severe lesions of the cerebral cortex or the conducting paths therefrom are rare, but may occur.

## OTHER ORGANS.

The lesions outside the nervous system are not characteristic and are apparently not constant. In quite a number of autopsies, however, lesions have been found indicative of acute general infection, affecting especially the digestive and respiratory tracts and the lymph glands, viz., congestion of the mucous membrane of the small intestine and sometimes of the stomach; congestion and enlargement of the solitary follicles, Peyer's patches and mesenteric glands; less commonly a more general glandular enlargement; occasional pneumonic foci in the lungs; congestion of the liver and spleen, with occasional enlargement of the latter; congestion and sometimes beginning parenchymatous degeneration of the kidneys.

## THE BLOOD.

The characteristic blood changes in the acute stage are diminution of the total number of white cells (leucopenia) with relative increase in the proportion of *lymphocytes*. More observations are needed to fully establish the constancy and degree of these changes.

## SYMPTOMATOLOGY.

As is to be expected from its pathology the symptoms of acute poliomyelitis are most diverse. Broadly speaking, they are the symptoms which may be expected from—

- (1) An acute general infection.
- (2) An acute inflammation affecting the leptomeninges and medullary substance of the brain and cord. The nervous symptoms are first those of irritation, followed in more severe cases by symptoms of depression, and in typical cases by loss of function of certain areas of the central nervous system. The irritative symptoms, arising from inflammatory lesions of comparatively mild degree but wide extent, are usually both sensory and motor; predominantly spinal, but to some extent bulbar and cerebral. The depression and loss of function resulting from more intense inflammatory changes, characteristically localized in the anterior cornua of the cord, are motor.

Of a disease embracing such a variety of symptoms it is impossible to give a single, clear-cut, clinical picture. Wickman has differentiated eight clinical types, and as later observations have confirmed

his classification, it will be adopted and followed as closely as consistent with the scope and purpose of this paper. Wickman's types of acute poliomyelitis are as follows:

I. The *spinal poliomyelitic* type, characterized by onset with fever, gastro-intestinal disturbances or angina, headache, pain, often rigidity of the neck and spine, and pains in the extremities of varying intensity and distribution. From one to six days after the onset of the febrile symptoms there develops a paralysis which has certain distinctive characteristics, viz, it is a flaccid, motor paralysis. It is sudden in its onset, reaching its height within a few days, after which it shows a regression in extent, the final result being usually a permanent paralysis of considerably less extent than in the acute stage, although complete recovery may take place. This is the most common and easily recognized form of acute anterior poliomyelitis.

II. The *ascending* or *descending* type of paralysis runs the clinical course of a *Landry's paralysis*. Beginning usually in the lower extremities, the paralysis ascends until it involves, in some instances, the whole of the body; such cases usually terminate fatally from respiratory paralysis. In rare cases the paralysis is descending instead of ascending.

III. The *bulbar* or *pontine* form is characterized by paralysis of muscles supplied by cranial nerves (having their nuclei in the medulla or pons).

IV. The *encephalitic* type is distinguished by paralysis due to lesions in the motor area of the brain, resulting in a spastic monoplegia or hemiplegia. This is the rarest type.

V. In the *ataxic* type the characteristic motor disturbance is an acute ataxia, with or without paralysis.

VI. The *polyneuritic* type gives a clinical picture closely resembling multiple neuritis.

VII. The *meningeal* type includes (1) cases which in their onset are characterized by marked symptoms of meningitis, but which result in spinal or bulbar paralysis; and (2) cases in which the symptoms of meningitis are not followed by paralysis.

VIII. Abortive types include cases showing the initial symptoms of acute poliomyelitis, but not followed by paralysis.

The differentiation of these types depends upon the localization of the lesions in the central nervous system. The initial symptoms, before definite localization has taken place, are in a general way similar in all the types.

#### INCUBATION.

The incubation period of acute poliomyelitis has been found to vary from 3 to 46 days in monkeys experimentally inoculated, the more common period being from 7 to 15 days. The length of incu-

bation in persons has not been definitely determined. Approximately 2 to 10 days has been generally accepted as the most usual period, but apparently great variations occur, the period being sometimes prolonged to 3 weeks or more.

#### INITIAL SYMPTOMS.

*Definite prodromal symptoms* are relatively rare. In some cases malaise, weakness, digestive disturbances (nausea, constipation, or diarrhea), angina or restlessness precede by several days the definite onset of the acute febrile stage. Bronchitis and coryza more rarely precede an attack of acute poliomyelitis—probably not more often than may be ascribed to coincidence.

Sometimes the disease develops in two stages. After slight, indefinite prodromal symptoms, the patient apparently recovers completely in a few days, and with no suspicion of a serious illness, returns to the usual routine of life; but a few days later is stricken down by an acute attack of poliomyelitis. Wickman expresses the suspicion that these cases may be relapses, brought on by exertion, and may illustrate the therapeutic value of *rest*, after even a very mild attack of this disease.

Numerous cases are reported in which no constitutional disturbance was noted prior to paralysis. As such cases have most commonly occurred in children, it is probable that in many instances a mild febrile stage has been overlooked. It nevertheless appears to be certain that cases of poliomyelitis may develop with constitutional symptoms which are negligible.

#### ONSET.

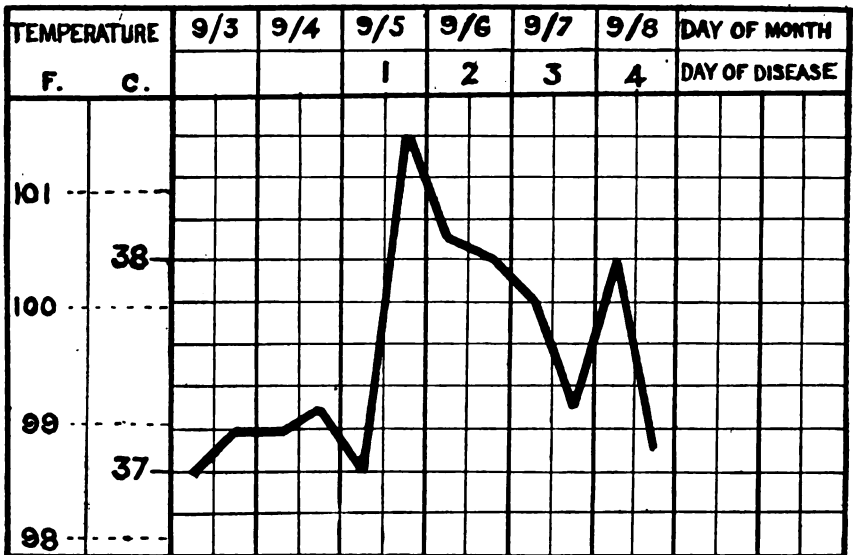
Acute poliomyelitis is usually quite abrupt in its onset, suddenly prostrating persons in apparently good health. The first symptoms observed vary a good deal. A sudden, sharp rise of temperature is probably the most common feature; a definite chill is rare. In its onset acute poliomyelitis may present the clinical picture of mild meningitis, acute neuritis, gastroenteritis, or tonsillitis. In some epidemics gastroenteritis has been the most prominent symptom of onset; in others, meningitis, neuritis, or tonsillitis. In a certain proportion of cases the onset is gradual and insidious.

#### GENERAL SYMPTOMS.

*Fever* is perhaps the most constant single symptom, although it seems fairly well established that some cases run their course without fever. The rise of temperature is usually sudden and sharp, often reaching its maximum in the first day of illness.



The range of temperature is quite variable. Wickman states that it is usually from 38° to 39° C. (99° to 102.2° F.). The investigation of the New York epidemic of 1907 showed the most usual range of fever to be from 101° to 104° F. Higher temperatures (105°–106° F.) have occasionally been noted. The height of the temperature is, according to Wickman, no index to the severity of the infection. It has been noted, however, by Lovett and Lucas<sup>1</sup> that cases in which the onset is accompanied by severe symptoms are more apt to result in extensive paralysis than cases with mild symptoms. Abortive cases, which recover in a few days, may, however, run quite as high temperatures as cases resulting in extensive paralysis or death.



C. R. D. Boy, 4 months old. Taken sick in General Foundling Asylum, Stockholm, Sept. 5, 1899. Extensive paralysis. Died Sept. 9, 1899. (Wickman, 1907.)

Exact records of the course of the fever are scarce. The following charts, adopted from Wickman, illustrate the irregularities in the development and course of the fever.

The fever may be expected to continue from one to seven days, usually falling to normal about the time paralysis develops. Cases are cited, however, in which the fever has continued for several weeks.

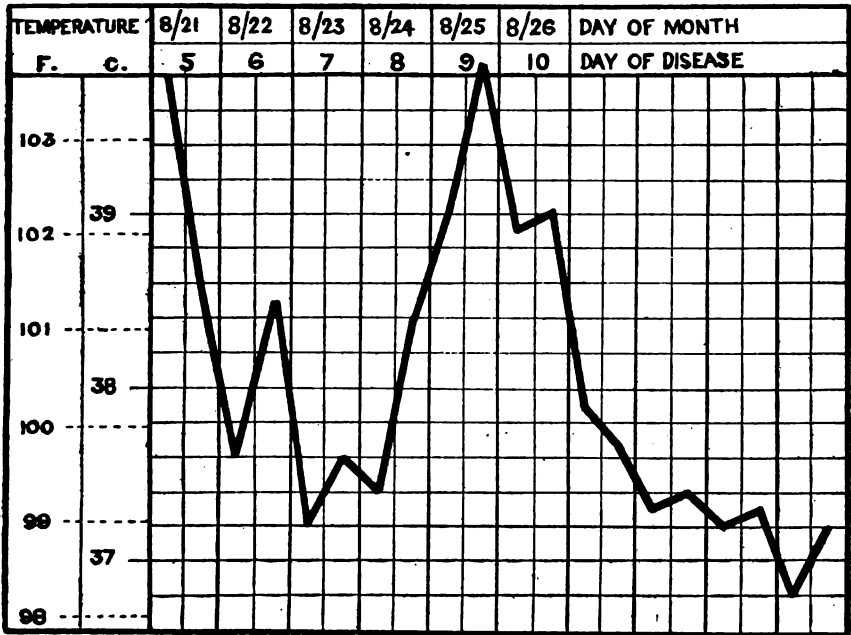
*Headache* is complained of by a large proportion of those who are old enough to give a clear account of their sensations. According to Wickman's observations the headache is usually occipital, but the committee which investigated the New York epidemic found it

<sup>1</sup> Lovett, R. W., and Lucas, W. P., Jour. Am. Med. Assn., 1908, vol. 51, pp. 1677–1684.

more commonly general or frontal. The headache is usually of moderate severity, such as is to be expected in almost any acute general infection, but is occasionally intense, constituting the most prominent symptom.

*Prostration.*—When the onset is sudden and acute there is marked prostration from the first. Even in cases with mild constitutional symptoms the prostration is often much greater than would be expected. Extreme weariness and muscular weakness are characteristic features of many mild, abortive cases.

*Digestive system.*—Some disturbance of digestion is among the most common early symptoms. Constipation is perhaps the most



J. P. Girl, 17 years old. Taken sick Aug. 17, 1905. Quite extensive paralysis of arms and legs. (Wickman, 1907.)

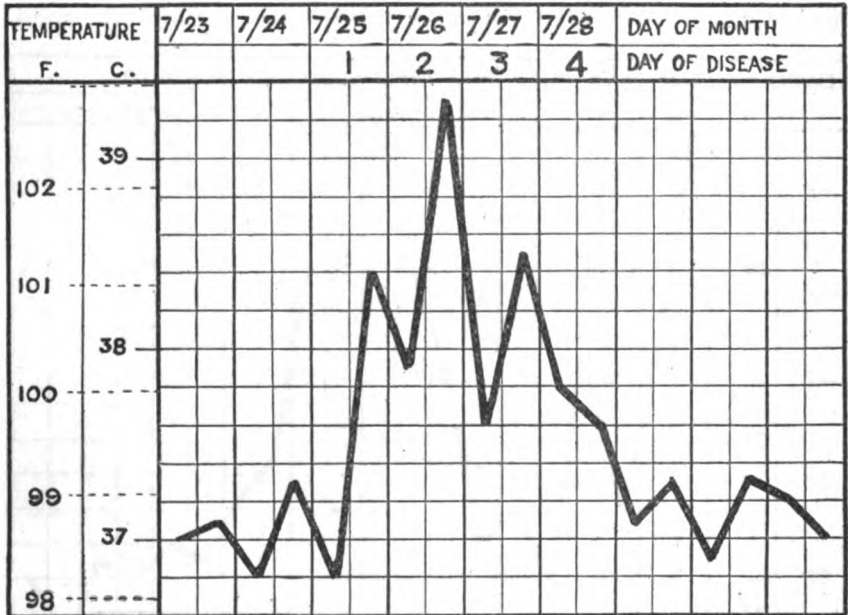
usual derangement. Diarrhea has been very common in certain epidemics, notably one in Westphalia studied by Krause,<sup>1</sup> but in recent American epidemics has been found to be much less usual than constipation. More serious disturbances of the bowels, such as obstipation or incontinence are rather rare. Vomiting is very common; it usually occurs early in the illness and subsides in a few days. When constipation is marked there is apt to be abdominal distention.

*Respiratory system.*—Catarrhal conditions of the respiratory system are rare, a point emphasized by Wickman as an aid in the early differentiation of acute poliomyelitis from influenza, which it often

<sup>1</sup> Krause, P., Deutsch. med. Wochenschr., 1909, vol. 35, p. 1822.

resembles in many respects. Sore throat is fairly common in some epidemics but is not in general a prominent symptom. More serious respiratory troubles, especially broncho-pneumonia, may develop later in the disease, due to paresis or paralysis of respiratory muscles.

*Urinary system.*—Although, post-mortem, the kidneys are sometimes found congested, with incipient parenchymatous degeneration, there is very seldom any clinical evidence of damage to the urinary organs. Albuminuria is rare. Retention of the urine occurs occasionally. Incontinence of urine is more rare.



K. J. Boy, 2½ years old. Convalescent from an exudative pleurisy at time of onset (of acute anterior poliomyelitis), July 25, 1899. Paralysis of the neck, July 26. (Wickman, 1907.)

*Circulatory system.*—The heart's action suffers the derangement common to acute infections. More serious disturbances—arrhythmia, tachycardia, bradycardia—may result from early involvement of the vagus center. Vaso-motor disturbances are sometimes observed, but are not characteristic.

*The skin.*—Excessive sweating has been noted by Müller<sup>1</sup> as a characteristic early symptom. While this has been noted occasionally in the epidemics studied elsewhere, it has not been found a constant distinctive feature. Skin eruptions were noted in less than 10 per cent of the cases investigated in the New York epidemic of 1907, and in 6 out of 150 cases studied in Massachusetts in 1909. The char-

<sup>1</sup> Müller, Eduard, Münch. med. Wochenschr., 1909, vol. 56, pp. 2460-2462.

acter of the skin lesions varied greatly. No skin eruption can be said to be at all characteristic of acute poliomyelitis. The rarity of herpes has been noted by Wickman.

#### NERVOUS SYMPTOMS.

*Restlessness* or irritability is a very common and marked symptom. In children very often the first symptom to attract attention is their irritability. Older persons frequently show an early stage of excitement, characterized by extreme restlessness, vague anxiety, and mental perturbation out of proportion to the severity of their other symptoms.

An *apathetic, drowsy state* frequently follows, especially in children. A child may lie sometimes for a day or more, asleep or half asleep, unless aroused; but when aroused, the faculties are clear, or at most, somewhat confused. *Coma* is rare, it being a noteworthy feature of acute poliomyelitis that even in fatal cases the patient usually retains consciousness throughout the greater part of the illness. *Delirium* is not uncommon, but is usually of short duration, occurs early, and is often a confused state rather than a wild delirium such as characterizes meningitis. *Convulsions* sometimes occur in children.

*Pain and tenderness.*—Pain of some sort is a very constant early symptom, giving clinical confirmation to the anatomical studies which have shown the involvement of the meninges and spinal ganglia of the cord in the acute stage. The most characteristic pain is in the back of the neck and spine; the whole of the spinal column may be painful, especially on motion, and very tender. It is Wickman's opinion that the pain which young children evidently feel on being moved is due rather to the tenderness and consequent rigidity of the spine than to general cutaneous hyperesthesia. The pain in the neck and back is sometimes extremely severe. Pains are also very common in the arms and legs, sometimes in the face, and less commonly in the trunk. The pains in the limbs may resemble a myalgia, without cutaneous hyperesthesia or tenderness over the nerve trunks. In other cases, however, the clinical picture is that of neuritis, with marked hyperesthesia and tenderness over nerve trunks. The pains may be of short duration, subsiding with or before the onset of paralysis, but in some cases tenderness over the nerve trunks persists for weeks.

Sensory disturbances other than pain have been observed occasionally. *Paræsthesias* are not uncommon; numbness is noted in a fair proportion of cases in older children and adults. Wickman describes a case observed by him, with motor paralysis of both lower limbs, great *diminution of the sense of pain* from the hips down, and

*diminution of temperature-sense* in the feet. He cites a similar case described by Wernicke, and also cites from reference other cases, in one of which there was complete *anesthesia*, and in several others *loss of electrocutaneous sensation*. Wickman thinks it probable from the pathology of the disease that closer observation of cases would show disturbances of temperature, pain, and electro-cutaneous sensation to be more common than heretofore reported. •

*Meningitic symptoms*.—A train of symptoms indicative of meningeal irritation is frequently observed; these symptoms are—

*Pain in the neck*, which in varying degrees of intensity is quite common; *stiffness of the neck*, usually of moderate severity, rendering it painful or even impossible to bend the head forward; less frequently *retraction of the head*, due to actual contraction of the posterior neck muscles. While marked retraction of the head, such as is characteristic of cerebro-spinal meningitis is rare, a great many cases are found in which the head is held farther back than normal. *Stiffness of the spine* is usually due to the pain which motion of the spine causes, but in rare cases is due to actual *contracture of the spinal muscles*. A modified *Kernig's sign*—that is, inability to completely extend the leg when the thigh is flexed at a right angle, is sometimes present in cases showing other meningitic symptoms.

Some of the above symptoms are seen in the majority of cases with acute onset, as is to be expected from the fact that the pia mater is always found to be congested and infiltrated in the acute stage. Meningitic symptoms of moderate severity, when present, constitute the most characteristic symptom-complex of the early stage of acute poliomyelitis. When the meningitic symptoms are severe, the differentiation from cerebro-spinal meningitis may be impossible without examination of the cerebro-spinal fluid.

*Motor symptoms*.—Prior to the onset of paralysis, as well as in cases which do not result in paralysis, disturbance of the motor centers may be indicated by muscular twitching, jerking of the limbs, or tremor. The jerking of the limbs is usually slight and irregular. It may be most noticeable when the patient is asleep or may be brought on by the disturbance incident to making a physical examination. In one case which came under the writer's observation a slight disturbance of the patient set up clonic movements of one leg, continuing for several minutes. The other leg was flaccid, almost completely paralyzed.

*Reflexes*.—The patellar reflex is quite commonly exaggerated in the early stages, but is almost always diminished or abolished prior to the onset of paralysis; it may be abolished on one side and exaggerated on the other. In rare cases a persistently exaggerated patellar reflex may be associated with bulbar or cervical-segment paralysis (Wickman).

Reflexes other than the patellar have not been studied closely or extensively enough to warrant definite generalizations. Krause<sup>1</sup> found the skin, plantar, abdominal, and cremasteric reflexes normal in most cases. The New York investigating committee states that "A study of the reflexes established the general doctrine that in poliomyelitis the deep reflexes in the parts paralyzed are absent and that they are often absent in nonparalyzed parts."

Disturbances of the ocular reflexes are not characteristic, but need cause no surprise if noted in occasional cases.

Summarizing briefly the symptoms above enumerated, the characteristic features of acute anterior poliomyelitis in the early stage are sudden onset with fever, gastro-enteric disturbances (vomiting, diarrhea, constipation), occasionally sore throat, headache, restlessness followed often by apathy, pains in the neck, back, and limbs: muscular twitchings, exaggeration or abolition of tendon reflexes. Symptoms of a rather mild meningitis are present in a varying proportion of cases, and when present are rather characteristic.

The clinical picture prior to the onset of paralysis may be that of an indefinite general infection or toxemia, gastro-enteritis, tonsillitis, multiple neuritis, meningitis, or encephalitis.

#### TYPES OF ACUTE POLIOMYELITIS.

##### I. THE SPINAL POLIOMYELITIC TYPE.

The characteristic of this, the most typical and common form of poliomyelitis, is the development of a *flaccid motor* paralysis of parts supplied by nerves of *spinal* origin.

The paralysis develops, in the great majority of cases, within a week after the onset of acute symptoms, most commonly from the second to the fourth day. In exceptional instances it may develop more than a week after the onset.

In small children it is difficult to follow accurately the development of paralysis, which has given rise to the common statement that complete paralysis develops quite suddenly. Observations upon older persons have shown that the paralysis is often somewhat more gradual in its onset, beginning as a paresis, which may not be noted even by the patient until some effort is made which requires considerable strength. For instance, an adult, able to move his legs in bed, may not suspect a loss of power in them until he attempts to stand. Or the first indication of a beginning paralysis may be intention tremor and incoordination. In some cases the weakness never progresses to actual paralysis, receding sometimes to complete recovery in a few days. Cases of this kind are undoubtedly often overlooked in children. Usually, however, the paresis progresses rapidly to

<sup>1</sup> Münch. med. Wochenschr., 1910, vol. 57, p. 47.

complete paralysis of the affected part, reaching its maximum, both in degree and extent, within one or two days. It is quite the general rule that the extent of the paralysis is greater at first than it is later. The paralysis is primarily due to edema and infiltration of the cord. As the acute inflammation in the cord subsides, improvement takes place in some of the affected limbs. This improvement may be quite rapid, so that a limb which was completely paralyzed may return to normal in a few weeks, or even in a few days. Where the acute process has resulted in the destruction of the ganglion cells there is, of course, no return of function in the corresponding muscle. The parts supplied by nerves from these centers are permanently paralyzed. Between edema and infiltration, with transitory disturbance of the function of the ganglion cells in an area, and complete destruction of the ganglion cells, there are many gradations. The cells may be damaged so severely as to return slowly to normal, or only a part of the cells in an area may be destroyed, leaving the rest capable of performing their function. The rate and degree of improvement is correspondingly variable, and there is no certain means of telling, when the paralysis is at its maximum, how extensive it will finally be.

A sufficient number of statistics have been collected within the past few years to warrant some generalizations as to the parts most commonly paralyzed. The lower limbs are affected more than twice as frequently as the upper. Any combination may occur, as both legs, one leg and one arm of the same or opposite sides, both legs and one arm, both legs and both arms, both arms and one leg, both arms alone, etc. Combinations of parts supplied by the same spinal segment are more common than combinations of parts supplied by different segments—for example, it is more common to have paralysis of both legs than of one leg and one arm.

The resulting permanent paralysis, while it may involve one or more limbs in their entirety, is more usually limited to certain muscle-groups. In the lower limbs the groups most often affected are the peroneal and the quadriceps femoris. In the upper extremity the scapular muscles, deltoid, and upper-arm muscles are more frequently affected than the muscles of the forearm and hand.

Paralysis of the extremities is the most common and most serious feature of poliomyelitis; but the muscles of the trunk are affected more often than is generally supposed. In the acute stage the muscles of the back are very often paralyzed. As this usually occurs while the patient is confined to bed and in connection with paralysis of one or more extremities and is often of comparatively short duration, it may easily be overlooked. Paralysis of the neck muscles, rendering the patient unable to raise the head, is less common, occurs most frequently in combination with paralysis of the upper extremities, and can hardly be overlooked. Wickman lays emphasis upon

the comparative frequency of paralysis of the abdominal muscles, usually associated with rather extensive paralysis of the extremities. When abdominal paralysis is bilateral, distention is apt to result; the abdomen is flaccid and can not be contracted in expiratory efforts; the patient is unable to raise his body from the recumbent posture without support. Unilateral or more localized abdominal paralysis may give rise to hernia-like protrusions and retraction of the navel toward the unaffected side.

Paralysis of the bladder and rectum is very rare as compared with paralysis of the lower limbs. In cases with extensive paralysis of the extremities, retention of urine may occur, indicating a paralysis of the bladder, but this condition is almost without exception of short duration. Paralysis of the sphincters, with incontinence of feces or urine, is also rare.

Paralysis of the muscles of respiration seldom occurs except in cases of extensive paralysis. It may occur, however, with less extensive paralysis of parts supplied by the cervical segment of the cord. If the intercostal muscles are paralyzed, the chest is immobile, and respiration is of the abdominal type. Paralysis of the diaphragm causes a reversal of the usual *abdominal* movements in respiration; the abdomen is retracted in inspiration and protruded in expiration. Diaphragmatic paralysis is more serious than intercostal paralysis. Paralysis of both diaphragm and intercostals causes death by respiratory failure. Respiratory paralysis is the gravest symptom of acute poliomyelitis. Occasionally, however, the disturbance of function of these muscles does not reach total paralysis, and in such cases may be quite transient. If the patient does not die of the respiratory paralysis or of pneumonia secondary thereto, these muscles are likely to return to their normal function.

The tendon reflexes in paralyzed limbs are totally abolished in the great majority of cases. Prior to the onset of paralysis, however, the reflexes, especially the patellar, are quite commonly exaggerated. The exaggeration of any reflex, however, need not cause astonishment. Even after the development of complete *flaccid* paralysis of a limb, exaggeration of the patellar reflex may persist. This, according to Wickman's view, may be accounted for by a lesion in the pyramidal tract of the cord, overcompensating the diminution of the reflex caused by the partial destruction of the ganglion cells of the anterior cornua.

The eye reflexes have been found disturbed in various ways. The pupils may react sluggishly or unevenly. Wickman has noted in rare cases signs of involvement of the cilio-spinal center in the cervical cord, viz, narrowing of the aperture between the lids of one side, with contraction of the pupil.



The subsidence of the symptoms which characterize the pre-paralytic stage is usually about coincident with the development of paralysis. The temperature may, however, in rather exceptional cases persist for a week or more after this time. The persistence of other constitutional symptoms is variable. While the acute pains in the limbs usually subside about this time or even before, there is often a persistent tenderness of the muscles and nerve trunks, and considerable pain in the joints on attempted passive motion.

*Stage of regression.*—As already stated, following the development of paralysis, there is a more or less indefinite stage of improvement. Up to a certain point this improvement is rapid, being noticeable from week to week, perhaps from day to day, until a part or in some cases all the paralyzed muscles are restored to their normal function. After the first few weeks improvement is much slower; the parts which remain paralyzed now show atrophy, and quite frequently a lowering of surface temperature. This indicates a severe degree of damage to the spinal motor centers, but not necessarily complete destruction. Even after several months, improvement may continue to take place in muscles that appeared completely paralyzed.

Contractures of the muscles and deformities of the limbs due to such contractures or to overaction of healthy muscles opposing paralyzed muscles are likely to occur in this stage unless care is exercised in their prevention.

The electrical reactions of the paralyzed limbs usually show alteration by the second week. The alteration may consist of a diminution of the normal electrical excitability of the muscles or more profound changes—the reaction of degeneration. The development of the reaction of degeneration, denoting destruction of the spinal center of a muscle, is given by Church and Petersen<sup>1</sup> as follows:

“First. The *muscle* responds weakly, sluggishly, and deliberately to faradism, and shows a tendency to maintain the contraction after the current is withdrawn. This is the *modal change*.

Second. The *nerve trunk* loses progressively and equally its responsiveness to both galvanism and faradism—a quantitative change.

Third. The *muscle* becomes much more excitable by galvanism and much less excitable by faradism, which latter reaction, with the nerve trunk responses, is completely lost after two or three weeks. This is the *qualitative change*.

Fourth. A *polar change* appears in the *muscle* about the second week, when directly stimulated by galvanism. The anodic closing contraction now equals or exceeds the cathodal closing contraction.

If there has been complete destruction of the nerve elements, with complete degeneration, *all electrical response* is gradually lost.”

<sup>1</sup> Church, H., and Petersen, F.: *Nervous and Mental Diseases*. Phila., 1907, W. B. Saunders Co., 5th ed., p. 46.

## II. THE ASCENDING OR DESCENDING TYPE OF PARALYSIS.

In the more common spinal type of poliomyelitis the paralysis is pretty definitely limited, reaching its maximum in a few hours or a few days. In some cases, however, the paralysis progresses from the part first affected, either ascending or descending until nearly the whole of the body is paralyzed, or until death ensues from paralysis of the respiratory muscles. Usually the progress of the paralysis is *upward*, affecting in order the legs, abdomen, back, intercostals, arms, neck, and diaphragm. The progress may be very rapid; in one case which came under my observation, death ensued from respiratory paralysis 48 hours after the onset of the illness and less than 24 hours after paralysis was first noted. In some epidemic cases of this type have been observed more frequently in young adults and older children than in infants. The clinical course of a case of ascending or descending acute poliomyelitis is identical with that of a Landry's paralysis. Wickman has shown that a number of cases diagnosed as Landry's paralysis were in reality acute ascending poliomyelitis. He also doubts whether this type is more common in adults than in children, ascribing the general impression to that effect to the greater accuracy with which the course of the paralysis can be followed in an adult.

When the paralysis is of the descending type, appearing first in the upper extremities or in the muscles supplied by the cranial nerves, death from respiratory failure is likely to occur before the lower limbs are affected.

Respiratory failure may be due either to paralysis of the respiratory muscles (intercostals and diaphragm), as already described, or to a lesion affecting the respiratory center in the medulla. In the latter case the onset of dyspnoea is more sudden. Cheyne-Stokes respiration and acceleration of the heart's action may be noted in such cases, due to interference with the vagus center.

It is typical of such cases as the above that the patient retains consciousness to the end.

## III. BULBAR (MEDULLARY) OR PONTINE TYPE.

This type embraces those cases in which there is paralysis of muscles supplied by *cranial* nerves whose nuclei are situated in the medulla oblongata or pons cerebri. It includes: (*a*) cases in which, in addition to the paralysis of the cranial nerves, there is paralysis of typical spinal type, and (*b*) cases in which the only paralysis is bulbar.

Wickman cites Medin (1890) as the first to call attention to the frequency of paralysis of cranial nerves in epidemic poliomyelitis. The unexpected frequency of this form of paralysis has been one of

the striking facts brought out by the recent studies of Wickman, the New York Investigation Committee, the Massachusetts State Board of Health, and others. In the report of the New York committee paralysis of the cranial nerves was found as follows: Facial, 27; eye muscles, 26; eyelids, 18; speech, 28; out of a total of 625 to 700 cases. The report of the Massachusetts State Board of Health for 1909 records 34 cases of facial paralysis in a total of 628 cases of poliomyelitis (4.7 per cent). In 150 cases studied more carefully double vision was noted in four cases, difficulty of deglutition in two, difficulty of speech in two. Medin<sup>1</sup> noted involvement of some of the bulbar centers in 17 out of 65 cases (=26 per cent). It would appear from the wide variations between these statistics that there must be differences in epidemics in regard to the frequency of the occurrence of cranial-nerve paralysis.

The most common paralysis of this type is facial, which is much more often unilateral than bilateral. Ocular paralyzes are next in frequency. The external rectus is most frequently affected, causing the eye to turn inward. Paralysis of the oculo-motor may cause divergent squint, with or without ptosis; or, more rarely, ptosis may be the only indication of ocular paralysis. In very rare cases there is paralysis of all the muscles of the eye. Transient motor disturbances of the eye, either nystagmus, diplopia, or fixedness of the eyes may occur. Wickman cites two cases in which the optic nerve was affected, with resulting atrophy and blindness of one eye.

Sudden deafness, usually of short duration, has been noted in the course of acute poliomyelitis, but it is a very rare symptom.

Disturbances of deglutition, when they occur, are usually associated with rather extensive paralysis, although there are exceptions to this. Disturbances of speech were noted in 28 cases (not noted in 615 cases) collected by the New York investigation committee.

Paralysis affecting the respiratory center may also be included as a "bulbar" symptom. In a case reported by the writer sudden death was due apparently to this cause. The patient, a previously healthy girl of 12, after a few days of slight illness, died very suddenly, with no paralysis. There having been no distinctive symptoms of poliomyelitis in this case, the diagnosis was made only by post-mortem histological examination.

Paralysis of bulbar origin is often temporary, as is to be expected from the fact, already cited, that the damage to the ganglion cells in the bulb is usually less severe than in the cord.

Lesions in the white matter which forms the conducting tracts from the cerebellum may perhaps give rise to the acute ataxia noted in some cases. Similar lesions in the pyramidal tracts of the medulla,

<sup>1</sup> Cited by Wickman: Beiträge zur Kenntniss der Heine-Medin'schen Krankheit, p. 27.

interrupting the connection between the cerebral and spinal motor centers, may give rise to exaggeration of reflexes.

#### IV. CEREBRAL OR ENCEPHALITIC TYPE.

There has long been a discussion among clinicians as to the occurrence, in acute anterior poliomyelitis, of paralysis due to lesions in the motor area of the brain. Paralysis due to such a lesion would be monoplegic or hemiplegic, and spastic, resulting in contractions, but no atrophy. A similar paralysis might result from lesions in the conducting tracts of the upper motor segment.

Paralysis of this type is extremely rare in acute poliomyelitis. Wickman found no example of it among the 1,031 cases studied by him, and the collective investigation of the New York epidemic failed to reveal any case of this type. Wickman, however, considers the occurrence of the type established by the following evidence:

1. Lesions are commonly found in the cortex of the brain at autopsy, even when there has been no clinical evidence of the existence of such lesions.

2. A number of authors<sup>1</sup> have noted, in epidemics of acute poliomyelitis, the occurrence of cases presenting initial symptoms similar to acute poliomyelitis, but resulting in spastic hemiplegia. Pasteur, Buccelli, and Hoffman noted instances in which two or more children of a family were affected about the same time, with similar initial symptoms. One child developed spastic hemiplegia, and the others developed the typical spinal flaccid paralysis of acute poliomyelitis.

3. Others have reported the coexistence in the same patient of typical flaccid spinal poliomyelitic paralysis in one part of the body, and equally typical spastic cerebral paralysis in other parts. Pierre-Marie and Rossi<sup>2</sup> were able to demonstrate by autopsy on a case of this kind well-marked cortical and spinal lesions.

#### V. THE ATAXIC TYPE.

This type, like the preceding, was first differentiated by Medin, who noted, during the Stockholm epidemic, cases whose motor disturbance was an ataxia of cerebellar type, associated with exaggerated reflexes, not followed by atrophy, and terminating usually in recovery. According to the observations of Wickman and to more recent observations in the United States, cases in which a marked ataxia is the only motor disturbance are relatively rare. It is not rare, however, to find some degree of incoordination associated with

<sup>1</sup> Moebius, Schmidt's Jahrb., 1884; Pasteur, W. Trans. Clin. Soc., 1897; Buccelli, Poll-clinico, 1897; Strümpell, Beitr. z. path. Anat. u. klin. Med., Leipzig, 1897; Medin, cited by Wickman, Beiträge zur Kenntniss der Heine-Meduschen Krankheit, p. 72; Hoffman, cited by Wickman, *ibid.*

<sup>2</sup> Cited by Wickman. Beiträge zur Kenntniss der Heine-Meduschen Krankheit, pp. 74-75.

paresis in the early stage of cases of acute poliomyelitis. Incoordination may be ascribed to several possible causes:

- (1) Lesions of the cerebellum.
- (2) Lesions in the conducting tracts leading from the cerebellum.
- (3) Lesions in the posterior cornua of the cord, affecting muscle sense.
- (4) Paresis of limbs, especially paresis of certain groups of muscles, disturbing the balance between these and their opposing (unaffected) muscles.
- (5) Peripheral neuritis.

There is ground to believe that any of the above lesions may occur, in varying degrees, in cases of poliomyelitis, except, perhaps, peripheral neuritis, which is considered improbable.

#### VI. POLYNEURITIC TYPE.

Wickman describes three classes of cases *clinically* resembling multiple neuritis:

- (1) Cases which in the stage of onset are characterized by marked pain and tenderness in the extremities, but which recover without paralysis or with only a transitory paresis; many of these cases could perhaps be better classed as abortive.
- (2) Cases in which, after the subsidence of acute symptoms, there remains tenderness of the nerve trunks.
- (3) Cases of acute ataxia associated with marked pain and tenderness; such cases may be considered as belonging to either the ataxic or the polyneuritic type, dependent upon the predominance of ataxia, or of pain and tenderness.

The frequent occurrence during epidemics of cases clinically resembling acute polyneuritis, and the occurrence of symptoms of neuritis in cases of undoubted poliomyelitis, are sufficient to establish the identity of causation between this type and the paralytic form of the disease. There has been some discussion as to whether the clinical picture in these cases is actually due to inflammation of the peripheral nerves or to lesions in the cord. Wickman concludes that the lesions are central, giving the following reasons:

- (1) There is no loss of sensation in these cases, whereas in toxic, peripheral neuritis, loss of sensation is usually more marked than loss of motion.
- (2) Post-mortem examination has failed to reveal peripheral neuritis in cases of poliomyelitis, even where the involvement of the cord was very extensive.
- (3) These symptoms may all be accounted for by lesions which are quite generally found in the spinal cord in cases of poliomyelitis,

viz, diffuse infiltration and edema of the whole cord, infiltration and edema of the pia mater.

Infiltration of the spinal ganglia has, however, been found at autopsy in cases of poliomyelitis, both human<sup>1</sup> and experimental.<sup>2</sup>

#### VII. THE MENINGITIC TYPE.

Symptoms indicative of a mild grade of meningitis have been noted (p. 28) as among the most characteristic manifestations of acute anterior poliomyelitis in the early stage. Such symptoms are not usually, however, predominant over the other symptoms. In some cases, the proportion of which seems to vary in different epidemics, the most striking symptom complex of the acute stage is as follows: Intense headache, ocular disturbances, pain in the neck and back, retraction of the head, contracture of the spinal muscles, spasticity of the limbs, Kernig's sign. No better idea can be given of this type than by citing a case of Wickman's:

*Wickman's case No. 299.*—Boy, 10 years old; taken sick August 18, 1905, after feeling badly for several days. Headache, fever, and vomiting; could be up and out of bed for the first few days, after which he was confined to bed; paresis noted later; stiffness of neck, pains in his whole spine; could not support himself upon his legs.

August 29: Lies with head retracted and stiff neck; cries when attempt is made to raise his head from pillow; can move head from side to side, but can not raise it; is tender all over spine and can hardly bear to be lifted up; the back is bowed (opisthosis) so that the patient can not lie flat upon the mattress; lying upon his back, he is supported upon his shoulders and hips, and a hand may be passed between his back and the bed; patient keeps his knees flexed—can extend them, but only with considerable pain; the feet hang limp and can neither be flexed nor extended; belly retracted and walls tense and tender; abdominal muscles paretic; patellar reflex abolished; cremaster and abdominal reflexes marked.

About seven weeks in bed he was able to crawl upon the floor and eventually to walk.

October 22, 1905 (examination by Wickman): Gait "wobbly," paretic; patient drags the toes; is said to fall often; leg muscles atrophic and flaccid; thigh muscles feel flaccid, but not noticeably atrophied; diminished dorsal flexion of left foot; otherwise movements of legs all possible but weak; glutel of both sides weak, but can be contracted; has difficulty in raising himself after bending over, as to pick up something from the floor, helping himself up with his hands upon his legs like a person with progressive muscular atrophy. On raising the leg, extended on the thigh, patient feels pain at an angle of about 45°; no pain if knee is flexed; no contractions of muscles; patellar reflex on both sides exaggerated; no ankle clonus.

The diagnosis of poliomyelitis in this case is confirmed by the subsequent development of flaccid paralysis.

<sup>1</sup> Strauss: Epidemic Poliomyelitis, Report of the Collective Investigation Committee on the New York Epidemic of 1907, p. 87.

<sup>2</sup> Flexner, Jour. A. M. A., 1910, vol. 55, pp. 1105-1113.

In other cases, however, there may be no paralysis, or what may be even more confusing, an ocular or facial paralysis. A fatal case of this kind, reported by Wickman, is abstracted for illustration:

H. K., female, age 27, married; taken sick suddenly August 19, 1905, with fever, headache, pains in back; next day vomiting so violently as to dislocate the jaw; tenderness and stiffness of neck, increasing until head was moderately retracted; violent tonic contraction of the shoulder muscles, throwing the arms up to the head; tonic contractions, flexing elbows, flexing fingers, and adducting thumb; cramp in muscles of the lower jaw, drawing it downward; no ocular paralysis; cramps so painful as to require chloroform; evening temperature 37° C. (99.6° F.). Patient fully conscious; during night cramps continued, and later affected muscles of back, causing opisthotonus.

August 21: Morning temperature 38.8° C. (101.8° F.); patient being six months pregnant, eclampsia was suspected, and forced delivery undertaken successfully; cramps continued, extending to legs; inability to swallow and difficulty of speech developed later in the same day; condition continued until death, at 6 a. m., August 22. Patient conscious throughout.

An autopsy was performed, revealing typical histologic lesions of acute poliomyelitis. The cerebrospinal fluid was found greatly increased in quantity and quite clear.

It will be noted that in neither of the above cases was there loss of consciousness. This can not, however, be taken as a constant point of differentiation between the meningitic form of acute poliomyelitis and cerebrospinal meningitis, for cases of poliomyelitis are cited, both by Wickman and by others, in which there was delirium followed by coma.

While there should be no great difficulty in distinguishing between an epidemic of poliomyelitis and an epidemic of cerebrospinal meningitis, there may be great difficulty in making the diagnosis in a particular case, especially if not closely associated with an epidemic of either disease. Lumbar puncture, with examination of the cerebrospinal fluid, is the only certain means of differentiation in such cases.

#### VIII. ABORTIVE FORMS.

Wickman<sup>1</sup> cites Breiglieb, Pasteur, and Leegard as having noted in intimate association with cases of undoubted poliomyelitis other cases of illness with strikingly similar initial symptoms, but terminating in rapid and complete recovery without paralysis. Caverly<sup>2</sup> also noted during an epidemic of poliomyelitis around Rutland, Vt., in 1894, that the prevalent diseases of children were accompanied by unusual nervous manifestations. It was Wickman, however, who first clearly pointed out the frequent association between cases of undoubted poliomyelitis and cases of a similar illness not followed by paralysis. It was he who recognized the latter as mild or abor-

<sup>1</sup> Wickman: Beiträge zur Kenntniss der Heine-Medinischen Krankheit, p. 132.

<sup>2</sup> Caverly, S. C., Med. Record, 1894, vol. 46, p. 673.

tive forms of acute anterior poliomyelitis, and called attention to the importance of including them in studies of the epidemiology.

In regard to the cases of illness without paralysis, considered by Wickman and others to be abortive forms of poliomyelitis, there are two chief points to be considered; first, whether such cases are due to the same infection as the paralytic forms of poliomyelitis, and second, whether they are clinically distinguishable from other infections.

(a) *Etiologic identity of abortive and paralytic forms.*—It has already been noted that the symptoms of acute poliomyelitis are due to *general infection, diffuse inflammation* of the central nervous system, and more severe *localized lesions* of the cord and brain. The localization of the nervous lesions gives to this disease its characteristic features and distinguishes the various types from one another. An abortive case of poliomyelitis may be considered as a case presenting only the symptoms of general infection and perhaps some diffuse inflammation of the cerebrospinal axis. The symptoms referable to these causes would be the same as the early symptoms in cases which later develop characteristic paralysis. There has been no pathologic evidence brought forward to prove the anatomic changes assumed as occurring in abortive cases, but the clinical evidence is very strong:

(1) Many observers in many parts of the world have noted during epidemics of poliomyelitis *cases presenting the same initial symptoms as paralytic cases*, but recovering in a short while without paralysis.

(2) Almost every closely studied epidemic shows a *gradation in severity of nervous symptoms*—extensive permanent paralysis; slight transient paralysis; partial paralysis (paresis); ataxia without paralysis; meningitic or neuritic symptoms without motor disturbances; general infection without distinctive nervous symptoms of any kind. A group of cases showing all these gradations, occurring in a circumscribed area within a short time, all presenting somewhat similar initial symptoms, differing to some extent from the symptoms of more usual infections, seldom fails to convince the observer of the existence of abortive cases of poliomyelitis.

(3) The occasional occurrence of such cases during an epidemic of poliomyelitis might be put down to merely coincident prevalence of two or more distinct infections; the *frequent, almost constant, occurrence* of such cases in intimate association with frank cases of poliomyelitis can not be ascribed to fortuitous coincidence.

(4) Experiments have demonstrated that monkeys inoculated with poliomyelitis occasionally develop an abortive form of the infection, characterized by rather mild and indefinite symptoms. Roemer and Joseph<sup>1</sup> have demonstrated in monkeys an immunity following such abortive attacks.

<sup>1</sup> Roemer, P., and Joseph, K., Münch. med. Wochenschr., 1910, vol. 57, pp. 520-522.



(5) Netter and Levaditi<sup>2</sup> have shown that the serum of a child recently recovered from an abortive attack was capable of neutralizing the virus of poliomyelitis. This property had been previously demonstrated in the serum of persons and monkeys who had recovered from frank attacks of poliomyelitis and had been shown to be absent from the serum of normal persons and monkeys. It may be taken as convincing evidence of infection with the virus of poliomyelitis.

It is therefore well established by clinical and experimental evidence that the infection of acute anterior poliomyelitis may cause slight illness without definite motor disturbances.

(b) *The recognition of abortive cases.*—Granting the occurrence of abortive cases, their recognition remains a difficult problem. In the absence of any specific diagnostic test it is necessary to recognize, by clinical observations alone, cases which do not present clear-cut clinical characteristics.

The symptoms vary greatly in kind and degree. There is usually some fever, often of very short duration, sometimes less than a day. Headache is one of the most constant features. Many cases exhibit an unusual degree of physical weakness and indisposition to exertion. Nausea and vomiting, associated with either diarrhea or constipation, are the most prominent symptoms in some cases. Restlessness and mental anxiety may be marked in older persons; irritability or drowsiness in children. Pain of some kind is a very common symptom. It may be a neuritic pain of the extremities, with hyperæsthesia, or it may be a myalgic pain of the neck and back. The most characteristic, though perhaps not the most common, pain is in the back of the neck, sometimes extending down the spine. Tenderness over the spine is, in some groups of cases, a common and characteristic symptom. Slight motor disturbances, such as slight paresis, ataxia, or diplopia, may be noted. If definite disturbance of motion can be made out, the case should be classed as frank rather than abortive poliomyelitis; but in children the only manifestation may be a rather indefinite clumsiness or indisposition to use the legs. Disturbance of the patellar reflex, either exaggeration, diminution, or abolition, is often noted. Convulsions or muscular twitchings may be observed in children.

Wickman distinguishes four clinical types of abortive cases:

- (1) With symptoms of general infection.
- (2) With gastroenteritis.
- (3) With pain and hyperæsthesia (like neuritic influenza).
- (4) With meningitic symptoms (severe occipital headache, pain and tenderness in neck and back, and rigidity of neck).

<sup>2</sup> Netter and Levaditi, *Compt. Rend. Soc. Biol.*, 1910, Vol. LXVIII, No. 18, pp. 855-857.

Cases of the same type quite commonly occur in groups. In one epidemic most of the abortive cases may be of the gastroenteric type, in another of the meningitic type. The meningitic and neuritic types are apparently the more common forms. This may, however, be due to the fact that these forms are more *distinctivè*, having less resemblance to the common epidemic diseases of summer, and are therefore more often recognized. There is, of course, no sharp line of differentiation between these several types of cases, which have been classified only according to the most prominent symptoms.

*Frequency of abortive cases.*—Wickman found among 1,025 cases of poliomyelitis studied in Sweden in 1905, 868 frank cases with paralysis, and 157 (= 15 per cent) abortive cases. He is of the opinion, however, that the proportion of abortive cases is greater than this. In Trästena, a small community where abortive as well as frank cases could be traced, he found 23 abortive cases (= 46 per cent) among a total of 49; in Atvidaberg, 11 abortive cases out of 31 (= 35 per cent), and in Smedjeback, 28 out of 50 (= 56 per cent).

Müller,<sup>1</sup> reporting an epidemic of 700 cases in the island of Nauru in January, 1910, states that many cases recovered without paralysis, and that many others had only slight paresis of two weeks or less duration. Only 50 cases had paralysis remaining after three months.

Anderson<sup>2</sup> observed in Polk County, Nebr., in the summer of 1909, 86 cases, of which 39 (= 44 per cent) had no definite paralysis.

The intensive study of 150 cases by the Massachusetts State Board of Health revealed 49 cases of illness, possibly abortive cases of poliomyelitis, occurring in the same houses with the 150 frank cases.

Mention has already been made of an epidemic which occurred in May, 1910, in a rural school district in Hancock County, Iowa, investigated later by the writer. Within a period of three weeks 30 cases of illness of the same general type occurred among 8 of the 12 families in attendance at this school. Five cases, resulting in typical, definite paralysis, were undoubtedly frank poliomyelitis. The remaining 25 may be considered in all probability abortive attacks of the same infection. The most common symptoms in this group were severe headache, pains in the limbs and back, stiffness of neck and spine, and gastrointestinal disturbances (nausea and constipation).

The proportion of abortive cases reported in various epidemics varies greatly, as is to be expected from the different circumstances under which the epidemics have been studied. In practically every epidemic studied in the light of Wickman's observations some abortive cases have been noted, and it may be stated pretty generally that the closer the observation the greater has been the proportion of abortive cases. From a review of the literature and from personal

<sup>1</sup> Müller, A., Arch. f. Schiffs u. Tropen. Hyg., 1910, vol. 14, No. 17.

<sup>2</sup> Anderson, C. A., Pediatrics, 1910, vol. 22, pp. 543-558.

observations in several localities where poliomyelitis was epidemic I am of the opinion that abortive cases are probably as numerous, and very possibly more numerous, than frank cases.

#### DIAGNOSIS.

Except in rare cases the diagnosis offers no difficulties after the onset of paralysis. The sudden onset of flaccid paralysis of one or more extremities, without loss of sensation, during or immediately following an acute febrile disturbance, is sufficiently characteristic. The rapid regression of paralysis of some of the parts, the reaction of degeneration, and atrophy of those muscles which remain paralyzed, complete the diagnosis. Even when the paralysis is transitory the diagnosis should offer no great difficulty if a satisfactory history can be obtained. Those cases in which cranial-nerve paralysis occurs without spinal paralysis have doubtless been frequently overlooked or wrongly diagnosed, and require more care in excluding local causes. The diagnosis in cases where the paralysis is of the cerebral, hemiplegic type will be very doubtful unless the early symptoms are quite typical and examinations of cerebro-spinal fluid and blood are made, or unless the association with undoubted cases of poliomyelitis has been striking. The combination of a flaccid paralysis with spastic, hemiplegic, paralysis would make the diagnosis of the cerebral type quite probable. While it is the general rule that the tendon reflexes are diminished or abolished in paralyzed extremities, the finding of persistent exaggerated reflexes does not exclude the diagnosis of poliomyelitis.

It is important to make the diagnosis, wherever possible, before the onset of paralysis, as well as in cases where no paralysis develops. This is obviously of great importance for the success of prophylactic measures. There is no evidence at present that failure to make an early correct diagnosis prejudices the patient's chance of recovery, but in the event that any effective specific treatment should be developed it will be necessary to employ it early. Before the use of a specific remedy it would be advisable to confirm the diagnosis by examinations of cerebrospinal fluid and blood, but the physician must at least suspect poliomyelitis from clinical evidence.

An acute febrile illness, with sudden onset, probably gastrointestinal disturbances, and symptoms of a mild meningitic inflammation, or other nervous symptoms, such as hyperesthesia, pains in the limbs, exaggerated or abolished tendon reflexes, ataxia, tremor, etc., warrants the suspicion of poliomyelitis. The diagnosis in such cases may be reasonably certain if the disease is known to be prevalent in the community. In the vicinity of Mason City, Iowa, the local physicians found it possible to make a fairly definite diagnosis prior to the development of paralysis in a considerable proportion of cases, prob-

ably 50 per cent. In other localities the proportion of cases showing distinctive initial symptoms may be smaller. There is always a certain proportion of cases in which the symptoms prior to paralysis are so slight or so indefinite as to arouse no suspicion of poliomyelitis, even in the presence of an epidemic.

The diseases with which poliomyelitis is most likely to be confounded are influenza, multiple neuritis, muscular rheumatism, acute articular rheumatism, gastroenteritis, and cerebrospinal meningitis. Certain forms of influenza may cause any or all of the symptoms seen in the early stage of poliomyelitis. Important considerations in the differential diagnosis are the frequency of catarrhal conditions of the respiratory tract in influenza and their rarity in poliomyelitis; the common occurrence of ear troubles in influenza; the greater prevalence of influenza in the winter months and of poliomyelitis in the summer months.

As already stated, the polyneuritic type of poliomyelitis gives at first a clinical picture identical with that of acute neuritis, from which it can be distinguished only by the subsequent developments. The swelling of the joints in acute articular rheumatism and the usual absence of severe constitutional symptoms in myalgia readily differentiate these diseases. Occasionally there is in acute anterior poliomyelitis tenderness and swelling of the joints, making the differentiation from acute articular rheumatism exceedingly difficult. Cerebrospinal meningitis can, in the great majority of cases, be excluded without lumbar puncture. Quantitative and differential leucocyte counts may be of aid, for in cerebrospinal meningitis the leucocyte count is high and the polymorphonuclear leucocytes relatively increased, while in poliomyelitis there is more apt to be a leucopenia with relative increase in lymphocytes. In cases of the severe meningitic type, however, lumbar puncture is the only certain means of diagnosis.

#### TREATMENT.

No specific treatment has been developed.

The treatment in the acute stage must therefore be symptomatic, directed along the same general lines as in other acute infectious diseases.

*Rest* is important, and even in very mild cases should be enforced for a while after the subsidence of acute symptoms.

Moderate purgation is recommended, and, if necessary, enemata. Diuresis should be promoted by the free administration of water, or by saline enemata, in cases requiring them. Hot packs are useful to promote diaphoresis and to relieve the restlessness and the pains.

The diet during the acute stage should be liquid, easily digestible, and nutritious.

The administration of urotropin (hexamethylene-tetramine) is advised on the ground that formalin is excreted into the cerebrospinal fluid. While there is no proof as yet that this drug has any effect in modifying the course of the disease, its use is free from any valid objection and is quite generally recommended.

Except when absolutely necessary to allay severe pain, drugs which have for their purpose the relief of nervous symptoms should be avoided, especially the antipyretics and analgesics. Morphine or codeine may be given when necessary to allay pain.

When symptoms of pressure are present a lumbar puncture may be made, with the hope of relieving the condition. This should be done, however, with the strictest aseptic precautions, should not be undertaken by the inexperienced, and is not advised as an indiscriminate therapeutic measure.

The effect of any treatment in the acute stage is extremely difficult to ascertain. Quite independently of any treatment, cases which have severe early symptoms may recover in a few days with no paralysis at all, while other cases, with less severe initial symptoms, may result in extensive paralysis or death. The proportion of abortive and paralytic cases also varies greatly. In some epidemics half of the cases have been of the abortive type. It is therefore evident that even the complete recovery of a large proportion of apparently severe cases does not indicate that there was any specific virtue in the treatment which they received.

It is, however, reasonable to suppose that intelligent treatment along the lines indicated above will aid the patient in combating the infection, and will have some effect, however slight, in modifying the course of the disease.

The objects of treatment after the subsidence of the acute stage are to promote the comfort and general nutrition of the patient, prevent contractures and deformities of paralyzed parts, and to maintain the nutrition of paralyzed muscles. The general health of the patient is usually good, and intelligent supervision of diet, ventilation, etc., is all that is necessary to maintain it. Tonics may be given, but the administration of strychnine in doses larger than are usually given in tonics, with the idea of its exerting a specific restorative action upon the spinal motor centers is to be avoided.

For a considerable time after the onset of paralysis there is often pain in the paralyzed parts, due to sensitiveness of the nerve trunks. Motion may be very painful, and the limbs often become quite rigidly flexed. Hot baths, with gentle exercise, will do much toward relieving this pain and preventing or lessening contractures. Massage and electricity are contraindicated while pain and tenderness persist. Deformities must be prevented by suitable mechanical appliances, designed to keep the limbs in proper anatomic position.

For the treatment of the residual paralysis, after the subsidence of all acute symptoms, the reader is referred to articles cited in the appended bibliography and to the standard textbooks on orthopedic surgery.

#### PROPHYLAXIS.

While there are differences of opinion as to the contagiousness of epidemic poliomyelitis, its probability has been sufficiently demonstrated to render preventive measures imperative.

The patient should be isolated as completely as possible in a clean, bare room, well screened to keep out insects. The members of the family, other than the necessary attendant, should not be allowed to come into contact with the patient. All discharges, including sputum, nasal secretions, urine, and feces, as well as all articles (linen, eating and drinking utensils, etc.) which may be soiled by such discharges, should be thoroughly disinfected before they leave the sick room. The nurse and physician should observe the same precautions regarding their hands and clothing as in attending a case of scarlet fever.

The rest of the family should, so far as possible, be kept out of contact with the neighbors, at least to the extent of excluding the rest of the family from school and prohibiting all unnecessary visiting. The period during which isolation should be maintained is as yet indeterminate. Three weeks would seem to be a reasonable minimum for exclusion from school; but in some cases it may prove more practicable to fumigate the premises earlier than this.

Since the virus can be killed experimentally by a 1 per cent solution of peroxide of hydrogen, an antiseptic gargle of this solution is recommended to be used by the patient and other members of the family. The mentholated powder above mentioned (page 12) might perhaps be substituted for or used in conjunction with this solution.

As soon as practicable after the recovery of the patient the house should be fumigated with formaldehyd. If vermin are present, it would be advisable to use sulphur instead of formaldehyd.

In the presence of an epidemic it would be advisable to keep down the dust by sprinkling streets and yards. This is recommended because dry-weather conditions have seemed generally more favorable to the spread of epidemic poliomyelitis and because in several instances the abatement of dust has been followed by the cessation of an epidemic. It would also be advisable during an epidemic to keep children off the streets and away from public gatherings, to prohibit their using public drinking cups, to pay careful attention to their diet, to prevent gastrointestinal disorders, and to protect them from overheating and overexertion, which might lower vital resistance.

It is beyond the scope of this paper to enter into a discussion of State and municipal preventive measures. There is, however, practically unanimous agreement on the following points:

- (1) That the disease should be required to be reported to the health authorities.
- (2) That patients should be isolated.
- (3) That members of their family should be excluded from schools for at least three weeks.

The degree of effectiveness of prophylactic measures is very problematic. A very apparent obstacle is the difficulty of recognizing cases early before the onset of paralysis and the difficulty, perhaps impossibility, of recognizing abortive forms.

#### PROGNOSIS.

The mortality from epidemic poliomyelitis varies greatly in different epidemics, as shown by the following figures, collected from several sources. Only cases showing *paralysis* are included in these figures.

Reported by—	Place.	Year.	Total cases.	Deaths.	Percentage mortality.
Caverly.....	Connecticut.....	1894	126	18	14
Wickman.....	Sweden (general).....	1905	868	145	16.7
Do.....	Trastena, Sweden.....	1905	26	11	42.3
Do.....	Atudaberg, Sweden.....	1905	41	4	10
Do.....	Smedjeback, Sweden.....	1906	22	5	22.7
Committee of Investigation.....	New York.....	1907	1 2,000	1 100	1 5
Hill.....	Minnesota.....	1909	283	68	24
Lovett.....	Massachusetts.....	1909	628	51	8

<sup>1</sup> Estimated.

The mortality also shows variations according to the age of the persons affected; Wickman gives the mortality at different ages in 842 cases as follows: 0–11 years, 592 cases, 71 deaths, =12.2 per cent; 12–32 years, 250 cases, 69 deaths, =27.9 per cent.

The Massachusetts State Board of Health found the mortality in 628 cases, in 1909, to be as follows: Less than 1 year, 16 per cent; 1–10 years, 4 per cent; over 10 years, 20 per cent.

These figures agree in showing that the disease is relatively more fatal in older persons than in young children.

According to Wickman's statistics, death occurs most frequently within the first week of illness. Paralysis of respiration is the most frequent cause of death. Broncho-pneumonia, secondary to partial respiratory paralysis, may result fatally. The severity of the early symptoms bears no constant relation to the extent of supervening paralysis. Extensive paralysis, progressing after the first 24 hours, is usually a serious prognostic sign.

The chance of complete recovery—restoration of paralyzed parts to their normal function—is greater than has been commonly supposed. In Massachusetts in 1909, 62 of the 628 paralyzed cases (=10 per cent) were reported as recovered within a year. Out of 150 cases closely studied, 25 (=16.7 per cent) were found completely recovered after 3 days to 12 weeks. The extent of paralysis in these cases is given as follows: One thigh and leg, 4; both thighs and legs, 8; both thighs, 1; one leg, 2; one arm, 1; one leg, arm, and back, 1; one leg and back, 1; one thigh, leg, arm, and forearm, 1; one arm, forearm, and cervical region, 1; cervical region, 4; indefinite staggering gait, 1. It is shown by the above that some of these cases had been quite extensively paralyzed.

Complete recovery was recorded in 40 out of 754 cases (=5.3 per cent) investigated in the New York epidemic of 1907; and “almost complete disappearance of paralysis” in 13 (=1.8 per cent), giving a total of 53 cases (=7.1 per cent) making a practically complete recovery.

Hill<sup>1</sup> states that 15 per cent of 283 cases occurring in Minnesota during 1909 completely recovered within a year. Since 24 per cent of these 283 cases died, the 15 per cent of recoveries is equivalent to 19.2 per cent of recoveries among those who survived.

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NOTE.—Since this paper went to press, Osgood and Lucas (*Journ. Am. Med. Assn.*, Feb. 18, 1911, vol. 56, p. 495) have reported experiments demonstrating that the nasal mucous membrane of two monkeys, experimentally inoculated with poliomyelitis, remained infectious for six weeks and five and one-half months, respectively. This very important observation strengthens the suspicion of the existence of human “carriers,” who may play an important part in the epidemiology of poliomyelitis. It raises still further doubts as to the efficiency of prophylactic measures directed only to persons in the acute stage.

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<sup>1</sup> Hill, H. W.: *Epidemiological Study of Anterior Poliomyelitis in Minnesota*. *Trans. Section on Preventive Medicine, Amer. Med. Assn.*, 1910.





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## LIST OF PUBLIC HEALTH BULLETINS.

The following is a list of the Public Health Bulletins that have been issued :

- \*1. Report on Trichinæ and Trichinosis. By W. C. W. Glazier. 1881. 212 pages. 87 il. 1 map. Paper. Senate Executive Document No. 9, Forty-sixth Congress, third session. Out of print.
- \*2. Report on the Etiology and Prevention of Yellow Fever. By George M. Sternberg. 1890. 271 pages. 21 pl. 20 il. Cloth. Out of print.
3. Mortality Statistics in the United States for the year ending December 31, 1897. From Annual Report Marine-Hospital Service, 1898. 24 pages. Paper.
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  4. Rat Leprosy. By W. R. Brinckerhoff.
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31. **Transactions of the Seventh Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service.** June, 1909. 86 pages. Cloth.
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- VIII. A Palliative Treatment for Leprous Rhinitis. By J. T. Wayson and A. C. Reinecke.
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- IX. Mosquitoes in Relation to the Transmission of Leprosy.
- X. Flies in Relation to the Transmission of Leprosy. By D. H. Currie.
- XI. Heredity Versus Environment in Leprosy. By H. T. Hollmann.
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41. Studies upon Leprosy. November, 1910. 36 pages. Paper.  
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OHIO STATE UNIVERSITY.

TREASURY DEPARTMENT

Public Health and Marine-Hospital Service of the United States

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PUBLIC HEALTH BULLETIN No. 45

JULY, 1911

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A DIGEST OF THE LAWS AND REGULATIONS OF  
THE VARIOUS STATES RELATING TO THE  
REPORTING OF CASES OF SICKNESS

BY

JOHN W. TRASK

*Assistant Surgeon General*

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PREPARED BY DIRECTION OF THE SURGEON GENERAL



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WASHINGTON  
GOVERNMENT PRINTING OFFICE

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# A DIGEST OF THE LAWS AND REGULATIONS OF THE VARIOUS STATES RELATING TO THE REPORTING OF CASES OF SICKNESS.

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By JOHN W. TRASK,  
*Assistant Surgeon General.*

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Reports of sickness are a necessity in public health work. Even a casual consideration of the subject will show that they are the foundation upon which public health work depends for its success. Accepting the function of the health officer as being the prevention of disease, a knowledge of the prevalence and geographic distribution of the preventable diseases within his jurisdiction is essential to his work. This knowledge is possible only in so far as cases of sickness are reported.

As our knowledge of pathology and epidemiology increases, additions are being constantly made to the diseases classed as preventable. It has long been recognized that certain of the more common contagious diseases, such as smallpox, scarlet fever, diphtheria, and measles should be reported, that proper restraint, isolation, or other indicated measures may be enforced for the protection of the community, or the public warned of possible danger. A community which has no means of knowing with what contagious diseases it is afflicted nor how many cases there are, nor where they are, is helpless to protect itself, and unnecessary sickness and deaths will result. Generally speaking, every case of an infectious disease is a focus from which other cases may directly or indirectly arise unless measures are taken to prevent them. Every typhoid-fever patient has potential possibilities for harm through the contamination of water and food supplies, which may be so far-reaching that it is but proper that cognizance be taken of each case. The same is true of tuberculosis, with the exception that its manner of spread is somewhat different. The majority of cases of this disease receive their infection from some existing human case. The disease is more or less chronic in character and the patient usually continues as a focus from which infection may be spread for months and sometimes years. If tuberculosis, which has so sorely affected mankind, is to be made a constantly diminishing factor as a cause of unnecessary sickness and premature death,



the location and activities of those affected must be known that they may be properly instructed how to conduct themselves that others may not be unduly endangered, that they may learn the ethical code to which the tuberculous should conform, and that its observance may be made as effective and easy as present knowledge can make it. Yellow fever is a disease of quite another type, spread in an entirely different way, but the importance of having each case reported at the earliest possible time has made a profound impression, and deservedly so, upon those living in infectible territory. And yet the ravages of this disease by sickness and death, while more striking perhaps, are no greater than those of some other diseases which are more constantly present and which very probably might be as effectively curtailed if as strenuously combated.

The above-named diseases serve as a few commonplace examples to illustrate the fundamental need for the reporting of the preventable diseases. The general statement may be made, it is believed, that in order to prevent the undue spread of the infectious diseases of man it is necessary that existing cases be reported to some authority with power and facilities to take such measures as are necessary to prevent the spread of the infection to others; also that the reporting of cases is the only generally reliable means a community has of knowing when unusual disease conditions or epidemics exist, and when, therefore, greater effort must be made for protection. The reporting of all cases of certain diseases occurring on water sheds is necessary for the proper protection of water supplies. The reporting of all cases of sickness possible of spread through milk when they occur at places where milk is produced, handled, or distributed, is essential to prevent epidemics of milk-borne disease.

Whenever it is desired to make a careful study of the cause of an epidemic, or of an unusual prevalence of a disease, the first step is to study the known cases to find the factors which have been operative in spreading the infection. Better results would undoubtedly be attained if, instead of unusual conditions being necessary as an incentive to epidemiological studies, every health authority had the means for constantly studying the movements of disease within his jurisdiction, the exacerbation and decline of sickness, the factors operative in the causation of disease, the best methods of prevention, and the times when special effort is necessary or most effective.

#### COLLECTION OF REPORTS.

The regulation of the reporting of sickness comes within the police powers of the individual States. As the sanitary condition of a State affects not only the inhabitants of the State itself, but, because of interstate commercial relations made easy by good roads and rapid transit, affects neighboring States, and even those more remote,

it would seem that it might reasonably be considered as having become the duty as well as the privilege of the individual States to meet the responsibility to such a degree at least as will guarantee a reasonable protection to other States. The minimum which would appear to serve this purpose would be that each State take measures to keep itself informed as to the prevalence and geographic distribution of the communicable diseases within its territory and make this information available at frequent intervals to those interested.

A State board or department of health, to be responsible for the local enforcement of State laws, must be represented locally by officials over which it has not only nominal but some actual supervision. This end has been accomplished in various ways. Some States (Massachusetts and Pennsylvania) have divided the State into health districts and placed a State representative in each. In Pennsylvania the county has practically been made the district. In Florida agents of the State board are employed in most of the counties. This gives the State board or department a representative, to a certain extent local in character. In Pennsylvania the actual local authority of the State has been carried still further, and all townships in which no township board of health has been organized are placed under employees of the State department of health, who act as local health officers. The State law requires incorporated municipalities and townships having a certain density of population (300 to the square mile) to organize local boards of health. All townships not so supplied, which in a way represent the strictly rural territory, are under the direct and immediate control of the State department of health.

In certain of the States a partial control over local boards has been obtained by the State authorities appointing a majority of the members of each local board. In Virginia the State board appoints three of the four members of each county and city board of health, and one of the three so appointed becomes the local health officer. In South Dakota the State board appoints two of the three members of each county board of health, but takes no part in the appointment of city boards. In West Virginia the State board appoints three of the five members of each county and city board of health; the three so appointed are nominated, however, by the county court in the case of counties and the council in cities. In Oklahoma the State commissioner of health appoints a county superintendent of health for each county. In Vermont the State board appoints a health officer for each town (township). In Wyoming the State board appoints the county health officers.

The health officer's knowledge of the prevalence or course of disease depends mainly upon reports made by physicians, the part played by the practicing physician being the most important factor

in securing reports of sickness. Physicians have not always been prompt in doing their part. It would seem, however, that if they are to avoid the unjust criticism of not being interested in prophylaxis, they must espouse the cause of preventive medicine and become, by virtue of their humanitarian calling, *ex officio* assistants of the health authorities. This idea appears to have been instrumental in shaping certain of the State laws. In Alabama the Medical Association of the State of Alabama constitutes the State board of health, and elects the State health officer. The county medical society constitutes a board of health for the county, and elects the county health officer and health officers for each incorporated municipality. In Mississippi the State medical association and all medical societies in affiliation with it constitute the State department of health, and any licensed practitioner of medicine may have his name enrolled as a member of the department. In North Carolina all registered physicians in each county constitute an auxiliary board of health for the county, the function of this board being to advise the county authorities on sanitary matters. In South Carolina the State board of health consists of the South Carolina Medical Association together with certain of the State officials.

Aside, however, from a consideration of the subject on a professional ethical basis, most physicians, because of their position as citizens, would without doubt desire to conform to the law once it had occurred to them that failure to do so placed them outside the class of law-abiding citizens. It would seem that where the State issues licenses, permitting the practice of medicine, one of the most reasonable penalties which it might be expected to impose upon physicians who did not comply with the laws, would be the suspension or revocation of the license. It is believed that a considerable percentage of those who do not now feel under moral obligation to carefully and accurately report all cases required by law would do so if it were made plain that the license was granted on condition that the recipient agreed to familiarize himself with State laws relating to the public health and to obey them, and that the license would be considered valid only so long as these conditions were fulfilled.

This has been enacted into law in Utah, where it is required that whenever any licensed practitioner of medicine is guilty of willful violation of the law in regard to the reporting of infectious diseases or the registration of births and deaths his license shall be revoked or canceled. (Utah Compiled Laws, 1907, sec. 1735-36 as amended by Acts of 1911, ch. 93.)

The question naturally arises as to which diseases should be made notifiable. Opinion in the past seems to have differed considerably. The number required to be reported varies from 33 in Pennsylvania to none at all in four States. There would seem to be decided

advantages in making notifiable all preventable diseases, and that these might be considered to include infectious diseases, certain parasitic diseases, occupation diseases, and certain diseases due to damaged or improper food.

The greatest need of reports of sickness, and their most important use, are for the immediate information of the health officer, that he may take such measures as are known to medical science to protect the family of the patient and the community from further and unnecessary infection or additional injury, or at least instruct them as to how this can be done. However, reports of sickness when compiled and classified become morbidity statistics which show the movement of disease, the progression, extension, recession, and periodicity of epidemics, and the effects upon disease of preventive measures and sanitary improvements.

The reporting of sickness is the foundation upon which the study of epidemiology necessarily rests, a study which will without doubt add much to existing knowledge of disease.

#### STATE LAWS AND REGULATIONS.

The laws and regulations of the various States relating to the reporting of sickness, and to the health authorities to and through whom the reports of cases are made, briefly abstracted and analyzed in tabular form, will be found on succeeding pages. It is desired to emphasize that these represent the requirements of State statutes and of regulations promulgated in accordance with the statutes, and are not to be understood as showing in all cases the work that is done, owing to the impossibility of enforcement of the provisions under existing conditions in some of the States. For some purposes it would have been better to have shown the measures being enforced and the extent of their enforcement, but for reasons which will be readily understood this was impossible.

There is considerable variation in the different States as to the authority to whom reports are made. The simplest and least common is where the physician makes the report direct to the State board or department of health. The most common is for the physician to report to the city health authority, if in a city, and to the township or county authority if outside of cities, and for the city and township or county authorities to report to the State department or board. In some States a third step is inserted and the local authorities report to the county health officer who in turn reports to the State. Various modifications of these schemes are also used, as will be seen by consulting the tables. The effort seems to have been made in most cases to have the physician report to the authority who would be benefited by the information and would take whatever action was necessary or possible.

The time when reports are to be made also varies. It is usually required that the physician make an immediate report; in some cases it is specified to be made within 12 or 24 hours, in others weekly, and in still others at the end of the month. Also varying requirements are made as to when the city, township, and county authorities shall report to the State. In some States these reports are made daily, in some weekly, in others semimonthly or monthly, in a few quarterly, annually, or not at all; in one or two weekly and also for the fraction of a week at the end of the month.

The variation in the laws and regulations of the States as to the manner and time of reporting, and the authorities to whom the reports are made, is such that the only method of satisfactorily showing the details seemed to be a tabular statement where the scheme adopted in each State could be shown. (See pp. 74 to 97, inclusive.)

The features peculiar to the various State laws have been noted by themselves as being of possible interest, and will be found on pages 66 to 68, inclusive.

A table showing the diseases required to be reported in each State will be found on pages 69 to 73.

#### ACKNOWLEDGMENT.

A copy of the proof of this publication was sent to the State health officer or secretary of the State board of health of each of the several States for criticism, and the indication of errors or omissions which might be noted. Replies containing helpful suggestions and in many instances corrections and additions were received from practically all. Many also went to great pains to forward copies of regulations and recently enacted laws.

It is a pleasure to acknowledge the assistance and cooperation of those who thus made possible a work which it is trusted will be found useful in making the various State requirements for the reporting of sickness easily accessible.

**ABSTRACTS OF THE STATE AND TERRITORIAL LAWS AND REGULATIONS RELATING TO THE REPORTING OF SICKNESS AND THE HEALTH AUTHORITIES TO AND THROUGH WHOM CASES ARE REPORTED.**

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ALABAMA.

HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The Medical Association of the State of Alabama is the State board of health, and elects an executive officer, known as the State health officer. (Political Code of 1907, ch. 22, Art. I.)

*Counties.*—The county medical societies in affiliation with the Medical Association of the State of Alabama are boards of health for their respective counties, and for all incorporated towns and cities therein, and are under the general supervision of the State board of health. The county board of health is the only local board of health. Others are prohibited. The county board elects a county health officer, and a health officer for every incorporated city and town in the county. (Ibid.)

MORBIDITY REPORTS.

*Notifiable diseases.*—Leprosy, cholera, typhus fever, cerebro-spinal meningitis, yellow fever, scarlet fever, plague, hydrophobia, glanders, smallpox, diphtheria, pulmonary tuberculosis, typhoid fever, chagres fever, beriberi. (Ibid., sec. 716.)

*Physicians, etc.*—Physicians are required to report cases of the above-named diseases occurring in their practice to the local health officer. (Ibid., sec. 714.) Midwives and other persons are to report in like manner suspected cases. (Ibid., sec. 715.)

*Municipal health officers.*—Municipal health officers are required to keep a "Register of infectious diseases," in which are recorded the name, age, sex, color, race, occupation, and residence of persons attacked by the above-named diseases. The presence of any of these diseases is to be reported promptly to the committee of public health of the county board of health and to the State health officer. (Ibid., sec. 710.)

*County health officers.*—County health officers also keep a "Register of infectious diseases," in which are recorded cases reported to them. They are required to report to the State health officer the presence of any of the reportable diseases in their respective counties. (Ibid., sec. 706.)

## ARIZONA.

## HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*Territory.*—The governor appoints a superintendent of public health, who, together with the governor and the attorney general, constitutes the Territorial board of health. (Acts of 1903, ch. 65.)

*Counties.*—The board of supervisors of the county appoints a superintendent of public health, who, with the chairman of the board of supervisors and the district attorney of the county, constitutes a county board of health, having jurisdiction outside of cities possessing a board of health. (Ibid.)

*Cities.*—The mayor of each city appoints two members of the city council, who, together with the city engineer and the health officer, constitute the city board of health. (Ibid.)

## MORBIDITY REPORTS.

*Physicians, etc.*—Physicians and other persons are required to report immediately to the local board of health all cases of contagious, epidemic, or infectious diseases coming to their knowledge. (Acts of 1903, ch. 65, sec. 24.)

Keepers of private houses, boarding houses, lodging houses, inns, or hotels are required to report within 24 hours to the local board of health cases of contagious, infectious, or epidemic disease which may occur in their houses, inns, or hotels. (Ibid., sec. 26.)

*Local boards of health.*—It is the duty of the local boards of health whenever it comes to their knowledge that a case of smallpox, scarlet fever, diphtheria, or other infectious or contagious disease exists within their jurisdiction, to report immediately to the Territorial board of health the existence and nature of such disease. (Ibid., sec. 31.)

The county superintendent of health is to report immediately to the Territorial superintendent of health whenever any case of contagious or infectious disease occurs in his county. (Ibid., sec. 7.)

## ARKANSAS.

## HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The State board of health consists of six commissioners of health appointed by the governor. The majority of the board consists of physicians. (Digest of Statutes, 1904, Kirby, sec. 534.) The board elects from its personnel or otherwise a person to be secretary and executive officer. (Ibid., sec. 536.)

*Counties.*—The several county judges may appoint county boards of health for their respective counties, these boards to be composed of three physicians. (Ibid., sec. 546.)

*Cities.*—In cities of the first (population over 5,000) and second (population between 2,500 and 5,000) classes the city council has the power to establish a board of health with jurisdiction extending 1 mile beyond the city limits, and for quarantine purposes, in case of epidemic, 5 miles. (Ibid., sec. 5525.)

## MORBIDITY REPORTS.

The law states that it shall be the duty of the State board of health to have general supervision of the State system of the registration of prevalent diseases, and that the board shall prepare the necessary methods and forms for obtaining and preserving such records and to insure the faithful registration of the same in the several counties. The secretary of the State board of health is the superintendent of registration of vital statistics of the State. (Ibid., sec. 540.)

## CALIFORNIA.

## HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—There is a board of health consisting of seven physicians appointed by the governor. (Political Code, 1909, Deering, sec. 2978.)

*Counties.*—The boards of supervisors in their respective counties appoint a health officer whose duty it is to enforce the orders of the board of supervisors and the State board of health. When public necessity requires, the board of supervisors may appoint a special health officer for any unincorporated town. (Ibid., sec. 4225.)

*San Francisco:* The board of health consists of the mayor of the city and county, and four physicians appointed by the governor. This board elects a health officer. (Ibid., secs. 3005, 3007.)

*Sacramento:* The board of trustees has established by ordinance a board of health, consisting of five physicians. (Ibid., sec. 3042.)

*Cities of the first class:* Cities having over 200,000 inhabitants are termed cities of the first class. Those having between 100,000 and 200,000 are cities of the first and a half class. These cities are entitled the city of ———, or the city and county of ———, as the case may be, and are required to have a board of health consisting of the mayor of the city, or the city and county, and five physicians appointed by the governor. (General Laws, California, 1910, Bender-Moss Co., Act No. 2348, sec. 165.)

*Cities and towns:* It is the duty of the board of trustees, council, or other corresponding board, of every incorporated town and city, to establish by ordinance a board of health for the town or city, consisting of five persons, one at least of whom shall be a physician, and one, if practicable, a civil engineer. (Political Code, 1909, Deering, sec. 3061.)

The board of supervisors for each county must appoint in each unincorporated city and town having 500 or more inhabitants, a health officer. (Ibid., sec. 3062.) The county board of supervisors may appoint a special health officer for unincorporated towns when public necessity requires. (Ibid., sec. 4225.)

## MORBIDITY REPORTS.

*Notifiable diseases.*—Cholera, plague, yellow fever, leprosy, diphtheria, scarlet fever, smallpox, typhus fever, typhoid fever, anthrax, glanders, epidemic cerebro-spinal meningitis, tuberculosis, pneumonia, dysentery, erysipelas, uncinariasis (or hookworm), trachoma, dengue, tetanus, measles, German measles, chickenpox, whooping cough, mumps, pellagra, beriberi, syphilis, gonococcus infection,



rabies, poliomyelitis. (Ibid., sec. 2979a, as amended by sec. 1, ch. 250, Laws 1911.)

*Physicians.*—It is the duty of every attending or consulting physician, nurse or other person having charge of or caring for any person afflicted with any of the above-named diseases to report at once in writing to the local board of health or health officer the nature of the disease and name and residence of patient excepting that syphilis and gonococcus infection are to be reported by office number only. (Ibid.)

The public-health law of 1907 requires that physicians, nurses, clergymen, attendants, owners, proprietors, managers, employees, and persons living in or visiting any sick person in any hotel, lodging house, house, building, office, structure or other place where any person is ill of any infectious, contagious, or communicable disease, promptly report such fact to the city, city and county, or other local health board or health officer, giving the name of the person, if known, the place where such person is confined, and the nature of the disease. (Acts of 1907, ch. 492, sec. 16.)

Medical practitioners attending or called in to visit a patient, whom he believes to be suffering from poisoning by lead, phosphorus, arsenic, or mercury, or their compounds, or from anthrax, or from compressed-air illness, contracted as a result of the nature of the patient's employment, are required to send to the State board of health a notice stating the name, address, and place of employment of the patient and name of the disease, and for this report the practitioner is entitled to a fee of 50 cents. (The State board of health is to transmit the data thus obtained to the State commissioner of the bureau of labor statistics.) (Acts of 1911, ch. 485, secs. 1 and 3.)

*Local health authorities.*—It is the duty of every coroner, local health officer, and every member of the local boards of health, to report at once in writing cases of the above-named diseases and of any other contagious or infectious disease to the secretary of the State board of health. (Political Code, sec. 2979a, as amended by sec. 1, ch. 250, Acts of 1911.)

Every county health officer, and every city and county, city or town board of health, or chief executive health officer, is to report in writing to the State board of health on or before the 5th day of each month, and also whenever requested by the State board of health or its secretary all infectious, contagious, and communicable diseases in man or beast which come to his knowledge, the report to be made on blanks furnished by the State board of health. (Acts of 1907, ch. 492, sec. 11.)

Local boards of health or health officers are to report immediately by telegraph to the secretary of the State board of health every case of plague, Asiatic cholera, yellow fever, or typhus fever, and after investigation and within 24 hours are to further report the cause, source, and extent of the infection and the measures adopted in each case. (Acts of 1907, sec. 13, ch. 492, as amended by sec. 3, ch. 339, Acts of 1911.)

In addition to the diseases previously enumerated, cases of malaria are to be promptly reported to the State board of health. (Ibid.)

## COLORADO.

## HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The law provides for a State board of health of nine members, appointed by the governor. (Rev. Stat., 1908, ch. 115, sec. 5009.)

*Counties.*—The board of county commissioners of each county constitutes a board of health for the county with jurisdiction outside of cities, towns, and villages. The board appoints a health officer. (Ibid., sec. 5030.)

*Incorporated cities and towns.*—The mayor and council or trustees of each incorporated city and town constitute a board of health for the city or town. The board appoints a health officer. (Ibid., secs. 5031, 5032.)

## MORBIDITY REPORTS.

*Householders.*—Whenever a householder knows that a person within his family is ill with smallpox or any other disease dangerous to the public health, he is required to report the case to the local (city or county) health officer immediately. (Ibid., sec. 5070.)

*Physicians.*—Physicians must report immediately to the local board of health all cases of smallpox, cholera, diphtheria, scarlet fever, or other disease dangerous to the public health occurring in their practice. They must also report the case to the householder, hotel keeper, keeper of a boarding house or tenant within whose house or rooms the sick person happens to be. The notice to the board of health must state the name of the disease, the age and sex of the person sick, the address of the patient, and the name of the physician giving the notice. (Ibid., sec. 5072.)

*Local boards of health.*—City and county health officers are required by law to keep the secretary of the State board of health constantly informed respecting every outbreak of a disease dangerous to the public health. (Ibid., sec. 5073.)

## CONNECTICUT.

## HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The law provides for a State board of health of seven members, six appointed by the governor, of whom three must be physicians, and one a lawyer, and a secretary chosen by the six so appointed. (General Statutes, 1902, sec. 2502.)

*Counties.*—The judges of the superior court appoint an attorney at law to be health officer for each county. (Ibid., sec. 2517.)

*Towns (townships).*—The county health officer appoints a person learned in medical and sanitary science to be health officer for each town, except in towns containing a city or borough whose limits are coterminous with the town limits. In towns containing a city or borough, whose limits are not coterminous with those of the town, the town health officer has jurisdiction in the town only outside of the limits of the contained city or borough. (Ibid., sec. 2521.)

*Cities and boroughs.*—The mayor of every city, and the warden of every borough is required to appoint a person learned in medical and sanitary science to be health officer for the city or borough, unless the charter of the city or borough makes other provision for the appointment of a health officer. (Public Acts, 1905, ch. 15.)

## MORBIDITY REPORTS.

*Physicians.*—Physicians are required to report in writing every case of cholera, yellow fever, typhus fever, leprosy, smallpox, diphtheria, membranous croup, typhoid fever, scarlet fever, or of other contagious or infectious disease, except those of a venereal nature, occurring in their practice, to the health officer of the town, city, or borough in which the case occurs, within 12 hours after the nature of the disease has been recognized. (Connecticut General Statutes, 1902, title 15, ch. 150, sec. 2534.) Physicians are required to report in writing the name, age, sex, color, occupation, place where last employed, and address of all cases of tuberculosis in their practice to the health officer of the city, town, or borough within 24 hours. (Public Acts, 1909, ch. 79, sec. 1.)

The secretary of the State board of health states that, in addition to the State laws and regulations, uniform sanitary regulations have been adopted by all the towns (townships) in the State which require that physicians shall report in writing to the town health officer within 12 hours every case of cerebro-spinal fever, whooping cough, and measles, in addition to the diseases above named, and that when no physician is in attendance householders are to report cases occurring in their houses.

*Hotel and lodging house keepers.*—Hotel and lodging house keepers are required to report to the local board of health within 12 hours cases of malignant or contagious disease occurring in their houses. (General Statutes, 1902, sec. 2546.)

*Midwives, nurses, etc.*—The midwife, nurse, or attendant having charge of an infant under two weeks of age is to report in writing within six hours to the local health officer whenever the infant's eyes become reddened, inflamed, or swollen. (Ibid., sec. 2535.)

*Institutions.*—Officers in charge of hospitals, dispensaries, asylums, and other similar institutions, are required to report cases of tuberculosis coming under their care or observation to the local health officer within 24 hours in the same manner as practicing physicians. (Public Acts, 1909, ch. 79, sec. 1.)

*Local health officers.*—When in any town, city, or borough, a case of smallpox, cholera, or any epidemic of infectious disease is known to exist, the local health officer is required to immediately notify the secretary of the State board of health of the existence of the same. (General Statutes, 1902, sec. 2508.)

The health officer of every town, city, and borough is required to make a report to the State board of health on or before the 8th day of each month of all contagious diseases reported to him during the preceding month. (Ibid., sec. 2532.)

Local health officers report to the commissioner of domestic animals cases of rabies within 24 hours after receiving information of such cases. (Public Acts, 1907, ch. 170, sec. 1.)

## DELAWARE.

## HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The law provides for a State board of health of seven physicians appointed by the governor. They elect a secretary who may

be a member of the board. (Laws of Delaware, vol. 19, ch. 642, sec. 1; also Rev. Stat., 1893, p. 296.)

*Counties.*—The governor appoints three physicians in each county to be health officers of the county. (Rev. Stat., 1893, ch. 46, p. 362.)

*Cities.*—It is the duty of the common council of every city and the commissioners of every incorporated town to appoint a board of health for the city or town of not less than three nor more than seven members, of whom at least one shall be a physician. (Delaware Laws, vol. 16, ch. 345, sec. 1; also Rev. Stat., 1893, p. 298.)

#### MORBIDITY REPORTS.

*Physicians, etc.*—Physicians, dentists, veterinary surgeons, or others practicing medicine or surgery or any branch thereof are required to give prompt notice to the local or State board of health of any and all cases of contagious or infectious diseases that come under their professional notice. (Acts of 1899, ch. 240, sec. 4, and Acts of 1903, ch. 327, sec. 6.)

Any physician or other person having knowledge of a case of disease dangerous to the public health which the State board of health requires to be reported is required to report the name, age, sex, and color of the patient and the place where the patient may be found to the health authority nearest to his place of residence. (Acts of 1903, ch. 328, sec. 3.)

*Local health authorities.*—It is the duty of the local boards of health to report to the State board of health the existence of any case of infectious or contagious disease which may come under their observation. (Acts of 1903, ch. 327, sec. 6.)

#### DISTRICT OF COLUMBIA.

##### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*District.*—The Commissioners of the District appoint a physician as health officer. (20 Stat. L., p. 107; 1 Sup. R. S., 2d ed., p. 179.)

#### MORBIDITY REPORTS.

*Notifiable diseases.*—(1) Asiatic cholera, (2) yellow fever, (3) typhus fever, (4) smallpox, (5) leprosy, (6) the plague, and (7) glanders (29 Stat. L., p. 635), (8) diphtheria, (9) scarlet fever, (10) measles, (11) whooping cough, (12) chicken pox, (13) epidemic cerebro-spinal meningitis, and (14) typhoid fever (34 Stat. L., p. 889), (15) tuberculosis (35 Stat. L., pt. 1, ch. 165, p. 126).

*Physicians or persons in charge.*—Physicians or persons in charge of cases shall report immediately to the health officer cases of the diseases (1 to 7) enumerated above, giving the name of the disease, name, age, sex, and color of the person suffering therefrom, and address where located. (29 Stat. L., p. 635.)

*Physician, head of family, etc.*—Every person in charge of any patient suffering from any of the diseases (8 to 14) enumerated above, is required to send to the health officer a signed certificate written in ink, stating the name of the disease, the name, age, sex,

and color of the person suffering therefrom, the school attended, and the address where the patient can be found. When the patient recovers or dies, the person in charge is required to send to the health officer as soon as possible an ink-written certificate of the fact.

The term "person in charge" is held to mean, first, each physician in attendance, and in the absence or default of the physician, then, second, the head of the family to which the patient belongs; third, the nearest relative present on the premises, and fourth, every person in attendance. (34 Stat. L., p. 889.)

Poliomyelitis is to be reported in the same manner as the above-named diseases 8 to 14, and, in addition, when the temperature of the patient returns to normal, or if it has not been above normal, the fact is to be reported. (Regulations, Commissioners of the District of Columbia, May 3, 1911.)

Officers having charge of hospitals, dispensaries, asylums, and similar institutions and physicians are required to report to the health officer cases of pulmonary or other communicable form of tuberculosis within one week after the disease is recognized. (35 Stat. L., pt. 1, p. 126.)

*Midwives, nurses, etc.*—Whenever any midwife, or any person other than a registered physician, is in attendance upon a case of childbirth, and the newly born child has inflammation of the eyes, attended by a discharge therefrom, said midwife or other person is required to report the fact in writing to the health officer, so that the report shall be received by the health officer within the six hours after the existence of the discharge becomes known. (Regulation, Aug. 25, 1911.)

#### FLORIDA.

##### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—There is a State board of health of three members appointed by the governor. This board designates and employs a physician as State health officer, who is also the board's executive officer and secretary. (General Statutes, 1906, secs. 1109, 1112.)

*Counties.*—The State board of health is given power to make rules and regulations for the preservation of the public health (General Statutes, 1906, sec. 1120), and the supervision and regulation of municipal and county sanitation. (Laws of 1909, ch. 5931, sec. 1.) The State health officer is authorized to employ suitable persons to serve as county sanitary agents, or special agents, or in such other capacities as may be necessary to carry out the powers and duties of the State board of health. (Rule 34, Florida State board of health.) Up to June 12, 1911, there had been 41 agents appointed in 39 counties. (The State contains 47 counties.) Thirty-four counties had 1 agent each, 3 counties 2 agents each, and 1 agent served for 2 counties. (State health officer, June 12, 1911.)

*NOTE.*—Charters granted to cities by the legislature usually make provision for city health officers.

##### MORBIDITY REPORTS.

*Physicians.*—It is the duty of physicians to report immediately to the president of the State board of health by telegram, or in the most expeditious manner, every case of yellow fever, smallpox, or cholera

that comes within his practice, the telegram to be paid for by the State. (General Statutes, 1906, sec. 1114.) Immediate report to be made also to the city health officer or mayor or the county physician or chairman of the county commissioners. (Ibid., sec. 1146.)

It is also the duty of physicians to report immediately to the State health officer or to an agent of the State board of health, by first mail, every case of diphtheria, leprosy, or scarlet fever which he may be called to attend. Where there is no physician in attendance upon such a case, it is the duty of any person having charge of, or in attendance upon, or upon whose premises the case occurs, to report in the same manner as required of physicians. (Rules and regulations of State board of health, 1904, rule 28.)

The State board of health in annual session in February, 1911, revised the rules and regulations of the board, and it is believed that they will be approved finally and made effective in February, 1912.<sup>1</sup> Rule 1 relating to the reporting of cases of sickness, as revised, reads:

Rule 1. Reports of communicable diseases.—It shall be the duty of every physician in the State of Florida to report immediately to the State health officer or to a representative of the State board of health, by first mail, every case of scarlet fever, diphtheria, measles, cerebro-spinal meningitis, anterior poliomyelitis, bubonic plague, glanders, anthrax, rabies, or leprosy, which occurs within his practice or which he may be called to attend. (Yellow fever, smallpox, and cholera are to be reported by telegram, charges collect. See section 1114, General Statutes, 1906. All other diseases should be reported by first mail, or by paid telegram.) Where there is no physician in attendance upon any case of the diseases herein mentioned, it shall be the duty of any person having charge of or in attendance upon, or upon whose premises a case of such diseases is suspected to exist, to report the same in the manner herein provided.

#### GEORGIA.

##### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS

*State.*—The law makes provision for a State board of health of 12 members, 11 of whom shall be physicians, appointed by the governor, the twelfth being the secretary. (Acts of 1903, No. 453, sec. 1.)

*Counties.*—The authorities of each county are authorized and requested to establish a board of health, and appoint a health officer, the board to have jurisdiction outside of municipalities. (Regulations, State board of health, 1904, secs. 46, 50.)

*Cities.*—The council of each incorporated city and town is authorized and requested to establish a board of health and elect a health officer. (Regulations State board of health, 1904, secs. 46, 48.)

Unincorporated cities and towns are put under the supervision of the county boards of health. (Regulations, State board of health, 1904, sec. 46.)

In case a city or county fails to establish a board of health, the State board of health may appoint a health officer for the city or county. (Regulations, State board of health, 1904, sec. 46.)

<sup>1</sup> Letter of State health officer, Oct. 30, 1911.

## MORBIDITY REPORTS.

*Notifiable diseases.*—The State board of health has declared the following-named diseases to be dangerous to the public health: Smallpox, Asiatic cholera, yellow fever, typhus fever, scarlet fever, diphtheria, and membranous croup. (Regulations, State board of health, 1904, sec. 9.)

*Physicians, etc.*—Physicians, householders, heads of families, county or municipal authorities aware of the existence of any of the above-named diseases are required to report them immediately to the local board of health or its proper officer. (Regulations, State board of health, 1904, sec. 9.)

*Local boards of health.*—It is the duty of local boards of health and of physicians in localities where there are no health authorities to report promptly to the State board of health the discovery of any of the following-named diseases: Asiatic cholera, yellow fever, scarlet fever, smallpox, diphtheria, typhus fever, typhoid fever, and such other contagious or infectious diseases, as the State board of health may from time to time specify. (Acts of 1903, No. 453, sec. 5.)

County and municipal health officers are required to keep a record of all cases of contagious or infectious diseases reported to them. (Regulations State board of health, 1904, sec. 49.)

## HAWAII.

## HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*Territory.*—Provision is made for a Territorial board of health consisting of seven members appointed by the governor, four to be laymen, two physicians, and the seventh to be the attorney general. All the members serve without pay except the president of the board. (Revised Laws, 1905, sec. 988.)

The board of health may appoint suitable agents in such localities as it may deem necessary to carry into effect all regulations for the public health. (Ibid., sec. 990.)

## MORBIDITY REPORTS.

*Notifiable diseases.*—Cerebro-spinal meningitis, Asiatic cholera, follicular conjunctivitis, diphtheria, amœbic dysentery, typhoid fever, paratyphoid fever, leprosy, measles, dengue, poliomyelitis, whooping cough, plague, scarlet fever, tetanus, trachoma, tuberculosis, typhus fever, chicken pox, smallpox, yellow fever, or any other infectious or communicable disease, or disease dangerous to the public health. (Ibid., secs. 1004, 1005, 1005A, as amended by laws of 1911, act 125.)

*Physicians.*—Physicians are required to report immediately to the board of health or its nearest agent in writing cases of the above-named notifiable diseases, or of any other infectious or communicable disease, or disease dangerous to the public health. In addition to the written report, cases of smallpox, scarlet fever, diphtheria, plague, cholera, yellow fever, typhus fever, cerebro-spinal meningitis, and amœbic dysentery are to be reported immediately by telephone or direct oral communication. The recovery of cases of tuber-

culosis is also to be reported. (*Ibid.*, sec. 1004, as amended by laws of 1911, act 125. Also laws of 1911, act 118, secs. 7 and 15.)

*Institutions.*—Superintendents in charge of hospitals, dispensaries, asylums, or other similar private or public institutions are to report to the board of health or its nearest agent within 24 hours, giving the name, age, sex, nationality, occupation, place where last employed, if known, and previous address of every patient having tuberculosis who comes into their care or under their observation. (Laws of 1911, act 118, sec. 7.)

*Householders, etc.*—Householders, keepers of boarding and lodging houses, and masters of vessels are to report immediately to the board of health or its nearest agent any person in or about their respective houses or vessels whom they believe to be sick with a notifiable disease. Police officers are also to report immediately to the board of health or its nearest agent cases of the notifiable diseases coming under their observation. (*Ibid.*, sec. 1005, as amended by laws of 1911, act 125, sec. 2.)

*Every person.*—It is the duty of every person to report to the board of health or its agent forthwith every case known or believed to be leprosy. (*Ibid.*, sec. 1124 and acts of 1909, chap. 81, sec. 3.)

The board of health is required during the prevalence of any severe pestilence or epidemic to publish weekly a report of the public health. (Revised Laws, 1905, sec. 988.)

#### IDAHO.

##### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The law provides for a State board of health of five members as follows: Two physicians appointed by the governor, the attorney general of the State, the State engineer, and a physician elected as secretary of the board by the other four members. (Revised Political Code, 1908, title 8, ch. 1, art. 1, p. 529.)

*Counties.*—The board of county commissioners and the county physician constitute a county board of health, the county physician being secretary and the executive officer of the board. (*Ibid.*, art. 3, p. 534.)

*Cities.*—Rule VIII of the rules and regulations of the State board of health (May, 1909), requires that the county boards of health shall insist on the organization of municipal boards of health in incorporated towns and villages within their respective counties.

##### MORBIDITY REPORTS.

*Notifiable diseases.*—Rule X of the rules and regulations of the State board of health (May, 1909), declares the following-named diseases to be dangerous and contagious: Asiatic cholera, yellow fever, smallpox, chicken pox, typhus fever, leprosy, bubonic plague, diphtheria, scarlet fever, typhoid fever, measles (including rotheln), and whooping cough. Cerebro-spinal meningitis and "infantile paralysis" were added to this list by regulation of the State board of health October 6, 1910.

*Physician, head of family, etc.*—Physicians are required to report cases of the dangerous and contagious diseases in their practice in



writing within 24 hours to the board of health having jurisdiction, giving the name and residence of the sick person. If there is no attending physician it is then the duty of the owner or agent of the building in which the case occurs or of the head of the family to make the report. (Rule XIV, State board of health, 1909.)

Physicians or other persons called to attend cases of smallpox, cholera, plague, yellow fever, diphtheria, membranous croup, scarlet fever, typhoid fever, or any other disease dangerous to the public health, or required by the State board of health to be reported, are required to report said cases to the health officer having jurisdiction, giving the name, age, sex and color of the patient, and the place where the patient may be found. It is also the duty of the head of the family and of the owner or agent of the owner of the building in which cases occur to give immediate notice to the health officer. (Revised Political Code, 1908, sec. 1099.)

*Midwives, nurses, etc.*—It is the duty of midwives, nurses, or other persons having charge to report within six hours to the local health officer or to some physician when the eyes of an infant under two weeks of age become reddened or swollen or contain pus. (Ibid., sec. 1108.)

*Municipal authorities.*—All health reports of municipal boards of health must be transmitted to the county board of health quarterly. (Rule IX, State board of health, 1909.)

*County authorities.*—The county physician is required to make a quarterly report to the State board of health, containing a summary of contagious and infectious diseases. (Rule IV, State board of health, 1909.)

#### ILLINOIS.

#### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The law provides for a State board of health of seven members appointed by the governor. (Rev. Stat., 1909, ch. 126A, sec. 1.)

*Counties and townships.*—The board of county commissioners in counties not under township organization and the supervisor, assessor, and town clerk of every township in counties under township organization, constitute a board of health with jurisdiction outside of the limits of incorporated cities and villages. These boards have the power to appoint physicians as health officers. (Ibid., ch. 34, sec. 116, 117.)

*Cities and villages.*—The city council or board of trustees have jurisdiction in and over all places within one-half mile of the city or village limits for the purpose of enforcing health and quarantine ordinances and regulations. (Ibid., ch. 24, sec. 44.)

The city council in cities and the president and board of trustees in villages have the power to appoint a board of health for the respective cities and villages except in cities incorporated under special acts making other provision. (Ibid., ch. 24, sec. 62, par. 76.)

#### MORBIDITY REPORTS.

*Physicians.*—The attending physician or the householder in whose dwelling the case occurs must immediately notify the local health authorities of existing cases of smallpox, scarlet fever, diph-

theria, Asiatic cholera, yellow fever, bubonic plague, glanders, anthrax, or leprosy. (Rules and regulations, State board of health, 1907, p. 83.)

*Midwives and nurses.*—Midwives and nurses having charge of infants under 2 weeks of age are to report in writing within six hours to the local health officer or to some physician whenever the eyes of an infant become inflamed or reddened. (Rev. Stat., 1909, ch. 38, sec. 510.)

*Local health authorities.*—The local health authorities are required to report immediately to the secretary of the State board of health the first case of smallpox, diphtheria, scarlet fever, Asiatic cholera, yellow fever, bubonic plague, glanders, anthrax, or leprosy occurring in any town, township, village, city, or county, and to report at least once a week the progress of outbreaks of these diseases. (Rules and regulations, State board of health, 1907, p. 83.)

*Occupation diseases.*—Every employer engaged in carrying on any process of manufacture or labor in which sugar of lead, white lead, lead chromate, litharge, red lead, arsenate of lead, or Paris green are employed, used, or handled, or in the manufacture of brass, or the smelting of lead or zinc, is required, as often as once every calendar month, to cause all employees who come into direct contact with the poisonous agencies or injurious processes to be examined by a competent physician for the purpose of ascertaining if there exists in any employee any industrial or occupational disease or illness, or any disease or illness due or incident to the character of the work in which the employee is engaged. Physicians making these examinations are to immediately report their findings to the State board of health. If any case of such disease is found, the report is to give the name, age, address, and sex of the employee affected, the nature of the disease or illness, and the probable extent and duration thereof, the name of the employer, and the last place of employment. If no case of such disease is found, the report shall so state. The secretary of the State board of health is to immediately forward copies of these reports received by the State board of health to the State department of factory inspection. (Act approved May 26, 1911.)

#### INDIANA.

##### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—There is a State board of health of five members, of whom four are appointed by a board of appointment, consisting of the governor, secretary of State, and auditor of the State. The four so appointed elect a physician to be secretary. The secretary, by virtue of his election, is a member of the State board of health, executive officer of the board, and State health commissioner. (Burns Annotated Indiana Statutes, 1908, ch. 81, sec. 7589, Acts of 1909, ch. 144, sec. 1.)

*Counties.*—In every county the board of county commissioners elects a physician to be county health commissioner. The State board has the power to discharge any county health commissioner or health officer in the State. (Acts of 1909, ch. 144, secs. 3, 4.)

*Cities.*—In every incorporated city there is to be a department of health composed of a board of three commissioners, of whom two

must be physicians. This board is to be known as the city board of health and is appointed by the mayor. This board appoints a secretary who is executive officer of the board. (Ibid.)

In counties with a population of less than 30,000 the board of county commissioners may, upon agreement with the mayor or mayors of any or all the incorporated cities within the county, consolidate the boards of health of one city, or the boards of all cities with the office of county health commissioner, and appoint a single health officer known as the county health commissioner. (Ibid.)

*Incorporated towns.*—The board of town trustees constitutes the board of health and appoints a town health officer. (Ibid.)

#### MORBIDITY REPORTS.

*Notifiable diseases.*—The diseases required to be reported immediately to the local health officer are yellow fever, smallpox, cholera-diphtheria, membranous croup, scarlet fever, measles, typhus fever, bubonic plague, leprosy, pulmonary consumption, typhoid fever, chickenpox, and whooping cough. (Rule 10, Indiana State Board of Health.)

*Physicians.*—Physicians and midwives are required to report immediately to the secretary of the local board of health cases of contagious or infectious disease required by the State board of health to be reported. These reports are made on forms supplied by the State board of health. In cities and towns the reports are sent to the city or town health officer. Outside of cities and towns the reports are sent to the county health officer or his deputies. If no physician is in attendance the report is to be made by the householder or person having the case in charge. (Burns Annotated Statutes, 1908, sec. 7607.)

*Parents, etc.*—Whenever one or both eyes of an infant under 2 weeks of age become inflamed, swollen, or reddened, or show any unnatural discharge, and no legally qualified physician is in attendance, it is the duty of its parents or caretakers to report the fact in writing within six hours to the health officer having jurisdiction. (Acts of 1911, ch. 129, sec. 3.)

*Town and city health officers.*—Town and city health officers enter the record of cases of infectious disease reported to them in a record book and by the 2d of each month forward the original infectious disease reports received during the preceding month to the county health commissioner. (Rule 6, Indiana State Board of Health.)

*County health commissioners.*—County health commissioners make a special monthly report to the State board of health by the 8th of each month for the preceding month, giving the number of cases reported of typhoid fever, scarlet fever, smallpox, diphtheria, and membranous croup. They also make quarterly reports of contagious diseases on blanks furnished by the State board. All books and documents are kept at the county seat. (Rule 1, Indiana State Board of Health.)

#### IOWA.

#### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The State board of health consists of the attorney general the State veterinary surgeon, one civil engineer, and seven physicians.

The board elects a secretary, who is not a member of the board. (Iowa Code, Ch. XVI, Title XII.)

*Districts.*—The State is divided into eight health districts. (Ibid.)

*Townships.*—The trustees of each township constitute a township board of health and appoint a physician as health officer. (Ibid.)

*Cities.*—The mayor and council of each town or city constitute a local board of health for the town or city and appoint a physician as health officer. (Ibid.)

#### MORBIDITY REPORTS.

*Notifiable diseases.*—Scarlet fever, diphtheria, smallpox, cholera, leprosy, epidemic cerebro-spinal meningitis, poliomyelitis, plague. (Regulations, State board of health, July 21, 1911, Rules I and III.)

*Physician or householder.*—All cases of the above-named diseases are required to be reported immediately to the mayor of the city or town, or the clerk of the township, if outside of a city or town, by the attending physician, or in his absence, by the householder of the premises wherein the disease exists, this immediate report to be followed within 24 hours by a written notice of the case. (Ibid.)

*Midwives, nurses, etc.*—Persons in charge of infants are to report to the local health officer or to a physician within six hours whenever the eyes of an infant become inflamed within two weeks after birth. (Acts of 1896, ch. 57, sec. 1. See footnote, p. 123.)

*Local authorities.*—It is the duty of the mayor of every town and city and the clerk of every township to report to the secretary of the State board of health within 24 hours every case of the above-named diseases reported to him. All reports are to be made on postal cards in accordance with forms adopted by the State board of health.

The mayors of incorporated cities and towns and the clerks of townships are required to keep a record of all cases of contagious or infectious diseases reported to them and to forward a copy of this record for the preceding calendar year to the secretary of the State board of health by the 1st of February. (Regulations, State board of health.)

#### KANSAS.

##### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—There is a State board of health consisting of nine physicians and one other person (“preferably an attorney”) appointed by the governor. The board elects a secretary, who becomes the executive officer of the board, but not a member of it. (General Statutes, 1909, sec. 8027.)

*Counties.*—The county commissioners of the several counties act as local boards of health for their respective counties, and each board elects a physician, who becomes ex officio a member of the board and health officer of the county. (General Statutes, 1909, sec. 8033.)

#### MORBIDITY REPORTS.

*Physicians.*—Whenever a physician knows or has reason to believe that any person whom he is called to visit, or any person sick within

his knowledge without the care of a physician, is sick with or has died of cholera, smallpox, scarlet fever, diphtheria, epidemic cerebro-spinal meningitis, or any disease dangerous to the public health, he is required to give notice of the fact to the nearest board of health or health officer. (General Statutes, 1909, sec. 8074.)

Tuberculosis is declared to be an infectious and communicable disease, dangerous to the public health, and physicians are required to report cases of it to the county health officer, or in cities of the first class (cities having over 15,000 inhabitants) to the city health officer within 24 hours after he becomes aware of their existence, the report to be in writing and to give the name, age, sex, color, occupation, place where last employed, and address. Similar reports are to be made by the chief officer having charge for the time being of any hospital, dispensary, asylum, or other similar private or public institution of cases coming under his observation. (General Statutes, 1909, sec. 8061.)

*Householder.*—Householders are required to give notice of cases of smallpox, cholera, scarlet fever, diphtheria, epidemic cerebro-spinal meningitis, or any disease dangerous to the public health occurring in their families. (General Statutes, 1909, sec. 8075.)

*Local health officers.*—Municipal and county boards of health and health officers having knowledge of any contagious or infectious disease, or of a death from such a disease, within their jurisdiction, are required to communicate without delay all information as to existing conditions to the State board of health. (General Statutes, 1909, sec. 8076.)

#### KENTUCKY.

##### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The State board of health consists of eight physicians, seven appointed by the governor, the eighth member is the secretary and executive officer and is elected by the board, of which he is ex officio a member. (Statutes, 1909, sec. 1757.)

*Counties.*—The State board of health appoints three physicians in each county, who, together with the county judge and one person elected by the fiscal court of each county, constitute a local board of health for the county. (Ibid., sec. 1743.)

*Cities.*—It is the duty of the council or board of trustees of every incorporated city and town of more than 2,500 inhabitants to appoint a board of health for such city or town, each of said boards to appoint a physician to be health officer of the city or town and executive officer and ex officio a member of the board. (Ibid., sec. 1769.)

##### MORBIDITY REPORTS.

*Physicians and heads of families.*—It is the duty of physicians to report cases in their practice, and of heads of families to report cases in their families, of cholera, smallpox, yellow fever, scarlet fever, diphtheria, and other epidemic and communicable diseases to the county board of health or to some member of the board within 24 hours. (Ibid., sec. 1743.)

*County boards of health.*—County boards of health are to report at least once in three months to the State board of health the nature and number of cases of the infectious, epidemic, and communicable diseases reported to them. (Ibid., sec. 1743.)

#### LOUISIANA.

#### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The law provides for a State board of health of seven physicians appointed by the governor. (Revised Laws, Wolff, 1904, vol. 2, p. 1440.)

*Parishes (counties).*—The police jury of each parish is required to appoint a parish board of health of three members, of whom one shall be a physician and two shall be members of the police jury, the physician to be the health officer and chairman of the board. (Ibid.)

*Cities.*—The legislative body of each incorporated municipal government is required to appoint five persons to be members of the town or city board of health. The chairman of the board is health officer. (Ibid.)

For the cities of Shreveport and Baton Rouge, the governor appoints three members and the council two members of the board of health. (Ibid.)

#### MORBIDITY REPORTS.

*Physicians, etc.*—Physicians are required to report within 24 hours to the local board of health all cases of contagious disease in their practice, stating the state of the disease, and the patient's place of dwelling and name, if known. (Louisiana Sanitary Code, 1909, Ch. III.)

The phrase "contagious disease" is declared to include diseases of an infectious, contagious, or pestilential nature. (Ibid.)

The following-named diseases are declared to be communicable and dangerous to the public health: Smallpox, cholera, diphtheria, typhoid fever, typhus fever, yellow fever, cerebro-spinal meningitis, relapsing fever, epidemic dysentery, rabies, glanders, charbon, tuberculosis, bubonic plague, leprosy, scarlet fever, measles, pneumonia, dengue.<sup>1</sup> (Ibid.)

Whenever a case of variola or varioloid breaks out in any community of the State, it is the duty of the attending physician, or in the absence of one, of the head of the household, or manager of the hotel, lodging house, or camp where the case may occur, to immediately notify the health officer having jurisdiction, and in the absence of such health officer, to notify the president of the State board of health. (Ibid.)

Physicians are to report cases of consumption in their practice immediately to the municipal or parish health officer on blank forms furnished by the State board of health. (Ibid.)

Cases of pneumonia are to be reported promptly to the local health officer by the attending physician, or in his absence by the head of

<sup>1</sup> The relationship of this list of diseases declared to be communicable, and dangerous to the public health to the preceding declaration that the phrase "contagious disease" shall be held to include diseases of an infectious, contagious, or pestilential nature is not clear.

the household. (Ibid.) Dengue and yellow fever are to be reported promptly by the attending physician. (Ibid, Ch. IX.)

*Midwives, nurses, etc.*—Persons other than physicians are to report cases of inflamed eyes in newborn children to the town or parish health officer within 12 hours. (Ibid., Ch. III.)

*Local health authorities.*—The parish health officer is to countersign the reports of cases of consumption received by him and forward them to the State board of health quarterly. (Ibid., Ch. III.)

Municipal and parish health officers are to immediately notify the president of the State board of health of cases of dengue, or yellow fever. (Ibid., Ch. IX.)

The local board of health is to report weekly to the State board, unless otherwise ordered, the progress of any of the quarantinable diseases which may be present in its jurisdiction. (Ibid, Ch. III.)

*State board of health.*—Whenever a quarantinable disease breaks out in any community of the State, it is the duty of the president of the State board of health to immediately notify the health authorities of surrounding States and the Surgeon General of the Public Health and Marine-Hospital Service. (Ibid., Ch. III.)

#### MAINE.

#### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—Provision is made for a State board of health consisting of six members appointed by the governor, and a secretary elected by the six members so appointed. The secretary is a member of the board and its executive officer. (Rev. Stat., 1903, ch. 18, sec. 1.)

*Towns (townships).*—The law provides for a board of health of three members appointed by the town (township) authorities in each organized town (township). (Rev. Stat., ch. 18, sec. 24.)

*Cities.*—Provision is made for a board of health of three members appointed by the municipal authorities in each city. (Ibid.)

#### MORBIDITY REPORTS.

*Physicians and householders.*—Householders are required to report cases of the following diseases occurring within their families or households: Smallpox, diphtheria, scarlet fever, cholera, typhus fever, typhoid fever, cerebro-spinal meningitis, measles, membranous croup, and whooping cough. (Poliomyelitis was added January 10, 1911, Regulations State board of health.) Notice is to be given to the health officer of the town either at the office of the health officer or by mail within 24 hours. In the absence of a health officer the report is to be made to the secretary of the local board of health. Physicians are to report cases of the above-named diseases occurring in their practice within 24 hours to the same authority. (Rev. Stat., 1903, ch. 18, secs. 33, 36.)

Physicians are required to report in writing on forms furnished by the State board of health the name, age, sex, color, occupation, place where last employed, and address of every person known by them to have tuberculosis, to the secretary of the State board of health within 48 hours after such fact comes to their knowledge. (Laws 1909, ch. 78, sec. 2.)

*Institutions.*—It is also the duty of the chief officer having charge for the time being of any hospital, dispensary, asylum, sanatorium, or other similar private or public institution to report in like manner to that prescribed for physicians, every patient having tuberculosis who comes into his care, or under his observation, within 48 hours, and also to state the previous address of the patient and to notify the secretary of the State board of health of changes in address of tuberculous patients who are or have lately been under his care. (Laws 1909, ch. 78, sec. 2.)

*Midwives, nurses, etc.*—When one or both eyes of an infant under four weeks of age become reddened or inflamed it is the duty of the midwife, nurse, or person having charge to report the fact at once to a legally qualified practitioner of medicine. (Rev. Stat., 1903, ch. 18, sec. 90.)

*Local health authorities.*—Local boards of health are required to report promptly to the State board of health every case of smallpox, varioloid, diphtheria, scarlet fever, typhoid fever, cerebro-spinal meningitis, measles, membranous croup, whooping cough, and pulmonary tuberculosis occurring within their respective jurisdictions. (Rev. Stat., 1903, ch. 18, sec. 30.)

*State.*—The State board of health is to keep a register of persons affected with tuberculosis. (Laws 1909, ch. 78, sec. 1.)

#### MARYLAND.

##### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The law provides for a State board of health of seven members, as follows: Four members, of whom one shall be a civil engineer, and three shall be physicians appointed by the governor, the attorney general of the state, and the commissioner of health of the city of Baltimore, the seventh member to be the secretary of the board. (Poe's Public General Laws, 1904, art. 43, p. 1192.) The State board of health and the bureaus under it are designated the State department of health. (Acts of 1910, ch. 560.)

*Counties.*—The board of county commissioners constitutes a local board of health in each county with jurisdiction throughout the county, except in cities and towns having charters inconsistent with such extension of jurisdiction. Each county board of health is to appoint a physician as county health officer, who thus becomes secretary and executive officer of the board. (Public General Laws, 1904, art. 43, secs. 22, 23.)

##### MORBIDITY REPORTS.

*Physicians.*—Physicians are to report immediately in writing to the board of health of the "city, town or county" in which the disease exists, cases of the following-named diseases occurring in their practice: Smallpox, diphtheria, membranous croup, scarlet fever, typhoid fever, typhus fever, yellow fever, measles, whooping cough, and any other contagious or infectious disease dangerous to the public health. (Ibid., sec. 51.)

Physicians are to report cases of pulmonary and laryngeal tuberculosis coming under their care to the secretary of the State board of



health within seven days, upon blanks furnished by said board, the report to give the name, age, sex, color, occupation, social condition, and residence of the person affected. (Ibid., sec. 58.)

*Institutions.*—The superintendent or other person in charge or control of any hospital, dispensary, school, reformatory, or other institution deriving the whole or any part of its support from the public funds of the State, or of any city, town, or county in the State, having in charge or custody or under care persons suffering with pulmonary or laryngeal tuberculosis is to make, or cause to be made, within 48 hours a record of the name, age, sex, color, occupation, social condition, and residence of the persons affected, these records to be forwarded to the State board of health on Monday of the week immediately following that in which the records are made. (Ibid., sec. 57.)

*Householders.*—Whenever a householder knows that a person within his family or house is sick with smallpox, diphtheria, membranous croup, scarlet fever, typhoid fever, typhus fever, measles, mumps, whooping cough, or any other infectious or contagious disease dangerous to the public health, he is to immediately give notice of the fact to the board of health of the "city or county" in which he dwells. (Ibid., sec. 50.)

*Midwives, nurses, etc.*—Midwives, nurses, or other persons in charge of infants under two weeks of age are required to report immediately to the local health officer or to a physician whenever one or both eyes of the infant become reddened or inflamed. (Ibid., art. 27, sec. 231.)

*Hotel keepers, etc.*—Hotel keepers, keepers of boarding houses and lodging houses, superintendents, managers, or directors of private or public institutions of any kind are to report any cases of known or suspected smallpox, cholera, yellow fever, typhus or typhoid fever, scarlet fever, leprosy, or any other infectious or contagious disease occurring on the premises under their management or control immediately in writing to the health officer of the city or town, or, in the absence of a local health officer, to the secretary of the State board of health. (Ibid., art. 43, sec. 67.)

*Local health authorities.*—The boards of health of "cities, towns, and counties" are to keep a record of the reports of disease made to them. (Ibid., art. 43, sec. 52.) When any board of health has had notice of the occurrence of a case of smallpox or any other contagious or infectious disease dangerous to the public health it is to notify the State board of health within 24 hours. (Ibid., art. 43, sec. 53.)

*State.*—The State board of health is to keep a register of all persons in the State known to be affected with tuberculosis. (Ibid., sec. 56.)

Pursuant to the preceding, local boards of health report once a month cases of smallpox, diphtheria, typhoid fever, scarlet fever, measles, whooping cough, mumps, and other diseases. (Secretary State board of health.)

Local health officers are also to promptly notify the secretary of the State board of health of the existence of any epidemic or any unusual sickness or mortality that may come to their knowledge within their respective jurisdictions or contiguous thereto. (Public General Laws, 1904, art. 43, sec. 29.)

## MASSACHUSETTS.

## HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—There is a State board of health consisting of seven members appointed by the governor. (Revised Laws, 1902, ch. 75, sec. 1.)

*Health districts.*—The State board of health was required by an act passed in 1907 to divide the State into not more than 15 districts, to be known as health districts, and to appoint in each district a State inspector of health for the district. The State inspectors of health are under the general supervision of the State board of health. (Acts of 1907, ch. 537, secs. 1, 2, and 4, as amended by Acts 1910, ch. 523.) The State is divided into 14 health districts. (Secretary State board of health.)

*Towns (townships).*—Each town “may” elect a board of health of three members. If this is not done the selectmen act as a board of health. (Acts of 1907, ch. 560, sec. 366.)

*Cities.*—In each city except Boston the board of health is to consist of three persons appointed by the mayor, one of whom must be a doctor of medicine, and no one of whom is to be a member of the city council. (Revised Laws, 1902, ch. 75, p. 657.) This does not apply to cities whose charters make other provision for boards or departments of health.

## MORBIDITY REPORTS.

*Notifiable diseases.*—The State board of health is directed to define what diseases shall be deemed to be “dangerous to the public health.” (Acts of 1907, ch. 183, sec. 1.)

The State board therefore on August 1, 1907, declared the following diseases to be “dangerous to the public health” and therefore notifiable: Actinomycosis, Asiatic cholera, cerebro-spinal meningitis, diphtheria, glanders, leprosy, malignant pustule, measles, scarlet fever, smallpox, tetanus, trichinosis, tuberculosis, typhoid fever, typhus fever, varicella, whooping cough, yellow fever. Anterior poliomyelitis, ophthalmia neonatorum, and trachoma were added in 1909.

*Householders.*—A householder who knows that a person in his family or house is sick of smallpox, diphtheria, scarlet fever, or any other infectious or contagious disease declared by the State board of health to be dangerous to the public health is required to forthwith give notice thereof to the board of health of the city or town in which he dwells. (Acts of 1907, ch. 480, sec. 1.)

*Nurses.*—Whenever one or both eyes of an infant become inflamed, swollen and red, and show an unnatural discharge at any time within two weeks after its birth, it is the duty of the nurse, relative or other attendant having charge of the infant to report the fact in writing within 6 hours thereafter, to the board of health of the city or town in which the parents of the infant reside. (Ibid.)

*Physicians.*—Physicians are required to give immediate notice of cases of dangerous diseases to the local authorities. If a physician knows that a person whom he is called to visit is infected with smallpox, diphtheria, scarlet fever, or any other disease declared by the State board of health to be dangerous to the public health, or if one or both eyes of an infant whom or whose mother he is called to visit become inflamed, swollen and red, and show an unnatural discharge

within two weeks after the birth of such infant, he is required to immediately give notice of the fact in writing over his signature to the selectmen or board of health of the town. (Ibid, sec. 2.)

*Local health authorities.*—The boards of health of cities and towns are required to report to the State board of health within 24 hours all cases which are reported to them of the diseases declared by the State board to be dangerous to the public health, and to give the name and location of each patient. (Ibid, sec. 3.)

If a local board of health refuses or neglects to make these reports, the city or town forfeits its claim upon the Commonwealth for the payment of expenses for the care and management of cases of the diseases dangerous to the public health, as provided in section 1, chapter 213, acts of 1902. (Revised Laws, ch. 75, sec. 53.)

#### MICHIGAN.

##### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—There is a State board of health of seven members appointed by the governor. (Compiled Laws, 1897, sec. 4397, and Laws of 1905, Act 18, sec. 4.)

*Townships.*—The township board constitutes a board of health. The supervisor is president and the township clerk is clerk of the board. Every board of health appoints a health officer, a physician being appointed where practicable. (Compiled Laws, 1897, sec 4410, 4411.)

*Cities and villages.*—The mayor and aldermen of each incorporated city, and the president and council or trustees of each incorporated village, in which no board of health is organized under its charter, exercise all the powers and perform all the duties of a board of health within the limits of the city or village. (Ibid., sec. 4459.)

##### MORBIDITY REPORTS.

*Notifiable diseases.*—In compliance with section 1, Act 293, Public Acts 1909, authorizing the State board of health to designate what diseases are dangerous, communicable diseases, and what diseases are contagious diseases, and making it the duty of every local board of health and health officer to observe such rules in relation to the dangerous communicable and the contagious diseases as may be prescribed by the State board, the following-named diseases are by regulation declared dangerous, communicable diseases, contagious and infectious in character and dangerous to the public health: Pneumonia, tuberculosis, typhoid fever, meningitis, diphtheria, whooping cough, scarlet fever, measles, and smallpox. Cases of each of these diseases must be reported by the attending physician or householder to the local health officer, who in turn must report them to the State board of health.

The regulation also states that the following-named diseases shall be reported for statistical purposes: Tetanus, rabies, cancer, erysipelas, and leprosy.

*Physicians.*—Whenever a physician knows that any person whom he is called to visit or who is brought to him for examination, is infected with smallpox, cholera, diphtheria, scarlet fever, or any other disease dangerous to the public health, he is required to imme-

diately give notice thereof to the health officer of the township, city or village, and to the householder, hotel keeper, keeper of a boarding house or tenant within whose house or rooms the sick person may be. The report to the health officer must state the name of the disease and the name, age, and sex of the person sick, and must designate by street and number or otherwise, the house or room in which the person is sick. (Ibid., sec. 4453.)

For this report the physician is entitled to the sum of 10 cents. (Ibid., sec. 4454.)

Every physician attending or called upon to treat a patient whom he believes to be suffering from poisoning from lead, phosphorus, arsenic, or mercury, or their compounds, or from anthrax, or from compressed-air illness, contracted as a result of the nature of the patient's employment, is required to send to the State board of health, who is to transmit to the commissioner of labor, a notice stating the name, post-office address, and place of employment of the patient, the length of time of such employment, and the disease from which in the opinion of the physician the patient is suffering. (Laws of 1911, act 119, sec. 1.)

*Householders, etc.*—Whenever any householder, hotel keeper, keeper of a boarding house or tenant knows or is informed by a physician or has reason to believe that any person in his family, hotel, boarding house, or premises is taken sick with smallpox, cholera, diphtheria, scarlet fever, or any other disease dangerous to the public health, he is required to immediately report the case to the local health officer. (Ibid., sec. 4452.)

*Midwives, nurses, etc.*—Midwives, nurses, or other persons in charge of infants are required to report in writing within six hours after its discovery to the local health officer or some legally qualified practitioner of medicine whenever one or both eyes of an infant become inflamed or swollen or reddened, or whenever any pus or secretion forms in the eyes or upon the edge of the lids at any time within two weeks after birth. (Ibid., sec. 4475.)

*Tuberculosis.*—Tuberculosis is declared to be an infectious and communicable disease. Physicians are required to report to the local health officer within 24 hours, in writing, the name, nationality, age, sex, color, occupation, place where last employed, and address of every person known by the physician to have tuberculosis, also the occupation at the time the disease was contracted and the date thereof, as near as can be, the time thereafter continued at such occupation, and all subsequent occupations and the term of each up to the time of death or recovery of the patient. It is also made the duty of the chief officer having charge for the time being of any hospital, dispensary, asylum, or other similar private or public institution to report in like manner, and in addition give the previous address of the cases of tuberculosis coming into his care or under his observation. (Laws of 1909, Act 27, secs. 1 and 12a, as amended by Act 317; Laws of 1909, and Act 80, Laws of 1911.)

It is the duty of the attending physician to report to the local health officer whenever a person having tuberculosis recovers therefrom. (Ibid., sec. 12.)

It is the duty of local health officers to record all reports of cases of tuberculosis, including the results of examinations showing the

presence of tubercle bacilli, in a register furnished by the State board of health and to forward to the State board of health a copy of this register quarterly. The registers are not open for inspection except to the health authorities. (*Ibid.*, sec. 4.)

The State board of health shall, when it receives the full quarterly report, compile such report to show the number of cases and the location of each case, the number of deaths and the number of recoveries, the age, sex, and color, and the occupation at the time the person contracted the disease, and all subsequent occupations and the term of each up to death or recovery, and shall classify them to show the percentage of deaths in each trade or occupation from tuberculosis, these compilations to be published annually in the reports of the State board. (*Ibid.*, sec. 12a.)

*Local health officers.*—Whenever the health officer of any township city, or village, receives notice or otherwise has good reason to believe that there is in his jurisdiction a case of smallpox, diphtheria, scarlet fever, or other communicable disease dangerous to the public health, it is his duty to keep the secretary of the State board of health constantly informed respecting the outbreak. (Compiled Laws, 1897, sec. 4460.)

#### MINNESOTA.

#### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS\*

*State.*—The State board of health consists of nine members appointed by the governor. The board elects a secretary who is the executive officer of the board and may or may not be one of its members. The board exercises general supervision over all health officers and boards. (Revised Laws, 1905, sec. 2127–2130.)

*Counties.*—The county board elects two of its members and a resident physician to constitute a board of health for each county with jurisdiction over all unorganized towns therein. At least one member of every local board must be a physician and act as local health officer and executive of the board. (*Ibid.*, sec. 2134.)

*Townships.*—Every township board of supervisors constitutes a board of health for the township, and has jurisdiction over every village within its boundaries in which no organized board of health exists. The board of supervisors must appoint a physician to act as health officer. (*Ibid.*, sec. 2134.)

*Cities and villages.*—Villages may and cities must provide by ordinance for the establishment of a board of health. In the absence of such provision in any city, the State board may appoint three persons to act as a board. One member of every local board must be a physician and act as health officer. (*Ibid.*, sec. 2134.)

#### MORBIDITY REPORTS.

*Physicians.*—Physicians are to report immediately to the local health officer cases of the following diseases coming under their care: Smallpox, epidemic cerebro-spinal meningitis, epidemic anterior poliomyelitis, scarlet fever, diphtheria, measles. (Regulations, Minnesota State Board of Health, June 15, 1910.)

Cases of tuberculosis and typhoid fever are to be reported to the State board of health on blanks furnished for the purpose, within

one week after the patient comes under treatment, except that in cities and villages where physicians are required by ordinance or regulation to report such cases to the local board of health they are not required to also report them directly to the State board of health provided the local health officer makes returns of all such cases reported to him to the State board of health once a month on blanks furnished for the purpose. (Ibid.)

*Midwives, nurses, etc.*—Persons in charge of infants under 2 months of age are to report to the local health officer in writing within 12 hours whenever the eyes of such infant become inflamed. (Ibid.)

*Local health officer.*—Local health officers are to report immediately to the secretary of the State board of health cases of the following-named diseases occurring within their respective jurisdictions: Smallpox, scarlet fever, diphtheria, epidemic cerebro-spinal meningitis, anterior poliomyelitis, measles, typhoid fever and tuberculosis. (Ibid.)

#### MISSISSIPPI.

#### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—Department of public health: The Mississippi State Medical Association, and all other State, district, and county medical societies and associations of the State in affiliation with the purposes of its organization are constituted the Mississippi Department of Public Health. Any licensed practitioner of medicine may on application have his name enrolled as a member of said department. (Mississippi Code, 1906, sec. 1640.)

*Board of health.*—The State board of health consists of 13 physicians appointed by the governor. (Ibid., sec. 2482.) The board elects a president and a secretary from its members. (Ibid., sec. 2484.) It may remove county health officers from office. (Ibid., sec. 2490.)

*Counties.*—It is the duty of the bureau of vital statistics of the State department to appoint a county board of health in each county, consisting of one physician from each supervisor's district, for the purpose of collecting vital, mortuary, and sanitary statistics. The county health officer is chairman of the board. The county board "may" keep books of register for births, deaths and infectious disease. (Ibid., sec. 1645.)

The State board of health appoints in each county a physician to be county health officer. If interior counties do not want a health officer, the State board of health need not appoint one. (Ibid., sec. 2491.)

*Cities.*—Any municipality "may" establish a board of health and pass sanitary laws not inconsistent with the rules and regulations of the State board of health. (Ibid., sec. 2505.)

#### MORBIDITY REPORTS.

*Physicians.*—Physicians are required to report immediately to the secretary of the State board of health every case of yellow fever, cholera, dengue, smallpox, or other virulent, epidemic, contagious disease occurring in their practice, unless the State board of health directs otherwise. (Ibid., sec. 2498.) Physicians are also to report to the secretary of the State board of health all cases of tuberculosis,

consumption, or other pulmonary diseases in their practice within 10 days. (Acts of 1910, ch. 130, sec. 1.)

#### MISSOURI.

##### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The State board of health consists of seven members, appointed by the governor. At least five of the members are required to be physicians. (Annotated Statutes 1906, secs. 7518, 7519.)

*Counties.*—There is a county board of health in each county, consisting of the judges of the county court, and a physician appointed by them. This board has jurisdiction outside of incorporated cities and towns. The county boards are subsidiary to the State board. (Ibid., sec. 7529A.)

*Cities.*—St. Louis: Provision is made for a health department controlled by a board of health and a health commissioner. The health commissioner is appointed by the mayor. The board of health consists of the mayor, the presiding officer of the council, a commissioner of police, the health commissioner, and two physicians. (City charter, Art. XII.)

Cities of the first class (population between 75,000 and 150,000): Provision is made for a health department in all cities of the first class, this department to be under the control of a board of health consisting of the mayor and three members appointed by him. One member, but not more than one member, of the board must be a medical practitioner. (Laws, 1909, secs. 291, 292.)

#### MORBIDITY REPORTS.

*County health officer.*—It is the duty of the county health officer to immediately report to the secretary of the State board of health cases of the following-named diseases, whenever they occur within his jurisdiction: Smallpox, diphtheria, membranous croup, scarlet fever, typhus fever, yellow fever, cholera, bubonic plague, and leprosy. (Regulations, State board of health, Rules I and II.)

It is the duty of the secretary of the county board of health to report quarterly to the secretary of the State board of health, "the number of contagious diseases and the results during the past quarter." These reports are to be made on the 1st of March, June, September, and December, and are to conform to the blanks furnished by the secretary of the State board of health. (Ibid, Rule 12.)

#### MONTANA.

##### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The governor appoints three physicians who, together with the governor, attorney general, and State veterinarian, constitute the State board of health. The board elects a physician as secretary, who becomes a member of the board, its executive officer, and the State health officer. (Revised Codes, 1907, sec. 1474.)

*Counties.*—The board of county commissioners and one physician whom they appoint, constitute the county board of health. The

physician so appointed becomes secretary of the board, and county health officer. (Ibid., sec. 1492.)

*Cities and towns.*—The municipal authorities of each incorporated city and town appoint a board of health of three members, one of whom must be a physician; except that incorporated towns of less than 5,000 inhabitants may place themselves under the care of the county board of health, in which case the jurisdiction of the county health officer includes the town. (Ibid., sec. 1484.)

#### MORBIDITY REPORTS.

*Notifiable diseases.*—The communicable diseases are designated as smallpox, diphtheria, scarlet fever, cholera, plague, yellow fever, "spotted" or "tick" fever, typhus fever, typhoid fever, cerebro-spinal meningitis, and measles. (Ibid., sec. 1500.)

*Householders.*—Householders are required to report immediately to the health officer of the town or city or county in which they reside cases of any of the communicable diseases within their families or households. (Ibid., sec. 1501.)

*Physicians.*—Physicians are required to report cases of the communicable diseases in their practice immediately to the health officer of the city or town, or if not in a city or town, then to the county health officer. (Ibid., sec. 1502.)

*Local health officers.*—Local and county health officers are required, on or before the 5th day of each month, to forward to the secretary of the State board of health, on blanks provided for the purpose, a report of all communicable diseases reported to them during the preceding calendar month. (Ibid., sec. 1495.)

#### NEBRASKA.

#### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The State board of health consists of the governor, the attorney general, and the superintendent of public instruction. The governor appoints four physicians to be secretaries. (Compiled Statutes, 1909, secs. 4315, 4317.)

*Counties.*—The law provides that the county board of supervisors or commissioners in each county shall establish a board of health, one member of which shall be a physician, the board of health to have jurisdiction throughout the county except in cities and villages having power to establish boards of health. (Ibid., sec. 4401.)

*Cities.*—Cities of over 100,000 population have a health commissioner. Cities of less than 100,000 population have power to create a board of health. (Ibid., secs. 894, 1246.)

#### MORBIDITY REPORTS.

*Physicians.*—Physicians residing or practicing within the limits of any city, town, or township are required to report to the local board of health within 24 hours by the most expedient method cases of Asiatic cholera, yellow fever, smallpox (or varioloid), diphtheria (membranous croup), scarlet fever (scarlet rash or scarlatina), measles, typhus fever, ophthalmia neonatorum, typhoid fever, cerebro-spinal



meningitis, leprosy, whooping cough, chicken-pox, tuberculosis, puerperal fever, or any other disease contagious or dangerous to public health. Where no physician is in attendance the responsibility for reporting the case falls upon any person having charge, or the head of the family, or any person having the care or custody of any lodging rooms in which cases occur. School teachers are also to report to the local board of health cases of the above-named diseases. Where no local board of health is organized all the reports provided for above are to be made to the State board of health. (Rule 1, Regulations State board of health, promulgated in compliance with sec. 6, art. 7, ch. 55, Rev. Stat., 1903.)

*Local boards.*—Local boards of health are required during the prevalence of any of the diseases named in the preceding paragraph to make adequate report from time to time to the State board of health, giving the nature of the diseases and the number of cases. (Ibid., Rule 3.)

It is the duty of all boards of health to report to the State board of health promptly the existence of any one of the following diseases: Asiatic cholera, yellow fever, smallpox, scarlet fever, diphtheria, typhus fever, typhoid fever, and such other contagious and infectious diseases as the State board of health may from time to time specify. (Compiled Statutes, 1909, ch. 55, § 4404, sec. 8.)

#### NEVADA.

##### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The State board of health consists of a president and a secretary appointed by the governor and a third member appointed by the governor and the president and secretary of the board. (Laws of 1911, ch. 199, sec. 1.)

*Counties.*—In each county there is a board of health consisting of the county physician, the sheriff, and the board of county commissioners. The county physician acts as chairman of the board. (Laws of 1905, ch. 42, sec. 1.)

*Cities.*—In incorporated cities and towns the city council has the power to create a board of health and prescribe its powers and duties. (Laws of 1907, Ch. CXXV.)

The boards of county commissioners have the power to establish and maintain a board of health in any town or city in their respective counties. (Laws of 1903, Ch. XXXVIII.)

#### MORBIDITY REPORTS.

There is no State law requiring the reporting of cases of sickness.

#### NEW HAMPSHIRE.

##### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The State board of health consists of the governor, the attorney general, three physicians, and a civil engineer, the last four named being appointed by the governor. The board appoints a physician as secretary and executive officer of the board. The secre-

tary may be a member of the board. (Public Statutes, 1891, ch. 107, secs. 1, 2.)

*Towns (townships).*—The selectmen of each town are required to appoint a board of health, consisting of three persons, of whom at least one shall, whenever practicable, be a physician in active practice in the town. (Acts of 1897, ch. 45, sec. 1 as amended by sec. 1, ch. 65, Laws of 1899.)

*Cities.*—All powers vested in the board of health of towns is in cities vested in the city council. (Public Statutes, 1891, ch. 50, sec. 9.)

#### MORBIDITY REPORTS.

*Physicians.*—It is the duty of every physician who attends upon any person infected with smallpox, malignant cholera, diphtheria, scarlet fever, or other malignant pestilential disease to immediately report the same to the health officers, or, in their absence, to the selectmen of the town. (Acts of 1901, ch. 13, sec. 1.) Similar report is to be made in the event of suspected cases of smallpox. (Acts of 1903, ch. 45, sec. 1.)

It is also the duty of every physician practicing medicine or surgery to report in writing to the State board of health, within one week after the disease is recognized, on forms provided by said board, the name, age, sex, color, occupation, and address of every person under his care who in his opinion is infected with pulmonary or other form of tuberculosis. It is also the duty of the officer having charge for the time being of each and every hospital, dispensary, asylum, or other public or private institution, to report in like manner, the name, age, sex, color, occupation, and last address of every person in his care or who has come under his observation, within one week of such time, who in his opinion is infected with pulmonary or other form of tuberculosis. Physicians are also to report the recovery of cases of tuberculosis to the State board of health. (Acts of 1911, ch. 6, secs. 1 and 5.)

*Householders and others.*—Whenever any person knows, or has reason to believe, that any member of his family or household (boarder, roomer, or visitor) has either smallpox, diphtheria, membranous croup, scarlet fever, typhoid fever, measles, or any other malignant communicable disease, he is required to give notice within 24 hours, if no physician is in attendance, to the local board of health of the town or city in which he resides. Such notice may be given either verbally or in writing. (Acts of 1901, ch. 16, sec. 2.)

Upon the appearance of smallpox, typhoid fever, or any other dangerous, communicable disease in any unincorporated locality in the State, it is made the duty of any person having knowledge thereof immediately to notify the State board of health of the appearance of such disease, provided there is no local board of health having jurisdiction in the locality. (Acts of 1911, ch. 17, sec. 1.)

*Local board of health.*—Upon the appearance of any of the diseases named in the preceding paragraph in any town or city, the board of health is required to make an immediate report to the State board of health, upon blanks furnished for the purpose, and to thereafter make a weekly report as long as the disease continues, stating the number of cases, the number of infected houses, the fatality, and such other facts as may be required by the State board. (Ibid., sec. 5.)

*State board of health.*—The State board of health is required to keep a register of all cases in which the tubercle bacilli has been found present. This register is not to be open to inspection in such manner as to reveal the identity of the patient, except to a health officer. The recovery of cases is also to be recorded in the register. (Acts of 1911, ch. 6, sec. 3-5.)

#### NEW JERSEY.

#### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—Provision is made for a State board of health composed of six persons appointed by the governor, one of whom must be a physician, and becomes secretary of the board. (Act approved Mar. 31, 1887, sec. 1 as amended by sec. 1, ch. 299, Laws of 1908.)

*Townships.*—In each township the township committee, the township assessor, and one physician appointed by the township committee constitute a board of health for the township. (Laws of 1887, ch. 68, sec. 10.)

*Cities.*—Every city, borough, and town is required to have a local board of health. (Ibid., sec. 9.)

#### MORBIDITY REPORTS.

*Physicians, etc.*—Every physician is required to report within 12 hours to the local board of health having jurisdiction, or in the absence of such board to the assessor of the township, all cases of the following named diseases occurring in his practice: Cholera, yellow fever, typhus fever, leprosy, plague, trichinosis, smallpox, varioloid, typhoid fever, diphtheria, membranous croup, scarlet fever, malaria, tuberculosis in any of its manifestations, trachoma, rabies, glanders, anthrax, chickenpox, poliomyelitis, or any other contagious, infectious, or communicable disease which the State board of health may declare to be preventable and specially dangerous to the public health. The report is to be in writing, signed by the physician, and to include the name, age, and location of the person suffering from the disease. (Acts of 1911, ch. 381, sec. 1.)

When no physician is in attendance, the case is to be reported within 12 hours by the house owner or householder in whose dwelling or building it occurs. (Ibid.)

Physicians are to report in writing to the local board of health of the city, borough, town, or other municipality the name, age, sex, color, occupation, place where last employed, if known, and address of every person known by them to have tuberculosis. The report is to be signed and is to be made within 48 hours after the fact comes to the knowledge of the physician. Similar reports including the previous address are to be made within 48 hours by the chief officer having charge for the time being of any hospital, asylum, prison, or other private or public institution, of every patient having tuberculosis who comes under his care or observation. (Acts of 1910, ch. 169, sec. 1.)

Every physician who attends any person sick with typhoid fever, dysentery, scarlet fever, diphtheria, or tuberculosis on any dairy premises where milk is produced for sale or distribution, or in a household any member of which is employed at such a dairy, is

required to report the case within 12 hours after his first attendance, to the State board of health, giving the nature of the disease, the name of the person sick, and his place of residence. (Acts of 1911, ch. 380, secs. 1-2.)

*Midwives, nurses, etc.*—Ophthalmia neonatorum: When one or both eyes of an infant become inflamed, swollen, or reddened, or show any unnatural discharge at any time within two weeks after birth and no legally qualified practitioner of medicine is in attendance upon the infant at the time, it is the duty of the midwife, nurse, attendant, or relative having charge of the infant, to report the case in writing to the local board of health of the city, township, or other municipality within six hours. (Acts of 1895, Ch. CXVIII, sec. 1; also General Statutes, 1895, p. 1676, sec. 1.)

*Local health authorities.*—Reports of disease made by physicians in pursuance to section 1, chapter 381, Acts of 1911, cited above, are to be entered in a book kept for the purpose by the officer receiving them. This officer is also required to transmit by mail to the State board of health a transcript of the reports received by him at least once a week, and daily when required by the State board. (Acts of 1911, ch. 381, sec. 2.)

#### NEW MEXICO.

#### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*Territory.*—Provision is made for a board known as the New Mexico Board of Health and Medical Examiners, and composed of seven physicians appointed by the governor. This board elects one of its members secretary. (Acts of 1907, ch. 34, sec. 1, as amended by ch. 99, Acts of 1909.)

*Counties.*—The board of county commissioners in each county annually contracts in writing with some reputable physician to be county health officer. The health officer so appointed is subject to the orders of the board of county commissioners, and may with the board's consent appoint as many assistant health officers as the public health and safety require. (Acts of 1909, ch. 99, sec. 4.)

*Cities.*—The mayor and council, trustees or other governing bodies of incorporated cities and towns constitute a board of health for the city or town. (Laws of 1901, Ch. XVII, sec. 25.)

#### MORBIDITY REPORTS.

*Physicians.*—Whenever any physician or other person knows that any person is sick with smallpox or other contagious or infectious disease, dangerous to the public health, he is required to at once give notice thereof to the justice of the peace of the precinct in which the disease occurs if outside of an incorporated city, town, or village; if within the limits of a city, town, or village, then the notice is to be given to the health officer of the county. Whenever such notice is given to any justice of the peace, it is his duty to at once notify the health officer of the county. (Acts of 1903, ch. 103, sec. 19.)

*Householders.*—Whenever any householder knows that any person in his family is sick with smallpox or other contagious disease, dangerous to the public health, he is required to immediately give the same notice thereof as is required of physicians. (Ibid., sec. 20.)

## HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—Provision is made for a State department of health at the head of which is a commissioner of health, appointed by the governor. The commissioner must be a physician. (Consolidated Laws, 1909, p. 4422, sec. 2.)

In the State department of health there is a bureau of vital statistics for the registration of births, marriages, deaths, and prevalent diseases. (Ibid., p. 4423, sec. 5.)

If any municipal corporation (town, city, or village) authorized by law to establish a local board of health, omits to do so, the State commissioner may, in such municipality, exercise the powers of a local board of health and appoint a health officer for the corporation, and fix his duties and compensation. (Ibid., p. 4426, sec. 11.)

*Towns (townships).*—The town (township) board and one other citizen appointed by the town board constitute a town board of health, and appoint a physician to be town health officer. (Ibid., p. 4428, sec. 20.)

A town board of health does not have jurisdiction over any city or incorporated village, or part of such city or village within the town, provided such city or village has an organized board of health. (Ibid., p. 4445, sec. 34.)

*Cities of the first class* (cities having a population of over 175,000).—The charters of cities of the first class provide for the appointment of a commissioner of health by the mayor.

*Cities of the second class* (cities with a population of between 50,000 and 175,000).—In cities of the second class the commissioner of public safety (appointed by the mayor) exercises all the powers and performs the functions of a local board of health. He appoints a physician to be health officer. (Consolidated Laws, 1909, p. 5318, secs. 130, 131; and p. 5324, secs. 145, 146.)

*Cities of the third class* (cities with a population of less than 50,000).—In cities of this class there is a board of health consisting of the mayor and at least six other persons, one of whom must be a physician, nominated by the mayor, and appointed by the common council. This board, unless the city charter provides otherwise, appoints a physician to be health officer of the city. (Ibid., p. 4428, sec. 20.)

*Villages.*—In villages the board of trustees appoints a board of health of not less than three persons, nor more than seven. This board appoints a physician to be health officer. (Ibid.)

## MORBIDITY REPORTS.

*Notifiable diseases.*—The following named diseases are those designated by the State department of health to be reported: Anterior poliomyelitis, anthrax, bubonic plague, cancer, cerebro-spinal meningitis, cholera, diphtheria, hydrophobia, leprosy, measles, ophthalmia neonatorum, pellagra, pneumonia, scarlet fever, smallpox, tetanus, pulmonary or laryngeal tuberculosis, typhoid fever, typhus fever, whooping cough, yellow fever. (Monthly Bulletin, New York State Department of Health, November, 1910, p. 299.) (See also p. 156.)

*Physicians, etc.*—Every physician is required to immediately give notice of every case of infectious and contagious or communicable disease, required by the State department of health to be reported to it, to the health officer of the city, town (township), or village in which the case occurs. When no physician is in attendance on the case, it is the duty of the superintendent or other officer of an institution, hospital, or hotel or lodging-house keeper, or other person where the case occurs, to give such notice. The physician or other person giving the notice is entitled to the sum of 25 cents therefor. (Consolidated Laws, 1909, p. 4436, sec. 25.) (See also p. 156.)

Tuberculosis is declared to be an infectious and communicable disease, dangerous to the public health, and it is made the duty of every physician to report in writing the name, age, sex, color, occupation, place where last employed if known, and address of every person known by such physician to have tuberculosis, this report to be made to the health officer of the city, town (township), or village in which the case occurs within 24 hours after the fact comes to the knowledge of the physician. (Ibid., p. 4544, sec. 320.)

It is also the duty of the chief officer having charge for the time being of any hospital, dispensary, asylum, or other similar public or private institution, to report in like manner the name, age, sex, color, occupation, place where last employed if known, and previous address of every person having tuberculosis who comes into his care, or under his observation, this report to be made within 24 hours. (Ibid., p. 4544, sec. 320.)

Upon the recovery of any person having tuberculosis it is the duty of the attending physician to make a report of the fact to the local health officer. (Ibid., sec. 330.)

*Local health authorities.*—Local boards of health are required to report to the State department of health promptly the facts relating to infectious, contagious, or communicable diseases, and every case of smallpox or varioloid within the municipality (city, village, or town). Health officers of cities, villages, and towns (townships) are to report in writing once a month to the State department of health all cases of such infectious and contagious or communicable disease as may be required by the State department of health. Health officers of villages and towns are to be paid by the municipalities employing them a sum not to exceed 20 cents for each case so reported. (Ibid., p. 4436, sec. 25.)

The health officers, commissioners of health, or boards of health of cities of the first class, are required to report promptly to the State department of health all cases of smallpox, typhus fever, yellow fever, and cholera, and the facts relating thereto. (Ibid., p. 4436, sec. 25.)

#### NORTH CAROLINA.

#### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The State board of health consists of five persons (one of whom is a sanitary engineer) appointed by the governor, and four members of the Medical Society of the State of North Carolina chosen by the medical society by ballot. The board of health elects a secretary-treasurer who is known as the State health officer. (Revisal of 1905, secs. 4435, 4440.)

*Counties.*—There are county boards of health consisting of the chairman of the board of county commissioners, the mayor of the county town (in the absence of a mayor the clerk of the superior court), the county superintendent of schools, and two physicians chosen by the three first named. These boards elect in each county a county superintendent of health. The chairman of the board of county commissioners appoints as county quarantine officer a candidate approved by the State board of health. (Acts of 1911, ch. 62, secs. 9, 16.)

*Townships.*—The county quarantine officer is empowered to appoint one deputy quarantine officer in each township of the county. (Ibid., sec. 19.)

*Cities.*—City and town authorities are authorized to elect municipal health officers. (Ibid., sec. 14.) The city or town authorities may assign the duties of the quarantine officer in the city or town to the municipal health officer. (Ibid., sec. 15.)

#### MORBIDITY REPORTS.

*Notifiable diseases.*—Smallpox, diphtheria, scarlet fever, measles, whooping cough, yellow fever, typhus fever, cholera, and bubonic plague. (Ibid., secs. 17, 18.)

*Physicians.*—If a physician suspects that a person whom he is called to visit is infected with any one of the above-named diseases he is required to immediately give notice to the quarantine officer, or the deputy quarantine officer. (Ibid., sec. 18.)

*Householders.*—If a householder knows that a person within his family is sick with any one of the above-named diseases he is to give immediate notice to the quarantine or deputy quarantine officer. (Ibid., sec. 17.)

*Deputy quarantine officers (townships).*—The deputy quarantine officer is required to at once notify the county quarantine officer whenever he receives notice of the existence of cases of any of the notifiable diseases. (Ibid., sec. 19.)

*Quarantine officers (counties and cities).*—The quarantine officer is to notify the secretary of the State board of health by telegram within 24 hours after receiving information of the presence of yellow fever, cholera, typhus fever, or bubonic plague, of the existence of every case. He is also to mail to the secretary of the State board of health not later than the 5th of each month the original records of all cases of the notifiable diseases for the preceding month. (Ibid., sec. 19.)

#### NORTH DAKOTA.

##### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The State board of health consists of a president, a vice president, and a superintendent of health appointed by the governor. The State board of health superintends the several city, village, and county boards of health. (Revised Code, 1905, secs. 252, 255.)

*Counties.*—Provision is made for county boards of health composed of a president, a vice president, and a county superintendent of health appointed by the board of county commissioners. The county boards of health have jurisdiction within their respective counties, outside of the corporate limits of cities having a city board of health, and

subject to the supervisory control of the State board of health and the superintendent of public health. (Ibid., secs. 259, 262.)

*Townships.*—The supervisors of each township constitute a board of health for the township. (Ibid., sec. 3116.)

*Cities.*—In each incorporated city there is a board of health, and the mayor appoints a physician to be health officer. (Ibid., secs. 266, 267.)

The trustees of each incorporated village constitute a board of health for the village. (Ibid., sec. 3116.)

#### MORBIDITY REPORTS.

*Physicians, etc.*—Any physician attending a case of infectious or contagious disease is required by law to immediately notify the health officer within whose jurisdiction the case occurs, giving the name of the patient, place of residence, and character of the disease, and in addition to certify the facts to the clerk of the civil township in which the disease occurs, and in counties not organized into civil townships, to the county commissioner having jurisdiction. (Revised Code, 1905, sec. 290.)

The law also provides that whenever it comes to the knowledge of any physician or other person that a contagious, epidemic, or infectious disease exists within the jurisdiction of any local board, he shall immediately report to such board in writing the name and place of residence, if known, of every person afflicted with such disease, and if he is the attending physician of such person, he shall report not less than twice in each week the condition of each person so afflicted and the state of the disease. (Ibid., sec. 275.)

Each keeper of any private house, boarding house, lodging house, inn, or hotel is required to report in writing to the local board of health within whose jurisdiction the case may occur each case of contagious, infectious, or epidemic disease which may occur in his house, inn, or hotel, such report to be made within 24 hours after the existence of the disease becomes known, and to show the name of the patient and the nature of the disease. (Ibid., sec. 277.)

Also when no physician is employed, it is the duty of the parents to give, within 24 hours, notice to the proper office of the presence of contagious or infectious disease within their household. (Ibid., sec. 289.)

Also the oldest person next of kin, the keeper or other proper officer of every workhouse, poorhouse, reform school, jail, prison, hospital, asylum, or other public or charitable institution is to give like notice of any infectious or contagious disease occurring among the persons under his charge. (Ibid., sec. 289.)

Whenever one or both eyes of an infant become inflamed, swollen, or reddened, or show any unnatural discharge, or secretion at any time within two weeks after its birth, and no legally qualified physician is in attendance upon the infant at that time, it is the duty of its parents, or in their absence, whoever is caring for said infant, to report the fact in writing within six hours after discovery, to the health officer having jurisdiction. This report is not required to be made from recognized hospitals. (Acts of 1911, ch. 188, sec. 3.)

*Local health authorities.*—The health officer of each city, the clerk of each civil township, and in counties not organized into civil town-



ships the county commissioner for his district, and the superintendent of the county board of health of each county are required to obtain and register in the registry of infectious and contagious diseases the names of the persons affected; the sex, color, and age of such persons; the nature of the disease; and the date of record. (Ibid., sec. 288.)

It is the duty of the health officer of each city and the clerk of each organized civil township, and in counties not organized into civil townships the county commissioner for his district, to make and send a certified copy of the registry of infectious and contagious diseases for the preceding month to the superintendent of the county board of health, not later than the 10th of each month. (Ibid., sec. 291.)

It is the duty of each local board of health, whenever it comes to its knowledge that a case of smallpox, scarlet fever, diphtheria, or other infectious or contagious disease exists within its jurisdiction, to immediately notify the State board of health of the existence and nature of such disease. (Ibid., sec. 282.)

*County boards of health.*—The superintendent of the county board of health of each county is to make and send to the State superintendent of health, on or before the 15th day of each month, a copy of the records showing all the cases of infectious or contagious diseases reported to him for the preceding month. (Ibid., sec. 292.)

The county superintendent of health is to report the facts immediately to the superintendent of public health (State) whenever any contagious or infectious disease occurs in his county, either among persons or animals. (Ibid., sec. 260.)

*State authorities.*—The superintendent of public health is to make to the governor on the 1st day of December of each even-numbered year a full report showing the character and extent during the preceding two years of all contagious or infectious diseases which have been reported to him. (Ibid., 1905, sec. 257.)

## OHIO.

### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—Ohio has a State board of health consisting of eight members. The attorney general is ex officio member of the board. The other seven members are appointed by the governor. (Ohio General Code, 1910, sec. 1232.) The board elects a secretary. (Ibid., sec. 1234.)

*Townships.*—The trustees of the township constitute a board of health for the township outside the limits of cities and villages. They appoint a health officer. (Ibid., sec. 3391.)

*Cities and villages.*—The law specifies that the council of each city and village shall establish a board of health of five members appointed by the mayor. (Ibid., sec. 4404.) The board of health appoints a health officer. (Ibid., sec. 4408.)

In villages the council may appoint a health officer instead of a board of health, such appointee to be approved by the State board of health. (Ibid., sec. 4404.) If any city, village, or township fails or refuses to establish a board of health, or appoint a health officer, the State board of health may appoint a health officer for such city, village (ibid., sec. 4405), or township (ibid., sec. 3393).

## MORBIDITY REPORTS.

*Notifiable diseases.*—Smallpox, cholera, plague, yellow fever, typhus fever, diphtheria, membranous croup, scarlet fever, typhoid fever, and any other disease dangerous to the public health, or required by the State board of health to be reported. (Ibid., sec. 4427.)

The State board of health requires reports also of cases of cerebro-spinal meningitis, chickenpox, measles, whooping cough (Sept., 1910), infantile paralysis (Dec., 1910), and trachoma (Mar. 2, 1911).

*Physicians.*—Physicians or other persons attending cases of the above-named diseases, owners or agents of buildings in which cases reside, and heads of families in which cases exist are required to report the cases to the health officer within whose jurisdiction they occur, giving in such report the name, age, sex, and color of the patient and the house or place in which he may be found. (General Code, sec. 4427.)

*Midwives, nurses, etc.*—Midwives, nurses, or relatives in charge of infants less than 10 days old are to report within six hours in writing to the physician in attendance or to the local health officer whenever such infant's eyes become inflamed or swollen or show an unnatural discharge. (Ibid., sec. 12787.)

*Boards of health.*—Health authorities or officials, and physicians in localities where there are no health authorities or officials, are required to report promptly to the State board of health the existence of cases of Asiatic cholera, yellow fever, smallpox, scarlet fever, diphtheria, membranous croup, typhus or typhoid fever, and such other contagious or infectious diseases as the State board may specify. (Ibid., sec. 1243.)

The State board requires the boards of health of cities, villages, and townships to make semimonthly, on the 1st and 16th of each month, a report of the recorded cases of the following-named diseases: Asiatic cholera, bubonic plague, cerebro-spinal meningitis, chickenpox, diphtheria, measles, membranous croup, scarlet fever, smallpox, typhoid fever, typhus fever, whooping cough, and infantile paralysis. (Sept., 1910.)

## OKLAHOMA.

## HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—Oklahoma has a State board of health in charge of one commissioner, known as the State commissioner of health, who is appointed by the governor and has power to make and enforce any and all needful rules and regulations for the prevention and cure and to prevent the spread of any contagious, infectious, or malarial disease among persons, and to superintend the several boards of health in the counties, cities, villages, towns, and townships. (Laws 1907-8, ch. 79, secs. 1, 2.)

*Counties.*—The law requires that the State commissioner of health shall appoint in every county of the State a county superintendent of public health, who shall be a practicing physician in good standing and a resident of the county. (Ibid., sec. 6.)

*Townships.*—In each township of each county the board of directors constitutes a township board of health, and in its capacity as such is under the supervision of the county superintendent of public

health, and is governed by rules and regulations prescribed by the State board of health. It is the duty of the township board to enforce, under the direction of the county superintendent of public health, rules and regulations of the State board pertaining to quarantine or contagious and infectious disease. (Ibid., sec. 7.)

*Cities.*—Incorporated towns (villages): The town board of directors constitutes a board of health and performs the same duties as the township board, and is under the same supervision of the county superintendent and the State board. (Ibid., sec. 8.)

Cities of the first class: In cities of the first class the mayor and common council constitute a board of health and are authorized to appoint a city superintendent of public health, who shall be a practicing physician and a resident of the city. It is the duty of the mayor and council to enforce all rules and regulations in regard to the public health. (Ibid., sec. 9.)

(All cities of over 2,000 population may become cities of the first class.)

#### MORBIDITY REPORTS.

*Physicians.*—Practicing physicians are required to report to the county superintendent of public health, upon forms prescribed and furnished by the State board of health, all cases of infectious and contagious diseases, these reports to be made by the physician as soon as the disease is discovered. (Ibid., sec. 10; also Compiled Laws, 1909, sec. 349.)

In cities of the first class physicians report to the city superintendent of public health, upon forms prescribed and furnished by the State board of health, all cases of infectious and contagious diseases as soon as discovered. (Ibid., sec. 11; also Compiled Laws, 1909, sec. 350.)

Practicing physicians are required to report the cases of contagious and infectious diseases which have occurred in their practices during the month to the county superintendent or the city superintendent of public health, as the case may be, on the last day of each month. (Rules and regulations promulgated by the State commissioner of health pursuant to sec. 2, ch. 79, Session Laws 1907-8, rule 16.)

Tuberculosis is declared to be an infectious and communicable disease, dangerous to the public health, and it is made the duty of every physician to report in writing to the health officer of the city, town, or village, within 24 hours, the name, age, sex, color, occupation, place where last employed if known, and address of every person known by said physician to have tuberculosis. (Ibid., rule 41.)

It is also made the duty of the chief officer having charge for the time being of any hospital, dispensary, or asylum, or other similar public or private institution, to report in like manner the name, age, sex, color, occupation, place where last employed if known, and previous address of every patient having tuberculosis who comes into his care or under his observation, this report to be made within 24 hours. (Ibid., rule 41.)

*Local health officers.*—The city and county superintendents of health are required to make a report on the 10th day of each month to the State commissioner of health of all cases of contagious and infectious diseases reported to them for the preceding calendar month. (Ibid., rule 16.)

## OREGON.

## HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The law provides for a State board of health of seven members. The board elects a secretary, who becomes, by virtue of such election, a member of the board, and is known as the State health officer. (Oregon Acts, 1903, p. 82.)

*Counties.*—The county judge and county commissioners constitute ex officio a board of health for the county and elect a secretary, who becomes health officer.

*Cities.*—The mayor and common council of each incorporated city constitute a board of health for the city, except where boards of health are constituted by statute or city ordinance. Each board elects a secretary, who becomes health officer of the board. (Acts of 1905, ch. 170, as amended by ch. 82, Acts of 1907.)

## MORBIDITY REPORTS.

*Physician.*—Every physician or other person having charge of a case of any infectious or epidemic disease must report the case immediately to the county or city health officer. (Acts of 1903, p. 82, sec. 12.)

It is the duty of every practicing physician to report to the county health officer, or to the health officer of the municipal corporation, within 24 hours, by the quickest means of communication, cases of diphtheria, membranous croup, scarlet fever, cholera, typhus fever, typhoid fever, smallpox, measles, cerebrospinal meningitis, ophthalmia neonatorum, infantile paralysis, bubonic plague, leprosy, barber's itch, and tuberculosis. (Rule 1, Oregon State Board of Health, 1911.)

It is the duty of the superintendent of any State institution or of any children's home, or other institution of a public nature, to report to the secretary of the State board of health any of the diseases enumerated in the preceding paragraph by the 10th day of each month for the preceding calendar month. (Rule 3, Oregon State Board of Health, 1911.)

It is also made the duty of every physician called to attend a person sick, or suspected of being sick, or in the absence of a physician, the householder, to report in writing within 24 hours, giving the name, and residence, all cases of cholera, yellow fever, smallpox, diphtheria, membranous croup, scarlet fever, typhus fever, typhoid fever, or "bubonic" (sic), or any other contagious disease, to the county health officer, or other health officer having jurisdiction. (Rule 17, Oregon State Board of Health, 1911.)

*Local health authorities.*—It is the duty of the county board of health to report to the secretary of the State board of health monthly, not later than the 10th day of the month, all cases of infectious disease which have been reported to the county board during the preceding month. Cities which keep their own records report direct to the State board of health in the same manner as the county boards. (Acts of 1903, p. 82, sec. 8.)

## PENNSYLVANIA.

## HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—There is a department of health, consisting of a commissioner of health and an advisory board. The commissioner is a physician, is the head of the department, and is appointed by the governor. (Laws of 1905, act 218, sec. 1.)

*Districts.*—In order to insure the management of the sanitary affairs and the registration of vital statistics in the different parts of the State, the commissioner of health is authorized to apportion the State into 10 districts and to appoint a physician in each district to be health officer and to have, under the direction of the commissioner, supervision and control of the sanitary affairs of the district and the registration of vital statistics. The commissioner of health may also appoint and employ such assistants to the health officers of the districts as he may deem necessary. (Laws of 1905, act 218, sec. 11.)

Pursuant to the above, a physician of five or more years' experience in the practice of medicine has been appointed in each county by the State department of health to act as a representative of the department. Townships in which there are no local boards of health have been grouped into about 700 districts, in each of which is a local health officer (not necessarily a physician) appointed and paid by the State department of health.

*Townships of the first class* (that is, townships with a population of at least 300 to the square mile).—It is the duty of the township commissioners to appoint a township board of health of five members, of whom one must be a physician. The board elects a health officer. (Laws of 1907, act 228, sec. 1.)

*Cities.*—Cities of the first class: In cities of the first class (cities with a population of over 1,000,000) there is a board of health of three members appointed by the mayor. One member is designated as the chief of the board of health, and is president of the board. The director of public health and charities is the chief executive officer of the board. (Purdon's Digest, p. 2925, secs. 786, 788; 1903 Public Laws, 157, sec. 4.)

Cities of the second class: In cities of the second class (cities with a population of between 100,000 and 1,000,000) there is a bureau of health, which is connected with and under the control of the department of public safety. The director of the department of public safety appoints a superintendent of the bureau of health, and such other employes as are necessary. (Purdon's Digest, p. 3024, sec. 107; 1895 Public Laws, 350, sec. 1.)

Cities of the third class: The council of any city of the third class (cities with less than 100,000 inhabitants) may by ordinance create a board of health, consisting of five members. (Laws of 1889, Art. XI, p. 306.)

*Boroughs* (incorporated villages with over 300 inhabitants).—It is the duty of the president of the town council or burgess, where he is the presiding officer, to appoint a board of health of five members. (Purdon's Digest, Vol. I, p. 532; 1893 Public Laws, 44.)

## MORBIDITY REPORTS.

*Physicians.*—Every physician practicing in any portion of the State who treats or examines any person suffering from or afflicted with actinomycosis, anthrax, bubonic plague, cerebro-spinal meningitis (epidemic), cerebro-spinal fever (spotted fever), chickenpox, Asiatic cholera, diphtheria (diphtheritic croup, membranous croup, putrid sore throat), epidemic dysentery, erysipelas, German measles, glanders (farcy), rabies (hydrophobia), leprosy, malarial fever, measles, mumps, pneumonia (true), puerperal fever, relapsing fever, scarlet fever (scarlatina, scarlet rash), smallpox (variola, varioloid) tetanus, trachoma, trichiniasis, tuberculosis in any form, typhoid fever, typhus fever, whooping cough, *uncinaria duodenalis* (hook worm),<sup>1</sup> pellagra,<sup>1</sup> anterior poliomyelitis (infantile paralysis),<sup>1</sup> or yellow fever is required, if said case is located in a township of the first class, a borough, or a city, to forthwith make a report in writing to the health authorities of said township, city, or borough; and, if the case is located in a township of the second class, or a city, borough, or township of the first class not having a board of health or body acting as such, to the State department of health, upon blanks supplied for that purpose, in which report he shall, over his own signature, state the name of the disease, and the name, age, sex, color, nativity, and occupation, if any, of the person suffering therefrom, together with the street and house number of the premises in which said person may be located, or otherwise sufficiently designate the same, the date of the onset of the disease, the name and occupation of the householder in whose family the disease may have occurred, the number of children in said household attending school, and the name or names of the school or schools so attended, together with such other information relating to said case as may be required by said health authorities and the State department of health. (Laws, 1909, act 658, sec. 1.)

*Local health authorities.*—The health authorities of the several cities, boroughs, and townships of the first class are required at the end of each week, and for the fraction of each week occurring at the end of the month, to report to the State department of health, upon blanks supplied for that purpose, a list of all cases of communicable diseases mentioned in the preceding paragraph, which have been reported to them during said period; which report is to contain the name of each person suffering therefrom, respectively, and his or her age, sex, color, and nativity, together with the name of the disease and the date of the onset thereof; and in the event of no reports of any of said diseases having been received by the aforesaid health authorities, respectively, during any said period, that fact is required to be reported to the State department of health. All superintendents and other persons in charge of asylums, hospitals, or other institutions located in townships of the second class are required, at the end of each week, and portion of a week occurring at the end of each month, to report to the State department of health, on blanks supplied for that purpose, a list of the inmates of such institutions, respectively, who may have suffered from any of the diseases enumerated in the preceding paragraph, together with the above-mentioned data relative to each inmate, with the date of his or her admission to the insti-

<sup>1</sup> Added to list of reportable diseases by regulation adopted by the advisory board of the State department of health July 7, 1910, pursuant to act 218, approved Apr. 27, 1905.

tution, and the name of the city, borough, or township from which he or she was admitted. (Laws, 1909, act 658, sec. 23.)

*Midwives and nurses.*—Whenever one or both eyes of an infant become inflamed or swollen or reddened at any time within two weeks after birth, it is the duty of the midwife or nurse, or other person having care of the infant, to report the facts to the health officer or a legally qualified practitioner, in writing, within six hours after the discovery of the condition. (Public Laws, 1895, p. 373, sec. 1, Purdon's Digest, 13th ed., p. 1886, sec. 78.)

#### PORTO RICO.

##### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*Island.*—The governor appoints a member of the executive council to be director of health, charities, and corrections. (Laws of 1904, p. 89.) The director of health, charities, and corrections appoints an insular board of health and a director of sanitation. The director of sanitation is the chief sanitary officer of the island and the executive officer of the board of health. The chairman of the insular board of health is the chief of the bureau of vital statistics. (Laws of 1911, act 68, secs. 1-3.)

*Sanitary districts.*—For sanitary purposes the island is divided into four sanitary districts. Each district is in charge of a sanitary inspector appointed by the director of sanitation. (Ibid., sec. 17.)

*Sanitary zones.*—Each sanitary district is divided into sanitary zones. Each zone is in charge of a health officer under the immediate orders of, and appointed by, the director of sanitation. Each sanitary zone has a board of health of three members. (Ibid., secs. 22-23.)

*Towns.*—A sanitary police agent is appointed in each town having less than 10,000 inhabitants and at least two in towns having over 10,000 inhabitants. (Ibid.)

#### MORBIDITY REPORTS.

*Notifiable diseases.*—Exanthematic typhus, typhoid fever, small-pox, varioloid, scarlet fever, diphtheria, yellow fever, asiatic cholera, bubonic plague, beriberi, epidemic dysentery, cerebro-spinal meningitis, whooping cough, epidemic parotiditis, malaria, tuberculosis, glanders, leprosy, cutaneous syphilis, and hookworm disease, or uncinariasis. (Laws of 1911, act 68, sec. 25.)

*Physicians.*—Physicians are required to report cases of the above-named diseases to the nearest health officer, and all cases of infectious or contagious diseases treated by them to the local health officer. (Ibid., secs. 25-26.)

*Local health officers.*—Health officers are required to immediately report to the director of sanitation all cases of infectious or contagious diseases reported to them by physicians. (Ibid., sec. 26.)

#### RHODE ISLAND.

##### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The law provides for a State board of health of seven members. The board elects a physician to be secretary, who becomes

ex officio a member of the board, the commissioner of public health, and State registrar. (General Laws of Rhode Island, 1909, ch. 115, p. 415.)

*Towns (townships).*—The town councils and boards of aldermen constitute ex officio boards of health in their respective towns. (Ibid., ch. 50, p. 232.)

The town council is required to appoint a health officer. (Ibid., ch. 107, sec. 5.) The cities of Providence and Newport and such other towns as may establish a board of health or elect a superintendent of health are exempt from these provisions. (Ibid., sec. 7.)

*Cities.*—The city council of any city may appoint a board of health for the city, which may have any or all the powers and duties of the board of aldermen as a board of health as the city council may determine. (Ibid., ch. 50, p. 232.)

#### MORBIDITY REPORTS.

*Physician, householder, etc.*—Every householder is required to immediately inform the town council of the town wherein he dwells of any person in the house or tenement occupied by him who has smallpox or any other contagious or infectious distemper, or is suspected of being so affected. Every physician, householder, or other person having knowledge of the existence of smallpox in any town is required to immediately notify the town clerk, or, in cities, the superintendent of health. (General Laws, Rhode Island, 1909, ch. 110, secs. 13, 19.)

Any physician who discovers a case of poliomyelitis, tuberculous meningitis, or cerebrospinal meningitis is required to immediately report the existence of each and every case to the secretary of the State board of health. (Laws 1911, ch. 728, sec. 1.)

Physicians are to report to the secretary of the State board of health within seven days, upon blanks provided by the State board for the purpose, the name, sex, age, color, occupation, social condition, and residence of persons under their care affected with pulmonary or laryngeal tuberculosis. (Acts of 1909, ch. 386, sec. 12.)

*Institutions.*—The superintendent or other person in charge or control of any hospital, school, reformatory, or other institution deriving the whole or any part of its support from the public funds of the State, having in charge or under his care and custody any person suffering with pulmonary or laryngeal tuberculosis, is to make or cause to be made, within 48 hours, a record of name, age, sex, color, occupation, social condition, and residence of the person affected, this information to be forwarded each week to the secretary of the State board of health. (Ibid., sec. 11.)

*Midwives, nurses, etc.*—Midwives or nurses in charge of infants under 2 weeks of age are to report to the health officer within 6 hours in writing or to a physician, whenever the eyes of such infant become inflamed. (General Laws, 1909, ch. 343, sec. 25.)

*State.*—It is the duty of the State board of health to keep a register of all persons known to be affected with laryngeal or pulmonary tuberculosis. (Acts of 1909, ch. 386, sec. 10.)



## SOUTH CAROLINA.

## HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The State board of health consists of the South Carolina Medical Association, together with the attorney and comptroller general of the State. The above-named medical association every seven years elects seven members to be recommended to the governor for appointment to cooperate with the State officers named to constitute an executive committee, having power to act in the intervals between sessions of the State board of health. Upon the recommendation of the executive committee the governor appoints a State health officer, who becomes secretary and executive officer of the State board of health. The executive committee is authorized to divide the State into health districts, and in districts in which there are no boards of health it is required to appoint subboards of health.

The State board of health is invested with authority to direct and supervise the action of local boards of health in cities, towns, and townships, and may remove members of the local boards of health for cause. (South Carolina Code, 1902, Title VIII, Ch. XXIII, and Act No. 433, 1908.)

*Cities, towns, and villages.*—It is the duty of the mayor or intendant of every incorporated city, town, or village to appoint a board of health, which shall elect a secretary and a health officer. (South Carolina Code, 1902, Title VIII, Ch. XXIII.)

The executive committee of the State board has power and it is its duty to appoint local boards of health in all unincorporated towns and villages of more than 100 population. (Act No. 82, 1906.)

## MORBIDITY REPORTS.

*Notifiable diseases.*—The State board of health is authorized to name the diseases it considers contagious and infectious. (Act No. 395, 1910, sec. 4.) The executive committee of the board has named the following: Tuberculosis, typhoid fever, diphtheria, scarlet fever, smallpox, measles, whooping cough, epidemic cerebrospinal meningitis, leprosy, and poliomyelitis.

*Physicians.*—It is the duty of physicians in incorporated cities and towns to report to the secretary of the local board of health within 24 hours cases of contagious or infectious disease occurring within their practice. Physicians outside of incorporated cities and towns report within 24 hours direct to the secretary of the State board of health upon blanks furnished by the State board. (Act No. 395, 1910, secs. 1, 3.)

*Midwives and nurses.*—In cities having over 1,000 inhabitants midwives and nurses are to report at once to the local board of health whenever an infant under their charge has reddened or inflamed eyes. (Criminal Code, 1902, sec. 331.)

*Local boards of health.*—It is the duty of secretaries of local boards of health to report to the secretary of the State board of health, not later than the 5th day of each month, all cases of contagious and infectious disease reported to them during the preceding month, the report to be made upon blanks furnished by the State board. (Act No. 395, 1910, sec. 2.)

## SOUTH DAKOTA.

## HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The State board of health consists of five physicians appointed by the governor. The board annually elects a superintendent, who is ex officio secretary of the board. (Political Code, 1903, secs. 238, 240, as amended by ch. 217, Laws of 1903.)

*Counties.*—Provision is made for a county board of health in each county, consisting of the State's attorney of the county, and two physicians appointed by the State board of health, one of whom shall be superintendent of the county board and ex officio its secretary; the other shall be vice president of the board. (Ibid., sec. 246.)

*Cities.*—City councils have the power to appoint a board of health for their respective cities and to prescribe its powers and duties. (Ibid., sec. 1229.)

## MORBIDITY REPORTS.

*Physicians.*—Whenever any physician shall know or suspect that any person whom he is called to visit has smallpox, scarlet fever, diphtheria, measles, cholera, or any other disease dangerous to the public health, such physician shall give notice immediately, including the location and a full description of the case, to the superintendent of the county board of health within whose jurisdiction the case occurs. (Regulations State board of health, rule 5.)

All cases of poliomyelitis, or suspected cases are to be reported immediately by the attending physician, or head of the family, to the county board of health. (Regulations State board of health, Sept. 28, 1910.)

*Householders.*—Whenever any householder shall know or suspect that any person in his family or temporarily residing with him is sick with smallpox, scarlet fever, diphtheria, cholera, or any other disease dangerous to the public health he shall immediately give notice to the health officer having jurisdiction. (Ibid., rule 4.)

*Municipal health officers.*—City and town health officers are required to record the returns of all contagious and infectious diseases and to forward the returns monthly to the county superintendent of health. (Ibid., rule 15.)

*County superintendents.*—Superintendents of county boards of health are required to report immediately to the superintendent of the State board of health whenever any contagious or infectious disease occurs in their respective counties. (Political Code, 1903, sec. 248.)

## TENNESSEE.

## HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The law provides for a State board of health of three physicians, one live-stock breeder, and ex officio the State commissioner of agriculture. (Acts of 1897, ch. 46, sec. 1.)

*Counties.*—The county judge, court clerk, and health officer or jail physician constitute the county board of health, the last named being president of the board. (Law passed Apr. 4, 1885, sec. 1.)

It is the duty of county courts in counties having jails to appoint a jail physician or health officer. (Ibid., sec. 4.)

*Cities.*—Every municipality having 5,000 or more inhabitants is required to organize a board of health. (Laws of 1877.) Boards of health of cities and towns have jurisdiction and authority in the territory extending 1 mile from the corporation limits, provided such jurisdiction shall not extend beyond the limits of the county in which the municipality is situated, and provided that where two cities lie less than 2 miles apart the distance be divided between them. (Laws of 1877, ch. 28, sec. 7.)

#### MORBIDITY REPORTS.

*Notifiable diseases.*—Smallpox, yellow fever, cholera, bubonic plague, typhus fever, diphtheria, membranous croup, scarlet fever, or other communicable disease (except venereal diseases). (Acts of 1905, ch. 519, sec. 1.) The State board of health by resolution added poliomyelitis to the preceding list October 4, 1910.

The cards issued for the monthly report of contagious diseases contain, in addition to the above-named diseases, the following: Pulmonary tuberculosis, typhoid fever, cerebrospinal meningitis, measles, chicken pox, whooping cough, and pellagra.

*Householders.*—Whenever any one of the above-named diseases exists, or is suspected to exist in any household, it is the duty of the head of the household or any other person in the household having knowledge of the facts to immediately notify the municipal or county health authorities. (Ibid.)

*Physicians.*—It is also the duty of physicians to immediately report cases of the above-named diseases to the municipal or county health authorities. (Ibid., sec. 2.)

*Nurses, midwives, etc.*—Nurses, midwives, or other persons having care of infants under 2 weeks of age are to report immediately to the health officer or a legally qualified practitioner of medicine whenever one or both eyes of an infant become inflamed or reddened. (Acts of 1911, ch. 10, sec. 1.)

*Local health authorities.*—It is the duty of municipal and county boards of health upon receiving information of the existence or suspected existence of any case of smallpox, cholera, yellow fever, scarlet fever, diphtheria, or other disease dangerous to the public health to immediately notify the State board of health of the fact, and on the first of each month make a written report to the State board of health of all cases of communicable disease occurring in their respective jurisdictions during the preceding calendar month. (Acts of 1905, ch. 519, sec. 11.)

#### TEXAS.

#### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—There is a State board of health consisting of seven members appointed by the governor. Each member must be a legally qualified practicing physician, who has been in the actual practice of medicine in the State of Texas for at least 10 years. One member is designated by the governor as State health officer and is the president and executive officer of the board. (Laws of 1909, ch. 30, sec. 1.)

The president of the board appoints a registrar of vital statistics who is also the secretary of the board. (Ibid., sec. 4.)

The county and city health officers are under the general direction of the State board of health to which they are required to make such reports as the State board may require. (Ibid., secs. 25, 26, 28.)

*Counties.*—It is the duty of the commissioner's court of each organized county to appoint a competent physician to be county health officer. (Ibid., secs. 17, 18, 19.)

*Cities.*—It is the duty of the city council or the city commissioners, as the case may be, of each incorporated city and town within the State to elect a competent physician to the office of city health officer, except in cities where a different method of selecting city health physicians is provided for by charter, in which event the office of city health officer is to be filled as is provided for that of city physician. (Ibid., secs. 21, 22.)

#### MORBIDITY REPORTS.

*Notifiable diseases.*—The following-named diseases are classed as contagious: Asiatic cholera, bubonic plague, typhus fever, yellow fever, smallpox, scarlet fever, diphtheria, epidemic cerebrospinal meningitis, dengue, typhoid fever, epidemic dysentery, trachoma, tuberculosis, anthrax. (Acts of 1909, ch. 30, sec. 10, rule 3, as amended by acts of 1911, ch. 95, sec. 1.)

*Physicians, etc.*—Physicians are to report in writing or by telephone to the local health authority (city or county health officer, or local board of health) immediately each patient known to have or suspected of having a contagious disease. If the disease is pestilential in character the physician is to notify the president of the State board of health by telegraph or telephone at State expense. (Ibid., rule 1.)

Every hotel proprietor, keeper of a boarding house, or inn, or householder, or head of a family in a house wherein any case of reportable contagious disease occurs, is required to report such case to the local health authority within 12 hours unless previous notice has been given by the physician in attendance. (Ibid., rule 23.)

*Midwives, nurses, etc.*—Persons not practitioners of medicine are to report cases of inflammation of the eyes of infants under their care to the local health authority or to a reputable physician within 12 hours. (Ibid., 10, rule 22.)

*Local health authorities.*—City and county health authorities are required to keep a record of all cases of contagious disease reported to them including the name, age, sex, race, and location of the persons affected. They are also required to report these cases by the fifth of each month for the preceding calendar month to the president of the State board of health on blanks furnished by the State board. The reports on tuberculosis are to be considered confidential. (Ibid., rule 4.)

#### UTAH.

#### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The law provides for a State board of health of seven members appointed by the governor. A majority of the members must be physicians and one a civil engineer. (Compiled Laws 1907, sec. 1096.)

*Counties.*—Each board of county commissioners is required to divide the county, outside of incorporated municipalities, into sani-

tary districts and to appoint a health officer for each district. The district health officers, together with the board of county commissioners, constitute the county board of health. (Ibid., sec. 1106.)

*Cities.*—It is the duty of the board of trustees or the city council of every incorporated town and city to establish by ordinance a board of health of three or more members, one of whom shall, when practicable, be a physician and the executive officer of the board and be known as the health officer. (Ibid., sec. 1105.)

#### MORBIDITY REPORTS.

*Physicians, etc.*—It is the duty of every physician or other person caring for the sick to report immediately to the local board of health cases of scarlet fever, diphtheria, whooping cough, smallpox, typhoid fever, measles, tuberculosis, cholera, rubella, chickenpox, typhus fever, plague, cerebrospinal meningitis, poliomyelitis, leprosy, or pneumonia coming under his charge. (Ibid., sec. 1113x11, as amended by laws of 1911, ch. 75, sec. 1.)

Every physician and every superintendent of a hospital or public institution is required to immediately report to the State board of health every case of tuberculosis which he is called upon to treat or which is in such hospital or public institution. (Ibid., sec. 1113x27.)

All physicians or other persons having knowledge of the existence of any contagious or infectious disease, or having reason to believe that any such disease exists, are required to report the fact immediately to the local board of health. (Ibid., sec. 1111.)

It is the duty of every physician and every superintendent or manager of a hospital or public institution to immediately report to the local board of health every case of venereal disease which he is called upon to treat, or which may be in such hospital or institution, and to make such reports as may be called for by the regulations of the State board of health. The name of the person affected is not to be included in the report. (Laws of 1911, ch. 90, sec. 1.)

It is the duty of physicians and midwives to report to the local board of health within six hours every case where a newly born child has inflammation of the eyes attended by a discharge. (Laws 1911, ch. 61, sec. 1.)

*Local health authorities.*—Local boards of health or health officers report to the secretary of the State board of health monthly on or before the 5th day of each month all cases of scarlet fever, smallpox, diphtheria, membranous croup, typhoid fever, whooping cough, measles, chickenpox, pneumonia, and tuberculosis which have occurred in their respective jurisdictions during the preceding month. (Compiled Laws, 1907, sec. 1108.)

Upon receipt of a notification of inflammation of the eyes of a newly born child, the local health officer is to report immediately by telephone or telegraph to the State board of health. (Regulations, State board of health, 1911.)

## VERMONT.

## HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The law provides for a State board of health of three members appointed by the governor. The board appoints a physician as secretary and may also appoint a sanitary engineer and inspector. (Public Statutes, 1906, secs. 5409 and 5411.)

*Towns (townships).*—The State board appoints a health officer for each town. The health officer, together with the selectmen of the town, or the board of aldermen of the city constitutes a local board of health for such town or city. (Ibid., secs. 5433 and 5434.)

## MORBIDITY REPORTS.

*Physicians, etc.*—Physicians are required to report immediately to the local health officer cases of communicable disease dangerous to the public health giving the location of the cases, the name of the patient, and the degree of virulence, cause, and source of the disease. The head of a family in whose home there occurs a case of infectious or contagious disease dangerous to the public health is required to immediately notify the local health officers. (Public Statutes, 1906, sec. 5454.)

Physicians are required to report cases of tuberculosis to the secretary of the State board of health, giving the name and address of the person affected. (Ibid., sec. 5450.)

*Nurses, etc.*—It is made the duty of the nurse, relative, or other person having charge of an infant to report in writing within six hours thereafter to the local health officer of the town or city in which the parents of the infant reside, whenever one or both eyes of an infant become inflamed, swollen, or reddened, and have an unnatural discharge at any time within two weeks after its birth. (Regulation, State board of health.)

*Local health authorities.*—Upon receiving notice of a case of contagious or infectious disease dangerous to the public health, local health officers are to immediately report the facts of the case to the secretary of the State board of health. When a communicable disease prevails or becomes epidemic, the local health officer is to make weekly reports concerning the disease to the State board. (Ibid., sec. 5455.) Local health officers are to report to the secretary of the State board of health immediately every case of smallpox, varioloid, Asiatic cholera, typhus fever or yellow fever occurring within their respective jurisdictions. (Ibid., sec. 5453.)

## VIRGINIA.

## HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—There is a State board of health consisting of 12 members appointed by the governor, one from each congressional district and two additional from the city of Richmond. The governor also appoints a health commissioner who is the executive officer of the State board of health, although not a member of the board. (Pollard's Code, Biennial, 1908, sec. 1713d.)

*Counties, towns, and cities.*—The State board of health appoints annually three physicians of each county or corporation, who, with

the chairman of the supervisors or the mayor of the corporation, as the case may be, constitute a county, town, or city board of health. This does not apply to cities or towns whose charters provide for the creation of a board of health. Each board elects one of its medical members to be secretary and health officer.

#### MORBIDITY REPORTS.

*Notifiable diseases.*—The State board of health is authorized to prepare and promulgate from time to time a list of diseases considered as infectious, contagious, communicable, or dangerous, and of which cases are to be reported, and to prescribe the manner and time of the report. (Ibid., sec. 2.)

In compliance therewith the State board, in rule 30 (effective Nov. 1, 1910), requires every physician to report immediately to the secretary of the local board of health having jurisdiction, every case of the following-named diseases occurring in his practice: Smallpox, Asiatic cholera, bubonic plague, diphtheria, scarlet fever, and yellow fever. These diseases are termed reportable diseases, Class I. Rule 31 (effective Nov. 1, 1910) requires every physician to report to the secretary of the local board of health having jurisdiction, once each month, cases of the following-named diseases occurring in his practice: Typhoid fever, measles, chickenpox, tuberculosis, and hook-worm disease. These are termed reportable diseases, Class II.<sup>1</sup>

*Physicians.*—Every practicing physician who knows or suspects that any person whom he is called upon to visit, or who comes to him for examination or treatment, is suffering from any infectious, contagious, communicable, or dangerous disease is to report in writing, on blanks to be furnished for that purpose by the State board of health, to the executive officer of the board of health of the county, town, or city in which such person may be located, over his or her own signature, stating the name of the disease, and name, color, sex, and age of the person suffering therefrom, together with the street and number or such other sufficient designation of the house, room, or other place in which said person may be located, and giving such other information as may be deemed necessary by said health authorities. (Acts of 1910, ch. 307, sec. 1.)

*Local health authorities.*—It is the duty of the local authorities of the cities, towns, and counties of the State to report weekly to the State board of health all cases of infectious, contagious, communicable, or dangerous diseases which have occurred within their respective jurisdictions, except that it shall be their duty to report immediately any case or cases of smallpox, yellow fever, cholera, typhus fever, or bubonic plague that may occur. (Acts of 1910, ch. 340, sec. 7.)

#### WASHINGTON.

##### HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—There is a State board of health of five members appointed by the governor. (Ballinger's Code, ch. 10, sec. 2956.) These five so appointed elect a physician, who may or may not be a member of the board, to be State commissioner of health. The State commissioner of health is ex officio secretary and executive officer of the State board of health. (Acts of 1909, ch. 208, secs. 1, 2.)

<sup>1</sup> Poliomyelitis was made notifiable during the early part of 1911. (Letter, State Commissioner of Health, Oct. 31, 1911.)

The State board of health may remove from office any health officer who refuses or neglects to make prompt and accurate reports to the county health officer or to the State board of health, and any officer thus removed may not again be reappointed, except with the consent of the State board. (Acts of 1907, ch. 85, sec. 5.)

*Counties.*—The board of county commissioners in each county constitutes a county board of health having jurisdiction throughout the county, excepting in cities of the first class (cities having a population of over 20,000). This board appoints a physician as health officer, who becomes *ex officio* a member of the board and its executive officer. (Ibid, sec. 1.)

*Cities.*—The mayor of each incorporated city and town is required to appoint a physician as health officer of the city or town. This, however, does not apply to cities of the first class (cities with over 20,000 inhabitants). Nor does it apply to cities of the second class (cities with between 10,000 and 20,000 inhabitants) having a board of health, in which the health officer is appointed by the board of health. (Ibid, sec. 2.)

In cities of the first class, except in those having a board of health organized and a health officer appointed under the provisions of a special charter, the council organizes as a board of health, or appoints wholly or partially from its own members a suitable number of persons to act as such a board. This board appoints a health officer, who is *ex officio* a member of the board and its executive officer. (Ballinger's Code, 1897, sec. 1237.)

#### MORBIDITY REPORTS.

*Notifiable diseases.*—The State board of health is authorized to designate the diseases which shall be construed as dangerous, contagious, or infectious. (Remington and Ballinger's Annotated Codes and Statutes, 1910, sec. 5547.)

The State board of health has declared the following-named diseases to be contagious or infectious, and dangerous to the public health, and, as such, to be reported by physicians: Anterior poliomyelitis, Asiatic cholera, beriberi, chickenpox, diphtheria (or membranous croup), epidemic cerebro-spinal meningitis, favus, leprosy, measles, plague, pellagra, scarlet fever (scarlatina or scarlet rash), smallpox, pulmonary and abdominal tuberculosis, trachoma, typhoid fever, typhus fever, uncinariasis (or hookworm disease), whooping cough, yellow fever, and so-called cedar, Cuban, dobe, Egyptian, Japanese, kangaroo, Manila, or Philippine itch. (Rules and regulations State board of health, 1910, p. 6.)

(NOTE.—So-called cedar, Cuban, dobe, Egyptian, Japanese, kangaroo, or Manila itch are different names at times erroneously used for mild forms of smallpox.)

Smallpox is to be immediately reported by the attending physician, or in his absence by the head of the family or householder, to the local health officer. (Rules and regulations State board of health, 1910, p. 4.)

*Physicians.*—Physicians are required to report within 24 hours to the local health officer having jurisdiction (in cities to the city health officer; outside of cities, to the county health officer) cases of dangerous, contagious, or infectious diseases, or diseases required by the



State board of health to be reported. (Remington and Ballinger's Code, 1910, sec. 5545.)

Every physician is also to report immediately to the local health officer every case of obscure eruptive disease of the nature of which he is in doubt. (Rules and regulations State board of health, 1910, p. 6.)

*Householders.*—Whenever any householder knows that any person within his household is affected with an acute disease, accompanied with eruption of the skin, said householder shall immediately notify either the proper health officer or the family physician. (Rules and regulations State board of health, 1910, p. 6.)

*City health officers.*—All city health officers (except those of cities of the first class) are to report immediately in duplicate to the county health officer and to the State commissioner of health every new outbreak (that is, first case or cases) of any contagious or infectious disease within their respective jurisdictions, and thereafter are to report weekly all contagious and infectious diseases to the county health officer only. If no contagious or infectious disease is present within their jurisdictions, report of the fact is to be made to the county health officer not less than once each month. (Rules and regulations State board of health, 1910, p. 4.)

Health officers of cities of the first class (having a population of over 20,000) make the same reports, and are governed by the same rules as the county health officers, unless otherwise specified, and communicate directly with the State commissioner of health. (Rules and regulations, State board of health, 1910, p. 4.)

*County health officers.*—County health officers are to make monthly reports of all contagious or infectious diseases to the State commissioner of health, by the 5th day of the month for the preceding calendar month. Local health officers send the original reports received or filled out by them to the county health officer, who makes and keeps a record of each case, and who, in addition to his monthly report, forwards therewith to the State commissioner of health the original reports of individual cases of typhoid fever, tuberculosis, epidemic cerebro-spinal meningitis, anterior poliomyelitis, hookworm disease, and pellagra. If no infectious or contagious diseases occur during the month, such fact must be reported.

The county health officer makes his monthly report on blanks furnished by the State commissioner of health, and is to indicate thereon the geographic distribution of cases within his jurisdiction, the cities where no contagious or infectious diseases have occurred during the month, and cities which have neglected to make reports.

Immediately upon learning of the first case of Asiatic cholera, chicken pox in adults, diphtheria, plague, scarlet fever or scarlet rash, smallpox, yellow fever, or typhus fever, within their respective jurisdictions, county health officers must notify the State commissioner of health, and after investigation, send a report stating fully the source of infection and probable number of persons exposed from this or previously unknown cases, the danger of the disease spreading, and what measures have been taken for its control; and thereafter they are to make reports of the course of the disease, as long as cases remain, at such intervals as directed by the commissioner of health. (Rules and regulations, State board of health, 1910, p. 4.)

## WEST VIRGINIA.

## HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The law provides for a State board of health consisting of two physicians from each of the five congressional districts of the State. (Code of 1906, ch. 150.)

*Counties.*—It is made the duty of the county court to nominate and the State board of health to appoint three persons in each county who, together with the president of the county court and the prosecuting attorney for the county, shall constitute the county board of health. One member of this board is to be a physician, who becomes the executive officer of the board and the county health officer. The county board is to enforce within the county, outside of municipalities, the rules and regulations of the State board of health. (Code of 1906, ch. 150.)

*Cities.*—It is made the duty of the council of every incorporated city, town, or village to nominate, and the State board of health to appoint, in each incorporated city, town, or village three persons, one of whom shall be a physician, who, together with the mayor and city solicitor, if there be a city solicitor, constitute a board of health for the municipality, the physician on the board to be health officer. The boards of health of incorporated cities, towns, and villages are independent of the county board, and are auxiliary to the State board of health.

## MORBIDITY REPORTS.

*Physicians.*—It is the duty of physicians, where there is a local board of health, to report promptly cases of disease of the following character: Cholera, smallpox, scarlet fever, diphtheria, tuberculosis, and other endemic, epidemic, infectious, and contagious diseases. (Code of 1906, sec. 4383.)

*City and county boards of health.*—City and county boards of health are required to report at least once in every three months to the State board of health the character of all such infectious, contagious, and epidemic diseases (enumerated above), and the number of persons reported as infected, giving their names. (Ibid.)

## WISCONSIN.

## HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The law provides for a State board of health and vital statistics of seven members. (Wisconsin Statutes, 1898, sec. 1404.) They elect a secretary, who may be a member of the board. If a person is elected who is not a member of the board, he becomes a member upon election as secretary. (Acts of 1905, ch. 433, sec. 1.)

*Towns (townships).*—The town board of every town is required to organize as a board of health, and appoint a health officer, who is ex officio a member of the board and its executive officer. (Acts of 1907, ch. 140, sec. 1411.)

*Cities.*—The village board or common council of every village and city is required to organize as a board of health, and to appoint a health officer, who is ex officio a member of the board and its executive officer. (Ibid.)

## MORBIDITY REPORTS.

*Dangerous and contagious diseases.*—The State board of health has declared the following-named diseases to be “dangerous and contagious”: Asiatic cholera (cholerae), yellow fever, smallpox, typhus fever, leprosy, bubonic plague, diphtheria, scarlet fever (scarlatina), typhoid fever, measles (including rotheln), whooping cough, cerebrospinal meningitis. (Rules Wisconsin State board of health, adopted Aug. 7, 1907), and anterior poliomyelitis. (Rules Wisconsin State Board of Health, adopted Jan. 28, 1910.)

*Physicians, etc.*—Whenever a physician knows or has good reason to believe that any person whom he is attending is sick with a “dangerous, contagious, or infectious” disease, he is required by law to immediately report the case in writing to the local board of health, giving the nature of the disease and the name, age, sex, and place of residence of the person sick. In the absence of an attending physician the report is to be made by the head of the family or the person in charge of the house or building. (Acts of 1909, ch. 85, sec. 1.)

Physicians are required to report to the local board of health the name, age, and address of persons having any of the above-mentioned diseases or tuberculosis, chicken pox, or erysipelas. It is the duty of every physician or person, or owner, agent, manager, principal, or superintendent of every public or private institution or dispensary, hotel, boarding or lodging house, to report to the local (town, city, or village) department of health in writing or to have such a report made by some competent person, giving the name, age, sex, occupation, and latest address of every person afflicted with tuberculosis, who is in his care, or who has come under his observation, within one week. (Acts of 1905, ch. 192.)

*Nurses, etc.*—When one or both eyes of an infant become inflamed, swollen, and red, and show an unnatural discharge at any time within two weeks after its birth, the nurse, parents, or other attendant having charge of the infant are required to report the case in writing within six hours to the local board of health. (Acts of 1909, ch. 59, sec. 1.)

*Local health authorities.*—It is the duty of every local health officer, upon the appearance of any dangerous or contagious disease within his jurisdiction, to immediately investigate all the circumstances attendant upon the appearance of the disease and make a full report to the State board of health. (Wisconsin Statutes, 1898, sec. 1412.)

## WYOMING.

## HEALTH ORGANIZATION FOR THE COLLECTION OF MORBIDITY REPORTS.

*State.*—The law provides for a State board of health of three members appointed by the governor, one member of the board to be a physician, and to constitute the secretary and executive officer of the board. (Acts of 1901, ch. 55, secs. 1, 2.)

*Counties.*—The State board of health appoints a practicing physician in each county to be county health officer. (Ibid., sec. 3.)

The county health officers are under the direction and supervision of the State board of health, and the State board has authority to make such rules and regulations for the government and direction of county health officers as in its judgment may be best suited to maintain the public health. (Ibid., sec. 18.)

The State board or the county health officer may appoint an assistant county health officer in any locality remote from the residence of the county health officer, whenever the State board of health or the county health officer deem it expedient. (Rules and regulations, State board of health, 1909.)

#### MORBIDITY REPORTS.

*Householders.*—Whenever any householder knows or has reason to believe that any person within his family or household has any communicable disease, he is required to immediately give notice thereof to the county health officer or assistant health officer of the county within which he resides, such notice to be given at the office of the health officer within the shortest possible time, and by the most direct means of communication. (Rules and regulations, State board of health, 1909.)

*Physicians.*—Every practicing and licensed physician is required to make an immediate report of every case of communicable disease occurring in his practice to the county health officer. (Rules and regulations, State board of health, promulgated pursuant to sec. 3, ch. 99, Laws of 1909.)

It is the duty of every practicing or licensed physician to report immediately to the secretary of the State board of health and county health officer by telegram or telephone or in the most expeditious manner, every case of smallpox, cholera, scarlet fever, diphtheria or contagious or infectious disease that is a menace to the public health, said telegram to be paid by the State board of health. (Compiled Statutes 1910, sec. 2942.)

*County health officer.*—Whenever in any county a case of smallpox, cholera, typhoid fever, scarlet fever, diphtheria, or other epidemic or contagious or infectious disease is known to exist, it is the duty of the county health officer to immediately notify the secretary of the State board of health. (Compiled Statutes, 1910, sec. 2936).

When typhoid fever appears on any premises from which milk is sold, the health officer shall at once report the same to the State board of health. (Rules and regulations, State board of health, 1909.)

County health officers are required to report all cases of communicable diseases reported to them to the State board of health. (*Ibid.*)

## CERTAIN FEATURES PECULIAR TO THE VARIOUS STATE AND TERRITORIAL LAWS.

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### ALABAMA.

The Medical Association of the State of Alabama constitutes the State board of health and elects the State health officer.

The county medical societies in affiliation with the State association constitute boards of health for their respective counties and are the only local boards of health, others being prohibited. The county board in each county elects a county health officer, and a health officer for each incorporated city and town.

Beriberi and Chagres fever are among the notifiable diseases.

### ARKANSAS.

The jurisdiction of boards of health of cities with over 2,500 inhabitants extends 1 mile beyond the city limits, except in the time of epidemic, when, for quarantine purposes, it extends 5 miles.

There appears to be no requirement for the reporting of sickness.

### CALIFORNIA.

Syphilis and gonococcus infection are included among the diseases required by law to be reported by physicians to the local health authorities and by the local health authorities to the State board of health.

Physicians are required to report to the State board of health cases of poisoning by lead, phosphorus, arsenic, or mercury, or their compounds, cases of anthrax, and cases of compressed-air illness, contracted as a result of the nature of the patient's employment, and are entitled to a fee of 50 cents for each such report. (Acts of 1911, ch. 485, sec. 1.)

### CONNECTICUT.

The county health officers are attorneys at law, appointed by the judges of the superior court.

### DELAWARE.

The governor appoints three physicians in each county to be health officers of the county.

### FLORIDA.

Physicians report cases of the notifiable diseases direct to the State health officer, or State board of health—cases of yellow fever, smallpox, and cholera being reported by telegram at State expense. No State provision is made for local health officers or boards, excepting that made in the charters of certain cities.

## ILLINOIS.

The council and trustees of cities and villages have for sanitary purposes jurisdiction extending one-half mile beyond the corporation limits.

## IOWA.

Cases of the notifiable diseases are in cities and towns reported to the mayor, outside of cities and towns to the clerk of the township.

## KENTUCKY.

The law specifies that reports of cases of the notifiable diseases shall be made to the county board of health or some member of the board.

## LOUISIANA.

The sanitary code specifies that whenever a quarantinable disease breaks out within the State the president of the State board of health is to immediately notify the health authorities of surrounding States and the Surgeon General of the Public Health and Marine-Hospital Service.

## MASSACHUSETTS.

The State is divided into 14 health districts with a State inspector of health in each district.

## MICHIGAN.

For each complete report of a notifiable disease made by a physician to the local health authorities the physician is entitled to receive the sum of 10 cents from the township, city, or village in which the notice was given.

For cases of tuberculosis physicians are required to report in addition to the name, age, sex, color, nativity, and address of the patient also the occupation engaged in at the time the disease was contracted and each subsequent occupation engaged in up to the time of recovery or death. When a patient recovers, the fact is also to be reported.

## MISSISSIPPI.

Reports of cases of the notifiable diseases are to be made direct to the secretary of the State board of health.

## MISSOURI.

There appears to be no State requirement for the reporting of sickness by physicians.

## NEVADA.

There appears to be no requirement for the reporting of sickness.

## NEW JERSEY.

Physicians attending cases of typhoid fever, dysentery, scarlet fever, diphtheria or tuberculosis on any dairy premises where milk is produced for sale or distribution. or in any household any member

of which is employed at such a dairy, are required to report the cases to the State board of health within 12 hours.

Physicians and householders are entitled to the sum of ten cents for each case of a notifiable disease reported by them. Local authorities are entitled to the same amount for each case reported by them to the state board of health.

#### NEW MEXICO.

Outside of incorporated cities and towns reports of cases of the notifiable diseases are made to the justice of the peace of the precinct.

#### NEW YORK.

The physician or other person who reports a case of a notifiable disease is entitled to the sum of 25 cents therefor.

Health officers of villages and towns are paid by their respective village or town a sum not to exceed 20 cents for each case of notifiable disease reported by them to the State department of health.

#### SOUTH CAROLINA.

Physicians outside of incorporated cities and towns report cases of the notifiable diseases direct to the secretary of the State board of health.

#### TENNESSEE.

Boards of health of cities have jurisdiction and authority in the territory extending for 1 mile beyond the corporation limits.

#### UTAH.

The laws of Utah make the penalty for the willful violation of the law in regard to the reporting of infectious diseases the cancellation or revocation of the practitioner's license. (Utah Compiled Laws 1907, sec. 1735-1736, as amended by acts of 1911, ch. 93.)

Physicians are required to report immediately to the local board of health cases of venereal disease.

Upon the notification of a case of inflammation of the eyes in a newly born child the local health officer is required to report immediately by telephone or telegraph to the State board of health.

#### WASHINGTON.

The State board of health may remove from office any health officer who refuses or neglects to make prompt and accurate reports to the county health officer or to the State board of health.

*Diseases notifiable in each of the States and Territories.*

[The plus signs (+) indicate the notifiable diseases.]

States.	Actinomycosis.	Anthrax.	Beriberi.	Cancer.	Cerebro-spinal meningitis.	Chagas fever.	Chicken pox.	Cholera (Asiatic).	Dengue.	Diphtheria.	Dysentery.	Epidemic dysentery.	Erysipelas.	Favus.	German measles.	Glanders.	Gonococcus infection.	Leprosy.	Malaria.	Measles.	Mumps.	Ophthalmia neonatorum.	Pellagra.	Plague.	Pneumonia.	Poliomylitis.	
1 Alabama.....																											
2 Alaska.....																											
3 Arizona.....																											
4 Arkansas.....																											
5 California.....																											
6 Colorado.....																											
7 Connecticut.....																											
8 Delaware.....																											
9 District of Columbia.....																											
10 Florida.....																											
11 Georgia.....																											
12 Hawaii.....																											
13 Idaho.....																											
14 Illinois.....																											
15 Indiana.....																											
16 Iowa.....																											
17 Kansas.....																											
18 Kentucky.....																											
19 Louisiana.....																											
20 Maine.....																											
21 Maryland.....																											
22 Massachusetts.....																											
23 Michigan.....																											

1 California.—Medical practitioners are also to report cases of certain occupation diseases, see page 14.

2 Connecticut.—See also statement of the secretary of the State board of health, page 16.

3 When no physician is in attendance, cases of ophthalmia neonatorum are to be reported to the local health officer by the midwife, nurse, or other person in charge of the child.

4 Hawaii.—In addition follicular conjunctivitis, amoebic dysentery and paratyphoid fever are required to be reported.

5 Illinois.—Requires certain occupation diseases to be reported also, see page 23.

6 Maine.—Cases of ophthalmia neonatorum are to be reported to a physician by the nurse or other attendant.

7 Michigan.—Physicians are also to report cases of certain occupation diseases, see page 33.





- 1 Mississippi.—In addition to the diseases enumerated it is specified that cases of other virulent epidemic contagious diseases shall be reported.
- 2 New Hampshire.—In addition to the diseases enumerated malignant pestilential diseases and malignant communicable diseases are to be reported.
- 3 When no physician is in attendance, cases of ophthalmia neonatorum are to be reported to the local health officer by the midwife, nurse, or other person in charge of the child.
- 4 New York.—Physicians are also to report cases of certain occupation diseases, see page 156.
- 5 Cases of ophthalmia neonatorum are to be reported either to a physician or to the local health officer by the nurse or other person in charge of the child.
- 6 Oregon.—Barber's Itch is also reportable.
- 7 Rhode Island.—Requires meningial tuberculosis to be reported also.
- 8 Utah.—Requires also that venereal diseases shall be reported, see page 58.
- 9 West Virginia.—In addition other endemic, epidemic, infectious, or contagious diseases are to be reported.

When a physician is in attendance the case is not reported.

*Diseases notifiable in each of the States and Territories—Continued.*

States.	Puerperal fever.	Rabies.	Relapsing fever.	Rocky Mountain (spor- ted) fever.	Scarlet fever.	Smallpox.	Syphilis.	Tetanus.	Trachoma.	Trichinosis.	Tuberculosis.				Typhoid fever.	Typhus fever.	Tinea.	Whooping cough.	Yellow fever.	Contagious or infectious diseases dangerous to the public health.	Communicable diseases.	Contagious diseases.	Diseases dangerous to the public health.	Epidemic diseases.	Infectious diseases.	Pestilential diseases.		
											All forms.	Communicable forms.	Abdominal.	Laryngeal.													Pulmonary.	
1 Alabama.....																												
2 Alaska.....																												
3 Arizona.....																												
4 Arkansas.....																												
5 California <sup>1</sup> .....																												
6 Colorado.....																												
7 Connecticut <sup>2</sup> .....																												
8 Delaware.....																												
9 District of Columbia.....																												
10 Florida.....																												
11 Georgia.....																												
12 Hawaii <sup>3</sup> .....																												
13 Idaho.....																												
14 Illinois <sup>4</sup> .....																												
15 Indiana.....																												
16 Iowa.....																												
17 Kansas.....																												
18 Kentucky.....																												
19 Louisiana.....																												
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21 Maryland.....																												
22 Massachusetts.....																												
23 Michigan <sup>5</sup> .....																												
24 Minnesota.....																												
25 Mississippi <sup>7</sup> .....																												
26 Missouri.....																												
27 Montana.....																												
28 Nebraska.....																												
29 Nevada.....																												
30 New Hampshire <sup>8</sup> .....																												
31 New Jersey.....																												
32 New Mexico.....																												
33 New York <sup>10</sup> .....																												
34 North Carolina.....																												
35 North Dakota.....																												



*Notifiable diseases and the health authorities to and through whom reported.*

States.	Notifiable diseases.	By whom reported.	To whom reported.	When reported.	Remarks.
1 Alabama.....	1, leprosy; 2, cholera; 3, typhus fever; 4, cerebro-spinal meningitis; 5, yellow fever; 6, scarlet fever; 7, plague; 8, hydrophobia; 9, glanders; 10, smallpox; 11, diphtheria; 12, tuberculosis (pulmonary); 13, typhoid fever; 14, chagres fever; 15, beriberi.	1, physicians; 2, midwives and other persons to report suspected cases.	Local health officer.....	As soon as can be done.....	Municipal health officers are to report the presence of any of these diseases promptly to the committee of public health of the county board of health and to the State health officer. County health officers also are to report to the State health officer the presence of any of these diseases in their respective counties.
2 Alaska.....					
3 Arizona.....	1, contagious, epidemic, or infectious diseases.	Physicians or other persons.....	Local board of health.....	Immediately.....	The attending physician is to report twice each week the status of the case.
		Keepers of private houses, boarding houses, lodging houses, inns, or hotels.	Local board of health.....	Within 24 hours.....	
	1, smallpox; 2, scarlet fever; 3, diphtheria; 4, other infectious or contagious diseases.	Local boards of health (in cities, the city board; for the Territory outside of cities, the county board.)	Territorial board of health.....	Immediately.....	
4 Arkansas.....					The law makes it the duty of the State board of health to have general supervision over the registration of prevalent diseases.
5 California.....	1, cholera; 2, plague; 3, yellow fever; 4, leprosy; 5, diphtheria; 6, scarlet fever; 7, smallpox; 8, typhus fever; 9, typhoid fever; 10, anthrax; 11, glanders; 12, epidemic cerebrospinal meningitis; 13, tuberculosis; 14, pneumonia; 15, dysentery; 16, erysipelas; 17, uncinariasis;	Physicians, nurses, or other persons having charge of or caring for cases.  1, local health officers; 2, members of local boards of health; 3, coroners.	Local board of health, or health officer.  State board of health.....	At once.....  At once.....	

<p>18, trachoma; 19, dengue; 20, tetanus; 21, measles; 22, German measles; 23, chicken pox; 24, whooping cough; 25, mumps; 26, pellagra; 27, beriberi; 28, syphilis; 29, gonococcus infection; 30, rabies; 31, poliomyelitis.</p>	<p><b>Physicians, nurses, clergy-men, attendants, etc.</b> 1, boards of health of cities and towns, and the chief executive health officer where there is no municipal or town board of health; 2, county health officers.</p>	<p><b>Local health officer or board of health.</b> State board of health.....</p>	<p>Promptly..... On or before the 5th day of each month.</p>	
<p>1, plague; 2, Asiatic cholera; 3, yellow fever; 4, typhus fever.</p>	<p>Local boards of health and health officers.</p>	<p>Secretary of the State board of health.</p>	<p>Immediately by telegraph.</p>	
<p>Poisoning by lead, phosphorus, arsenic, or mercury, or their compounds, anthrax and compressed-air illness when contracted as a result of the nature of the patient's employment.</p>	<p>Physicians..... State board of health.....</p>	<p>State board of health..... Commissioner of the bureau of labor statistics.</p>		
<p>1, smallpox; 2, or any other disease dangerous to the public health. 1, smallpox; 2, cholera; 3, diphtheria; 4, scarlet fever; 5, or other diseases dangerous to the public health.</p>	<p>Householders..... Physicians.....</p>	<p>Local (city or county) health officer. 1, local board of health; 2, householder, hotel keeper, keeper of a boarding house or tenant within whose house or rooms the sick person happens to be.</p>	<p>Immediately..... Immediately.....</p>	<p>City and county health officers are required to keep the secretary of the State board of health constantly informed respecting every outbreak of a disease dangerous to the public health.</p>
<p>1, cholera; 2, yellow fever; 3, typhus fever; 4, leprosy; 5, smallpox; 6, diphtheria; 7, membranous croup; 8, typhoid fever; 9, scarlet fever; 10, or other contagious or infectious diseases, except those of a venereal nature.</p>	<p>Physicians.....</p>	<p>Health officer of the town (township), city, or borough.</p>	<p>Within 12 hours after the nature of the disease has been recognized.</p>	

*Notifiable diseases and the health authorities to and through which reported—Continued.*

States.	Notifiable diseases.	By whom reported.	To whom reported.	When reported.	Remarks.
7 Connecticut (con.)	1, tuberculosis.....	1, physicians; 2, officers in charge of hospitals, dispensaries, asylums, and other similar institutions.	Health officer of the town (township), city, or borough.	Within 24 hours.....	
	1, malignant or contagious diseases.	Hotel and lodging-house keepers.	Local board of health.....	Within 12 hours.....	
	Ophthalmia neonatorum.....	Midwife, nurse, or attendant..	Local health authority.....	Within 6 hours.....	
	1, smallpox; 2, cholera; 3, or any epidemic of infectious disease.	Local health officers.....	Secretary State board of health.	Immediately.....	
	Contagious diseases reported...	Health officers of towns (townships), cities, and boroughs.	State board of health.....	On or before the 8th day of each month for the preceding calendar month.	
	Rabies.....	Local health officers.....	Commissioner of domestic animals.	Within 24 hours.....	
8 Delaware.....	Contagious or infectious diseases.	Physicians, dentists, veterinary surgeons, or others practicing medicine.	Local or State board of health.	Promptly.....	
	Disease dangerous to the public health required by the State board of health to be reported.	Physician or other person having knowledge.	Nearest health authority...	.....	
	Contagious or infectious diseases.	Local health authorities.....	State board of health.....	.....	
9 District of Columbia.	1, Asiatic cholera; 2, yellow fever; 3, typhus fever; 4, smallpox; 5, leprosy; 6, plague; 7, glanders.	1, physician in attendance; or 2, the head of the family; or 3, the nearest relative present; or 4, any person in attendance.	Health officer.....	Immediately.....	
	8, diphtheria; 9, scarlet fever; 10, measles; 11, whooping cough; 12, chicken pox; 13, cerebro-spinal meningitis;	1, physician in attendance; or 2, the head of the family; or 3, the nearest relative present; or 4, any person in at-	Health officer.....	.....	When the case terminates the person in charge is to report the fact to the health officer.

	<p>14, typhoid fever; 15, polio-myelitis.</p>	<p>tendance.</p>	<p>Health officer.....</p>	<p>Within 1 week after the disease is recognized.</p>	
<p>10</p>	<p>Tuberculosis (pulmonary) or other communicable forms.</p>	<p>1, physicians; 2, officers having charge of hospitals, dispensaries, asylums, and similar institutions.</p>	<p>Health officer.....</p>	<p>In writing so that the report shall be received within 6 hours by the health officer.</p>	<p>Physicians are not required to report.</p>
	<p>Ophthalmia neonatorum.....</p>	<p>Midwife or other person in attendance at child/birth other than a registered physician.</p>	<p>Health officer.....</p>	<p>Immediately.....</p>	<p>The report to the State board is to be made by telegram at State expense or in the most expeditious manner.</p>
<p>11</p>	<p>1, yellow fever; 2, smallpox; 3, cholera.</p>	<p>Physicians.....</p>	<p>1, President of the State board of health; 2, city or county authorities.</p>	<p>Immediately by first mail.</p>	
	<p>1, diphtheria; 2, leprosy; 3, scarlet fever.</p>	<p>1, physicians; or 2, any person having charge of or upon whose premises the case exists.</p>	<p>1, State health officer; or 2, an agent of the State board of health.</p>	<p>Immediately.....</p>	
	<p>1, smallpox; 2, Asiatic cholera; 3, yellow fever; 4, typhus fever; 5, scarlet fever; 6, diphtheria; 7, membranous croup.</p>	<p>1, physicians; 2, householders; 3, heads of families; 4, county or municipal authorities.</p>	<p>Local board of health, or its proper officer.</p>	<p>Promptly.....</p>	<p>The discovery of the presence of these diseases is to be reported and not the cases themselves.</p>
	<p>1, Asiatic cholera; 2, yellow fever; 3, scarlet fever; 4, smallpox; 5, diphtheria; 6, typhus fever; 7, typhoid fever; 8, such other contagious, or infectious diseases as the State board of health may from time to time specify.</p>	<p>1, local boards of health; 2, physicians in localities where there are no health authorities.</p>	<p>State board of health.....</p>		



*Notifiable diseases and the health authorities to and through which reported—Continued.*

States.	Notifiable diseases.	By whom reported.	To whom reported.	When reported.	Remarks.
12 Hawaii.....	1, cerebrospinal meningitis; 2, cholera; 3, follicular conjunctivitis; 4, diphtheria; 5, amoebic dysentery; 6, typhoid fever; 7, paratyphoid fever; 8, leprosy; 9, measles; 10, dengue; 11, poliomyelitis; 12, whooping cough; 13, plague; 14, scarlet fever; 15, tetanus; 16, trachoma; 17, tuberculosis; 18, typhus fever; 19, chickentox; 20, smallpox; 21, yellow fever, or any other infectious or communicable disease or disease dangerous to the public health.	Physicians.....  Householders, keepers of boarding or lodging houses, masters of vessels, police officers.	Board of health or its nearest agent.  Board of health or its nearest agent.	Immediately, in writing...  Immediately.....	The recovery of cases of tuberculosis is also to be reported.  Superintendents of institutions are to report cases of tuberculosis coming under their care within 24 hours.
	1, smallpox; 2, scarlet fever; 3, diphtheria; 4, plague; 5, cholera; 6, yellow fever; 7, typhus fever; 8, cerebrospinal meningitis; 9, amoebic dysentery.	Physicians.....	Board of health or its nearest agent.	Immediately, by telephone or by direct oral communication.	This is in addition to the report in writing.
13 Idaho.....	Leprosy—known or suspected.	Any and every person.....	Board of health or its agent..	Forthwith.....	
	1, Asiatic cholera; 2, yellow fever; 3, smallpox; 4, chicken pox; 5, typhus fever; 6, leprosy; 7, bubonic plague; 8, diphtheria; 9, scarlet fever; 10, typhoid fever; 11, measles (including rotheln); 12, whooping cough; 13, cerebro-spinal meningitis; 14, infantile paralysis.	1, physicians; 2, in the absence of an attending physician, the owner or agent of the building in which the case occurs, or the head of the family is to report.	Local board of health.....	Within 24 hours.....	Health reports of municipal boards of health must be transmitted to the county board of health quarterly, and the secretary of the county board is to make a quarterly report to the State board of health, containing a summary of contagious and infectious diseases.
	Ophthalmia neonatorum.....	Midwife, nurse, or other person having charge.	Local health officer or physician.	Within 6 hours.....	

14	Illinois.....	1, smallpox; 2, scarlet fever; 3, diphtheria; 4, Asiatic cholera; 5, yellow fever; 6, plague; 7, glanders; 8, anthrax; 9, leprosy.	Local health authorities..... 1, attending physician; or 2, the householder in whose dwelling the case occurs. Local health authorities.....	Local health authorities..... Secretary of the State board of health. Local health officer or physician. State board of health..... State department of factory inspection.	Immediately..... The first case immediately and the progress of outbreaks at least once a week. Within 6 hours..... Immediately..... Immediately..... Immediately.....	
15	Indiana.....	Ophthalmia neonatorum..... Disease or illness due or incidental to occupation. 1, yellow fever; 2, smallpox; 3, cholera; 4, diphtheria; 5, membranous croup; 6, scarlet fever; 7, measles; 8, typhus fever; 9, plague; 10, leprosy; 11, tuberculosis (pulmonary); 12, typhoid fever; 13, chicken pox; 14, whooping cough.	Midwife or nurse having charge of infant. Physicians making physical examination of employees for occupation diseases. Secretary of State board of health. 1, physicians and midwives; 2, householder or person having case in charge. Town and city health officers. County health commissioners.	Local health authorities..... Secretary of the State board of health. Local health officer or physician. State board of health..... State department of factory inspection.	Immediately..... The first case immediately and the progress of outbreaks at least once a week. Within 6 hours..... Immediately..... Immediately..... Immediately..... By the 2d of each month forwards the original reports received during the preceding month. By the 8th day of each month for the preceding month. Within 6 hours.....	County health commissioners also, make a quarterly report of contagious diseases to the State board of health.
16	Iowa.....	Ophthalmia neonatorum when no physician is in attendance. 1, scarlet fever; 2, diphtheria; 3, smallpox; 4, cholera; 5, leprosy; 6, cerebrospinal meningitis; 7, plague; 8, poliomyelitis.	Parents or persons in charge of infant. 1, attending physician; or 2, in his absence by the householder of the premises where in the disease exists. 1, mayors of municipalities; 2, clerks of townships.	Local health officer..... 1, mayor of the city or town; 2, clerk of the township if outside of a municipality. Secretary of the State board of health.	Within 6 hours..... An immediate report to be made, followed within 24 hours by a written notice of the case. Within 24 hours, and by the 1st of February for the preceding calendar year.	

*Notifiable diseases and the health authorities to and through which reported—Continued.*

States.	Notifiable diseases.	By whom reported.	To whom reported.	When reported.	Remarks.
16 Iowa—(contd.) . . . . .	Ophthalmia neonatorum. . . . .	Midwife, parent, guardian, nurse, or other person having charge of the infant.	Health officer or some legally qualified practitioner.	Within 6 hours. . . . .	
17 Kansas . . . . .	1, cholera; 2, smallpox; 3, scarlet fever; 4, diphtheria; 5, cerebrospinal meningitis; or 6, any disease dangerous to the public health.  Tuberculosis. . . . .	1, physician; 2, householders to report cases in their families.  1, physicians; 2, chief officer having charge for the time being of any hospital, dispensary, asylum, or other similar private or public institution.	Nearest board of health or health officer.  1, county health officer; or 2, in cities of the first class to the city health officer.	Within 24 hours. . . . .	Municipal and county boards of health and health officers having knowledge of any contagious or infectious disease within their jurisdiction are required to communicate without delay the results to the State board of health.
18 Kentucky . . . . .	1, cholera; 2, smallpox; 3, yellow fever; 4, scarlet fever; 5, diphtheria; and 6, other epidemic and communicable diseases.	1, physicians to report cases in their families; 2, heads of families to report cases in their families.	1, county board of health or to some member of the board.	Within 24 hours . . . . .	
19 Louisiana. . . . .	Diseases of an infectious, contagious, or pestilential nature.  Smallpox. . . . .  Consumption. . . . .	County boards of health. . . . . Physicians. . . . .  1, attending physician; or 2, the head of the household or manager of the hotel, lodging house or camp where the case occurs; when no physician is in attendance.  Physicians. . . . .	State board of health. . . . . Local board of health. . . . .  Health officer having jurisdiction, or in the absence of such health officer, the president of the State board of health.  Municipal or parish health officer.	At least once in 3 months. . . . . Within 24 hours. . . . .  Immediately . . . . .  Immediately . . . . .	
	Ophthalmia neonatorum. . . . .	Parish health officer. . . . .	State board of health. . . . . Town or parish health officer.	Quarterly. . . . . Within 12 hours. . . . .	

Pneumonia.....	1, attending physician; or 2, in his absence by the head of the household.	Local health officer.....	Promptly.....	
Dengue.....	Attending physician.....	Local health officer.....	Within 24 hours.....	
Yellow fever.....	Municipal and parish health officers.....	President State board of health.....	Immediately.....	
Quarantinable diseases.....	Local board of health.....	State board of health.....	Weekly.....	
	State board of health.....	1, health authorities of surrounding States; 2, Surgeon General of the Public Health and Marine-Hospital Service	Immediately.....	
1, smallpox; 2, diphtheria; 3, scarlet fever; 4, cholera; 5, typhus fever; 6, typhoid fever; 7, cerebrospinal meningitis; 8, measles; 9, membranous croup; 10, whooping cough.	Householders.....	1, health officer of the town; or 2, the secretary of the local board of health.	Within 24 hours.....	
Tuberculosis.....	1, physicians; 2, chief officer having charge for the time being of any hospital, dispensary, asylum, sanatorium, or other similar private or public institution.	Secretary State board of health.	Within 48 hours.....	The State board of health is to keep a register of persons affected with tuberculosis.
1 smallpox; 2, diphtheria; 3, scarlet fever; 4, typhoid fever; 5, cerebrospinal meningitis; 6, measles; 7, membranous croup; 8, whooping cough; 9, tuberculosis (pulmonary).	Local boards of health.....	State board of health.....	Promptly.....	
Ophthalmia neonatorum.....	Midwife, nurse, or person in charge.	Legally qualified practitioner of medicine.	At once.....	

*Notifiable diseases and the health authorities to and through which reported—Continued.*

States.	Notifiable diseases.	By whom reported.	To whom reported.	When reported.	Remarks.
21 Maryland.....	1, smallpox; 2, diphtheria; 3, membranous croup; 4, scarlet fever; 5, typhoid fever; 6, typhus fever; 7, yellow fever; 8, measles; 9, whooping cough; 10, any other contagious or infectious disease dangerous to the public health.	Physicians.....	Board of health of the city, town, or county.	Immediately.....	
	1, pulmonary or laryngeal tuberculosis.	Physicians..... The superintendent or other person in charge or control of any hospital, dispensary, school, reformatory, or other institution deriving the whole or any part of its support from the public funds of the State or of any city, town, or county.	Secretary of the State board of health. State board of health.....	Within 7 days..... Weekly on Monday for the preceding week.	The State board of health is to keep a register of all persons known to be affected with tuberculosis.
	1, smallpox; 2, diphtheria; 3, membranous croup; 4, scarlet fever; 5, typhoid fever; 6, typhus fever; 7, measles; 8, mumps; 9, whooping cough; 10, any other infectious or contagious disease dangerous to the public health.	Householder.....	Board of health of the city or county.	Immediately.....	
	1, smallpox; 2, cholera; 3, yellow fever; 4, typhus fever; 5, typhoid fever; 6, scarlet fever; 7, leprosy; 8, any other infectious or contagious disease occurring on the premises under their management.	Hotel keepers, keepers of boarding houses and lodging houses, superintendents, managers, or directors of private or public institutions of any kind.	Health officer of the city or town or in the absence of such an officer to the secretary of the State board of health.	Immediately in writing....	
	1, smallpox; 2, any other contagious or infectious disease	Boards of health of cities, towns, and counties.	State board of health.....	Within 24 hours.....	In practices local boards of health report to the State

<p><b>Massachusetts</b>.....</p>	<p>dangerous to the public health.</p> <p>Ophthalmia neonatorum.....</p> <p>1, actinomycosis; 2, anterior poliomyelitis; 3, Asiatic cholera; 4, cerebro-spinal meningitis; 5, diphtheria; 6, glanders; 7, leprosy; 8, malignant pustule; 9, measles; 10, ophthalmia neonatorum; 11, scarlet fever; 12, smallpox; 13, tetanus; 14, trachoma; 15, trichinosis; 16, tuberculosis; 17, typhoid fever; 18, typhus fever; 19, varicella; 20, whooping cough; 21, yellow fever.</p>	<p>Midwife, nurse, or other person in charge.</p> <p>Householder.....</p> <p>Physician.....</p> <p>Boards of health of cities and towns (townships).</p>	<p>Local health officer or a physician.</p> <p>Board of health of the city or town (township).</p> <p>Selectmen or board of health of the town (township).</p> <p>State board of health.....</p>	<p>Immediately.....</p> <p>Forthwith.....</p> <p>Immediately.....</p> <p>Within 24 hours.....</p>	<p>board of health once a month cases of smallpox, diphtheria, typhoid fever, scarlet fever, measles, whooping cough, and mumps, and other diseases irregularly. Local boards of health are also required to report promptly to the State board of health the existence of any epidemic or unusual sickness.</p>
<p><b>Michigan</b>.....</p>	<p>Inflamed eyes in infants under 2 weeks of age.</p> <p>1, pneumonia; 2, tuberculosis; 3, typhoid fever; 4, meningitis; 5, diphtheria; 6, whooping cough; 7, scarlet fever; 8, measles; 9, smallpox; 10, cholera. (See "Remarks.")</p>	<p>Nurses, relative, or other attendant.</p> <p>Physician.....</p>	<p>Board of health of the city or town (township).</p>	<p>Within 6 hours.....</p> <p>Immediately.....</p>	
	<p>Tuberculosis.....</p>	<p>Householder, hotel keeper, keeper of a boarding house, or tenant having cases in his family or on his premises.</p> <p>Health officers of cities, villages, and townships.</p> <p>1, physicians; 2, chief officer having charge for the time being of any asylum, hospital, dispensary, or other similar private or public institution.</p>	<p>Local health officer.....</p> <p>Secretary of the State board of health.</p> <p>Local health officer.....</p>	<p>Immediately.....</p> <p>Constantly informed, respecting the outbreak.</p> <p>Within 24 hours.....</p>	<p>By regulation the following-named diseases are to be reported for statistical purposes: Typhus, rabies, cancer, erysipelas, and leprosy.</p>

*Notifiable diseases and the health authorities to and through which reported—Continued.*

States.	Notifiable diseases.	By whom reported.	To whom reported.	When reported.	Remarks.
23 Michigan (contd.).	Inflamed eyes of infants under 2 weeks of age. 1. Poisoning by lead, phosphorus, arsenic, or mercury, or their compounds. 2. Anthrax..... 3. Compressed-air illness when contracted as a result of the patient's employment.	Mid wives, nurses, or other persons in charge of the infant.  Physicians.....  State board of health.....	Local health officer or a physician.  State board of health.....  Commissioner of labor.....	Within 6 hours.....	
24 Minnesota.....	1, smallpox; 2, cerebro-spinal meningitis; 3, anterior poliomyelitis; 4, scarlet fever; 5, diphtheria; 6, measles.  Tuberculosis, typhoid fever...  1, smallpox; 2, scarlet fever; 3, diphtheria; 4, cerebro-spinal meningitis; 5, anterior poliomyelitis; 6, measles; 7, typhoid fever; 8, tuberculosis.  Ophthalmia neonatorum.....	Physicians.....  Physicians.....  Local health officer.....  Physicians.....	Local health officer.....  State board of health.....  Secretary of the State board of health.  Local health officer.....	Immediately.....  Within 1 week.....  Immediately.....  Within 12 hours.....	
25 Mississippi.....	1, yellow fever; 2, cholera; 3, dengue; 4, smallpox; 5, or other virulent, epidemic, contagious disease.  Tuberculosis, consumption, and other pulmonary diseases.	Physicians.....  Physicians.....	Secretary of State board of health.  Secretary of State board of health.	Immediately.....  Within 10 days.....	
26 Missouri.....	1, smallpox; 2, diphtheria; 3, membranous croup; 4, scarlet fever; 5, typhus fever; 6, yellow fever; 7, cholera; 8, plague; 9, leprosy.	County health officer.....	Secretary of State board of health.	1, immediately; 2, quarterly.	

27 <b>Montana</b> .....	1, smallpox; 2, diphtheria; 3, scarlet fever; 4, cholera; 5, plague; 6, yellow fever; 7, Rocky Mountain spotted, or tick fever; 8, typhus fever; 9, typhoid fever; 10, cerebro-spinal meningitis; 11, measles.	1, householders; 2, physicians...  City, town, and county health officers.	Health officer of the town, city, or county.  Secretary of the State board of health.	Immediately.....  On or before the 5th day of each month for the preceding calendar month.	
28 <b>Nebraska</b> .....	1, Asiatic cholera; 2, yellow fever; 3, smallpox; 4, diphtheria; 5, scarlet fever; 6, measles; 7, typhus fever; 8, ophthalmia neonatorum; 9, typhoid fever; 10, cerebro-spinal meningitis; 11, leprosy; 12, whooping cough; 13, chickenpox; 14, tuberculosis; 15, puerperal fever; 16, or any other disease contagious or dangerous to the public health.	Local board of health.....	1, local board of health; 2, where no local board of health is organized, the report is to be made to the State board of health.	Within 24 hours by the most expedient method.	
29 <b>Nevada</b> .....		Local board of health.....	State board of health.....	From time to time.....	
30 <b>New Hampshire</b> ..	1, smallpox (diagnosed or suspected); 2, cholera; 3, diphtheria; 4, scarlet fever; 5, or other malignant pestilential disease.	Physicians.....  If no physician is in attendance, report to be made by any person who knows or has reason to believe that any member of his family or household (boarder, roomer, or visitor) is affected.	1, health officer of the town (township); 2, or in his absence to the selectmen of the town (township).  Local board of health.....	Immediately.....  Within 24 hours.....	
	Tuberculosis.....	Local board of health.....	State board of health.....	Immediate report of the first appearance of the disease and a weekly report thereafter as long as the disease continues.	The recovery of cases is also to be reported.



*Notifiable diseases and the health authorities to and through which reported—Continued.*

States.	Notifiable diseases.	By whom reported.	To whom reported.	When reported.	Remarks.
31 New Jersey.....	1, cholera; 2, yellow fever; 3, typhus fever; 4, leprosy; 5, plague; 6, trichinosis; 7, smallpox; 8, typhoid fever; 9, diphtheria; 10, membranous croup; 11, scarlet fever; 12, poliomyelitis; 13, trachoma; 14, rabies; 15, glanders; 16, anthrax; 17, chicken pox; 18, tuberculosis; 19, malaria.	1, physician; 2, when no physician is in attendance the report is to be made by the house owner or the householder.	Local board of health or, in the absence of such board, the assessor of the township.	Within 12 hours.....	
	Tuberculosis.....	1, physicians; 2, chief officer having charge, for the time being of any hospital, asylum, prison, or other private or public institution.	Local board of health.....	Within 48 hours.....	
	1, typhoid fever; 2, dysentery; 3, scarlet fever; 4, diphtheria; 5, tuberculosis.	Physicians are to report cases occurring on dairy premises where milk is produced for sale or distribution or in households of which any member is employed on any dairy premises.	State board of health.....	Within 12 hours.....	
	Inflamed eyes in infants under 2 weeks of age.	When no physician is in attendance, the midwife, nurse, attendant, or relative having charge of the infant.	Local board of health.....	Within 6 hours.....	
32 New Mexico.....	1, smallpox; 2, or other contagious or infectious disease dangerous to the public health.	1, physician; 2, householder or other person.	1, county health officer, if within a city, town, or village; 2, justice of the peace of the precinct, if outside of a city.	At once.....	
33 New York.....	1, poliomyelitis; 2, anthrax; 3, plague; 4, cancer; 5, cerebrospinal meningitis; 6, cholera; 7, diphtheria; 8, hydrophobia; 9, leprosy; 10, measles;	1, physician; 2, when no physician is in attendance, the report is to be made by the superintendent or other officer of an institution, hospital,	Health officer of the city, village, or town (township).	Immediately.....	The physician or other person making the report is entitled to the sum of 25 cents therefor.

<p>11, ophthalmia neonatorum; 12, pellagra; 13, pneumonia; 14, scarlet fever; 15, smallpox; 16, tetanus; 17, tuberculosis (pulmonary or laryngeal); 18, typhoid fever; 19, typhus fever; 20, whooping cough; 21, yellow fever.</p>	<p>Poisoning from lead, phosphorus, arsenic, or mercury, or their compounds, or from anthrax, or from compressed air illness contracted as the result of the nature of the patient's employment.</p>	<p>or hotel or lodging-house keeper, or other person where the case occurs.</p> <p>Health officers of cities, villages, and towns (townships).</p> <p>Physicians.....</p>	<p>State department of health..</p> <p>Commissioner of labor .....</p>	<p>Once a month.....</p>	<p>Health officers of villages and towns (townships) are to be paid a sum not to exceed 20 cents for each case reported.</p>
<p>North Carolina.....</p>	<p>Smallpox .....</p> <p>1, smallpox; 2, typhus fever; 3, yellow fever; 4, cholera.</p> <p>1, smallpox; 2, diphtheria; 3, scarlet fever; 4, typhus fever; 5, yellow fever; 6, cholera; 7, measles; 8, whooping cough; 9, plague.</p>	<p>Local boards of health.....</p> <p>If health officers, commissioners of health, or boards of health of cities of the first class (population over 175,000).</p> <p>1, physician; 2, householders..</p> <p>Deputy quarantine officer of township.</p> <p>Quarantine officers (county and city).</p> <p>Quarantine officers.....</p> <p>Physician.....</p> <p>Physician or other person.....</p>	<p>State department of health..</p> <p>State department of health..</p> <p>Quarantine officer or his deputy.</p> <p>County quarantine officer....</p> <p>Secretary State board of health.</p> <p>Secretary State board of health.</p> <p>1, local health officer; 2, clerk of the civil township, or, in counties not under township organization, to the county commissioner.</p> <p>Local board of health.....</p>	<p>Promptly.....</p> <p>Promptly.....</p> <p>Immediately.....</p> <p>At once.....</p> <p>By 5th of month for preceding month.</p> <p>By telegram within 24 hours.</p> <p>Immediately.....</p> <p>Immediately.....</p>	<p>Physicians are to report to the local board of health not less than twice each week the condition of each person afflicted and the state of the disease.</p>
<p>North Dakota.....</p>	<p>1, plague; 2, yellow fever; 3, typhus fever; 4, cholera.</p> <p>Infectious or contagious diseases.</p> <p>Contagious, epidemic, or infectious diseases.</p>	<p>Quarantine officers.....</p> <p>Physician.....</p> <p>Physician or other person.....</p>	<p>Secretary State board of health.</p> <p>Secretary State board of health.</p> <p>1, local health officer; 2, clerk of the civil township, or, in counties not under township organization, to the county commissioner.</p> <p>Local board of health.....</p>	<p>By 5th of month for preceding month.</p> <p>By telegram within 24 hours.</p> <p>Immediately.....</p> <p>Immediately.....</p>	<p>Physicians are to report to the local board of health not less than twice each week the condition of each person afflicted and the state of the disease.</p>

*Notifiable diseases and the health authorities to and through which reported—Continued.*

States.	Notifiable diseases.	By whom reported.	To whom reported.	When reported.	Remarks.
35 North Dakota (continued).	Contagious, epidemic, or infectious diseases (continued).	1, each keeper of a private house, boarding house, lodging house, inn, or hotel to report cases on his premises; 2, in the absence of a physician it is the duty of parents to report cases occurring in their households; 3, also the oldest person next of kin, the keeper or other proper officer of every workhouse, poorhouse, reform school, jail, prison, hospital, asylum, or other public or charitable institution to report cases among persons under his charge.	Local board of health. ....	Within 24 hours. ....	
	Ophthalmia neonatorum. ....	When no physician is in attendance cases are to be reported by the parents or persons having charge of the infant.	Health officer having jurisdiction.	Within 6 hours in writing.	Physicians and recognized hospitals are not required to report.
	Contagious and infectious diseases.	1, health officers of cities; 2, clerks of organized civil townships; 3, county commissioners in counties not under township organization.  County superintendent of health.	County superintendent of health.  State superintendent of health.	Not later than the 10th day of each month for the preceding month.  1, immediately; 2, on or before the 15th of each month for the preceding month.	
		State superintendent of health.	Governor of the State. ....	Dec. 1 of each even-numbered year for preceding 2 years.	

Ohio.....	<p>1, smallpox; 2, scarlet fever; 3, diphtheria; 4, or other infectious or contagious diseases.</p> <p>1, smallpox; 2, cholera; 3, plague; 4, yellow fever; 5, typhus fever; 6, diphtheria; 7, membranous croup; 8, scarlet fever; 9, typhoid fever; 10, cerebrospinal meningitis; 11, chicken pox; 12, measles; 13, whooping cough; 14, poliomyelitis; 15, any other disease dangerous to the public health; 16, trachoma.</p>	<p>Local board of health.....</p> <p>1, physician or other person attending cases; 2, owners or agents of buildings in which cases occur; 3, heads of families in which cases exist.</p>	<p>State board of health.....</p> <p>Health officer.....</p>	<p>Immediately.....</p>	
<p>Ophthalmia in infants under 10 days old.</p> <p>Infectious and contagious diseases.</p>	<p>1, cholera; 2, plague; 3, cerebrospinal meningitis; 4, chicken pox; 5, diphtheria; 6, measles; 7, membranous croup; 8, scarlet fever; 9, smallpox; 10, typhoid fever; 11, typhus fever; 12, whooping cough; 13, poliomyelitis.</p>	<p>Boards of health of cities, villages, and townships.</p> <p>Midwives, nurses, or relatives.</p> <p>Physicians.....</p>	<p>State board of health.....</p> <p>Physician or local health officer.</p>	<p>Semi-monthly on 1st and 16th of each month.</p> <p>Within 6 hours.....</p>	
<p>Oklahoma.....</p> <p>Tuberculosis.....</p> <p>Infections and contagious diseases.</p>	<p>Infectious and contagious diseases.</p> <p>Tuberculosis.....</p> <p>Infections and contagious diseases.</p>	<p>1, county superintendent of public health if outside city of first class; 2, city superintendent of public health if in city of first class.</p> <p>Health officer for the city, town, or village.</p> <p>State commissioner of health.</p>	<p>1, county superintendent of public health if outside city of first class; 2, city superintendent of public health if in city of first class.</p> <p>Health officer for the city, town, or village.</p> <p>State commissioner of health.</p>	<p>The law requires an immediate report. The regulations promulgated by the State commissioner of health require reports monthly on the last day of the month.</p> <p>Within 24 hours.....</p> <p>On the 10th day of each month for the preceding calendar month.</p>	

*Notifiable diseases and the health authorities to and through which reported—Continued.*

States.	Notifiable diseases.	By whom reported.	To whom reported.	When reported.	Remarks.
38 Oregon.....	1, diphtheria; 2, membranous croup; 3, scarlet fever; 4, cholera; 5, typhus fever; 6, typhoid fever; 7, smallpox; 8, measles; 9, cerebrospinal meningitis; 10, ophthalmia neonatorum; 11, infantile paralysis; 12, bubonic plague; 13, leprosy; 14, barber's itch; 15, tuberculosis.	Physicians.....  Superintendents of State institutions, children's homes, and other institutions of a public nature.	County or municipal health officer.  Secretary State board of health.	Within 24 hours by the quickest means of communication.  Not later than the 10th day of each month for the preceding month.	
	1, cholera; 2, yellow fever; 3, smallpox; 4, diphtheria; 5, membranous croup; 6, scarlet fever; 7, typhus fever; 8, typhoid fever; 9, "bubonic" (sic); 10, or any other contagious disease.	Physicians, or in the absence of a physician, the holder.	Health officer having jurisdiction.	In writing within 24 hours, giving the name and residence of the patient.	
	Infectious diseases.....	County boards of health and city health officers.	Secretary State board of health.	Not later than the 10th day of each month for the preceding month.	All cases of smallpox or other contagious disease of alarming proportions must be reported at once.
39 Pennsylvania.....	1, actinomycosis; 2, anthrax; 3, plague; 4, cerebrospinal meningitis; 5, chicken pox; 6, cholera; 7, diphtheria; 8, dysentery (epidemic); 9, erysipelas; 10, German measles; 11, glanders; 12, hookworm disease; 13, leprosy; 14, malarial fever; 15, measles; 16, mumps; 17, pellagra; 18, pneumonitis; 19, poliomyelitis; 20, puerperal fever; 21, rabies; 22, relapsing fever; 23, scarlet fever; 24, smallpox; 25, tetanus; 26, trachoma; 27, trichiniasis; 28, tuberculosis; 29, typhoid fever; 30, typhus fever; 31, whooping cough; 32, yellow fever.	1, health authorities of cities, boroughs, and townships of the first class; 2, superintendent and other persons in charge of asylums, hospitals, or other institutions	State department of health...	At the end of each week and for the fraction of the week occurring at the end of each month.	

40	<p><b>Puerto Rico</b>.....</p>	<p><b>Inflamed eyes in infants under 2 weeks of age.</b> 1, typhus fever; 2, typhoid fever; 3, smallpox; 4, varioloid; 5, scarlet fever; 6, diphtheria; 7, yellow fever; 8, cholera; 9, plague; 10, beriberi; 11, epidemic dysentery; 12, cerebrospinal meningitis; 13, whooping cough; 14, mumps; 15, malaria; 16, tuberculosis; 17, glanders; 18, leprosy; 19, cutaneous syphilis; 20, uncinariasis.</p>	<p>located in townships of the second class. Midwife, nurse, or other person having care of infant. Physicians.....</p>	<p>Health officer or legally qualified practitioner. Nearest health officer.....</p>	<p>Within 6 hours.....</p>
41	<p><b>Rhode Island</b>.....</p>	<p><b>Infectious or contagious diseases.</b> 1, smallpox; 2, or any other contagious or infectious disease. Smallpox..... Tuberculosis (pulmonary or laryngeal).</p>	<p>Physicians..... Health officers..... Householder to report cases in his house. Physicians, householders, or other persons to report any cases known. Physicians.....</p>	<p>Local health officer..... Director of sanitation..... Town council..... 1, town clerk; 2, if in cities the superintendent of health. Secretary of the State board of health. Secretary of the State board of health. Secretary State board of health.</p>	<p>Immediately..... Immediately..... Immediately..... Within 7 days..... Cases to be reported each week. Immediately.....</p>
<p><b>The State board of health is to keep a register of all persons known to be affected with pulmonary or laryngeal tuberculosis.</b></p>		<p>Health officer or some qualified practitioner of medicine.</p>	<p>Within 6 hours.....</p>		

*Notifiable diseases and the health authorities to and through which reported—Continued.*

States.	Notifiable diseases.	By whom reported.	To whom reported.	When reported.	Remarks.
42 South Carolina.....	1, tuberculosis; 2, typhoid fever; 3, diphtheria; 4, scarlet fever; 5, smallpox; 6, measles; 7, whooping cough; 8, cerebrospinal meningitis; 9, leprosy; 10, poliomyelitis.	Physicians.....	1, secretary of local board of health in incorporated cities and towns; 2, secretary State board of health if outside of an incorporated city or town.	Within 24 hours.....	
	Ophthalmia neonatorum.....	Secretaries of local boards of health.	Secretary State board of health.	Not later than 5th day of each month for the preceding month.	
		Nurses, midwives, or persons in charge.	Local board of health.....	At once.....	This applies only to towns and cities having over 1,000 inhabitants.
43 South Dakota.....	1, smallpox; 2, scarlet fever; 3, diphtheria; 4, measles; 5, cholera; 6, or any other disease dangerous to the public health.	Physician.....	Superintendent of county board of health.	Immediately.....	
	Poliomyelitis.....	Physician or head of family... Householder to report cases in his family or in persons temporarily residing with him.	County board of health..... Health officer having jurisdiction.	Immediately..... Immediately.....	
	Contagious and infectious diseases.	City and town health officers..	County superintendent of health.	Monthly.....	
	Contagious or infectious diseases.	Superintendents of county boards of health.	Superintendent of State board of health.	Immediately.....	
44 Tennessee.....	1, smallpox; 2, yellow fever; 3, cholera; 4, plague; 5, typhus fever; 6, diphtheria; 7, membranous croup; 8, scarlet fever; 9, or other communicable disease (except venereal disease); 10, poliomyelitis.	1, head of the household or other person in the household; 2, physicians.	Municipal or county health authorities.	Immediately.....	

	<p>Ophthalmia neonatorum.....</p> <p>1, smallpox; 2, cholera; 3, yellow fever; 4, scarlet fever; 5, diphtheria; 6, or other disease dangerous to the public health.</p>	<p>Midwife, nurse, or other person having care of infant.</p> <p>Municipal and county boards of health.</p>	<p>Health officer or physician.</p> <p>State board of health.....</p>	<p>Immediately.....</p> <p>Immediately.....</p>	
<p>45 Texas.....</p>	<p>All communicable diseases.....</p> <p>1, Asiatic cholera; 2, plague; 3, typhus fever; 4, yellow fever; 5, smallpox; 6, scarlet fever; 7, diphtheria; 8, cerebrospinal meningitis; 9, dengue; 10, typhoid fever; 11, epidemic dysentery; 12, trachoma; 13, tuberculosis; 14, anthrax.</p>	<p>Municipal and county boards of health.</p> <p>Physicians.....</p> <p>Hotel proprietors, keepers of boarding houses or family boarders, and heads of families whenever notice has not been given by the physician in attendance.</p> <p>City and county health authorities.</p> <p>Physicians.....</p>	<p>State board of health.....</p> <p>Local health authority.....</p> <p>Local health authority.....</p> <p>President State board of health.</p> <p>President State board of health.</p>	<p>On the 1st of each month for the preceding calendar month.</p> <p>Immediately in writing or by telephone.</p> <p>Within 12 hours.....</p> <p>By the 6th of each month for the preceding calendar month.</p> <p>By telegraph or telephone at State expense.</p> <p>Within 12 hours.....</p>	
<p>46 Utah.....</p>	<p>Disease pestilential in character.</p> <p>Ophthalmia neonatorum.....</p> <p>1, scarlet fever; 2, diphtheria; 3, whooping cough; 4, smallpox; 5, typhoid fever; 6, measles; 7, tuberculosis; 8, cholera; 9, rubella; 10, chickenpox; 11, typhus fever; 12, plague; 13, cerebrospinal meningitis; 14, poliomyelitis; 15, leprosy; 16, pneumonia.</p>	<p>Nurse, midwife, or other person not a legally qualified practitioner of medicine.</p> <p>Physicians and other persons caring for the sick.</p>	<p>Local health authority, or in his absence to any reputable physician.</p> <p>Local board of health.....</p>	<p>Within 12 hours.....</p> <p>Immediately.....</p>	



*Notifiable diseases and the health authorities to and through which reported—Continued.*

States.	Notifiable diseases.	By whom reported.	To whom reported.	When reported.	Remarks.
46 Utah (cont'd) . . . . .	Any contagious or infectious disease.	Physicians or other persons having knowledge of actual or suspected cases.	Local board of health. . . . .	Immediately. . . . .	
	Veneral diseases. . . . .	Physicians and superintendents or managers of hospitals or public institutions.	Local board of health. . . . .	Immediately. . . . .	Name of person affected not to be included in the report.
	Ophthalmia neonatorum. . . . .	Physicians and midwives. . . . .	Local board of health. . . . .	Within 6 hours. . . . .	
	1, scarlet fever; 2, smallpox; 3, diphtheria; 4, membranous croup; 5, typhoid fever; 6, whooping cough; 7, measles; 8, chicken pox; 9, pneumonia; 10, tuberculosis.	Local health officer. . . . .	State board of health. . . . .	Immediately by telephone or telegraph.	
	Communicable diseases dangerous to the public health.	Local boards of health or health officers.	State board of health. . . . .	On or before the 5th day of each month for the preceding month.	
47 Vermont. . . . .	Infectious or contagious disease dangerous to the public health.	Physicians. . . . .	Local health officer. . . . .	Immediately. . . . .	
	Tuberculosis. . . . .	Head of family to report cases in his home.	Local health officer. . . . .	Immediately. . . . .	
	Ophthalmia neonatorum. . . . .	Physicians. . . . .	Secretary State board of health.		
	1, smallpox; 2, Asiatic cholera; 3, typhus fever; 4, yellow fever; 5, and contagious or infectious diseases dangerous to the public health.	Nurse, relative, or other person having charge of infant.	Local health officer. . . . .	Within 6 hours in writing.	
		Local health officer. . . . .	Secretary of the State board of health.	Immediately. . . . .	When a communicable disease prevails or becomes epidemic, the local health officer is to make weekly reports to the State board.

Virginia.....	1, smallpox; 2, Asiatic cholera; 3, plague; 4, diphtheria; 5, scarlet fever; 6, yellow fever.	Physician.....	Secretary of the local board of health.	Immediately.....	The State commissioner of health advised Oct. 31, 1911, that poliomyelitis had been made notifiable during the early part of 1911.
	1, typhoid fever; 2, measles; 3, chicken pox; 4, tuberculosis; 5, hookworm disease.	Physician.....	Secretary of the local board of health.	Once each month.....	
	Any infectious, contagious communicable, or dangerous disease.	Physician.....	Executive officer of the board of health of the county, town, or city.	.....	
	1, smallpox; 2, yellow fever; 3, cholera; 4, typhus fever; 5, plague.	Local health authorities of the cities, towns, and counties.	State board of health.....	Weekly.....	
Washington.....	1, anterior poliomyelitis; 2, Asiatic cholera; 3, beriberi; 4, chicken pox; 5, diphtheria (or membranous croup); 6, epidemic cerebrospinal meningitis; 7, furus; 8, leptosy; 9, measles; 10, typhoid; 11, plague; 12, scarlet fever; 13, smallpox; 14, trachoma; 15, tuberculosis (pulmonary and abdominal); 16, typhoid fever; 17, typhus fever; 18, undulant fever; 19, whooping cough; 20, yellow fever; 21, so-called bedar, Cuban dube, Egyptian, Japanese, Korean, Manila, or Philippine itch.	Physicians..... City health officers, except those of cities of the first class (cities having over 20,000 inhabitants).  1, county health officers; 2, health officer of cities of the first class.	Local health officer.....  Every new outbreak to the county health officer and to the State commissioner of health.  County health officer.....  State commissioner of health.	Within 24 hours.....  Immediately.....  Weekly.....  Monthly by the 5th day of the month for the preceding month.	
	1, Smallpox.....	Physicians, or in their absence heads of families or householders.	Local health officer.....	Immediately.....	
	Obscure, eruptive disease of the nature of which he is in doubt.	Physicians.....	Local health officer.....	Immediately.....	
	1, Acute disease accompanied by an eruption of the skin.	Householder.....	Local health officer or the family physician.	Immediately.....	

*Notifiable diseases and the health authorities to and through which reported—Continued.*

States.	Notifiable diseases.	By whom reported.	To whom reported.	When reported.	Remarks.
49 Washington (con.).	1, Asiatic cholera; 2, chicken pox in adults; 3, diphtheria; 4, plague; 5, scarlet fever; 6, smallpox; 7, yellow fever; 8, typhus fever.	1, county health officer; 2, health officers of cities of the first class.	State commissioner of health.	1, first case immediately; 2, after investigation report fully regarding outbreak.	
50 West Virginia.....	1, cholera; 2, smallpox; 3, scarlet fever; 4, diphtheria; 5, tuberculosis; 6, and other endemic, epidemic, infectious, or contagious diseases.	Physicians (where there is a local board of health). City and county board of health.	..... State board of health.....	Promptly..... At least once in every 3 months.	
51 Wisconsin.....	1, Asiatic cholera; 2, yellow fever; 3, smallpox; 4, typhus fever; 5, leprosy; 6, plague; 7, diphtheria; 8, scarlet fever; 9, typhoid fever; 10, measles; 11, whooping cough; 12, cerebro-spinal meningitis; 13, poliomyelitis.	1, physicians; 2, in absence of an attending physician the report is to be made by the head of the family or the person in charge of the house or building. Local health officer.....	Local board of health..... State board of health.....	Immediately..... To make report upon the appearance of any of the enumerated diseases.	
	1, chicken pox; 2, erysipelas.....	Physicians.....	Local board of health.....	Within 1 week.....	
	Tuberculosis.....	Physicians or person or owner, or agent, manager, principal, or superintendent of every public or private institution, or dispensary, hotel, boarding or lodging house.	Local department of health (town, city, or village).		
	Inflamed eyes of infants under 2 weeks of age.	Nurse, parents, or other attendant.	Local board of health.....	Within 6 hours.....	
42 Wyoming.....	Communicable diseases.....	1, physician; 2, householder to report cases in his family or household.	Local board of health or health officer.	Immediately.....	

<p>1, smallpox; 2, cholera; 3, scarlet fever; 4, diphtheria; 5, or contagious or infectious disease a menace to the public health.</p>	<p>Physician.....</p>	<p>1, secretary State board of health; 2, county health officer.</p>	<p>Immediately by telegram or telephone, or in the most expeditious manner, the telegram to be paid for by the State.</p>
<p>1, smallpox; 2, cholera; 3, typhoid fever; 4, scarlet fever; 5, diphtheria; 6, or other epidemic or contagious or infectious disease.</p>	<p>County health officer.....</p>	<p>Secretary of State board of health.</p>	<p>Immediately.....</p>
<p>Typhoid fever on premises from which milk is sold.</p>	<p>State health officer.....</p>	<p>State board of health.....</p>	<p>At once.....</p>

*Provisions made for health authorities by State and Territorial laws and regulations.*

Name of State.	State organization.	Counties.	Townships.	Cities.	Remarks.
1 Alabama.....	The State medical association is the State board of health. It elects a State health officer.	The county medical society constitutes a board of health for the county and for all municipalities therein. It elects a health officer for the county.	.....	Health officer elected by county board of health for each incorporated city and town.	.....
2 Alaska.....	.....	.....	.....	.....	.....
3 Arizona.....	Board of health and superintendent of public health.	Board of health and superintendent of public health with jurisdiction outside of cities, possessing a board of health.	.....	Board of health and health officer in incorporated cities.	.....
4 Arkansas.....	Board of health.....	The county judges may appoint boards of health for their respective counties.	.....	In cities of the first and second class the city council may establish a board of health with jurisdiction extending 1 mile beyond the city limits.	.....
5 California.....	Board of health.....	In each county the board of supervisors appoints a health officer.	.....	It is the duty of the board of trustees or council of every incorporated town and city to establish a board of health. Unincorporated towns having 500 or more inhabitants have health officers appointed by the county board of supervisors.	.....
6 Colorado.....	Board of health.....	The board of county commissioners constitutes a board of health with jurisdiction outside of municipalities. This board appoints a health officer.	.....	The mayor and council or trustees of each incorporated city and town constitute a board of health for the city or town and appoint a health officer.	.....
7 Connecticut.....	Board of health.....	The judges of the superior court appoint an attorney at law to be health officer for each county. He is not a local health officer, how-	The county health officer appoints a health officer for each town (township), except in towns containing a municipality.	The mayor of every city and the warden of every borough appoints a health officer for the city or borough, except in cities the char-	.....

		<p>ever, as each town (township) has a local health officer.</p>	<p>the limits of which are co-terminus with the town limits. In towns containing a city or borough, the limits of which are not co-terminus with those of the town, the town health officer has jurisdiction only outside of the limits of the city or borough.</p>	<p>ters of which make other provision for such appointment.</p>	
<p>8 Delaware.....</p>	<p>Board of health.....</p>	<p>The governor appoints 3 physicians in each county to be health officers of the county.</p>		<p>It is the duty of the common council in cities and of the commissioners in incorporated towns to appoint a board of health for the city or town.</p>	
<p>9 District of Columbia.....</p>	<p>Health officer appointed by the District Commissioners.</p>				
<p>10 Florida.....</p>	<p>1, State board of health; 2, State health officer.</p>	<p>The State health officer had appointed 41 agents in 39 counties (June 12, 1911).</p>		<p>Charters granted to cities by the legislature usually make provision for city health officers.</p>	
<p>11 Georgia.....</p>	<p>State board of health.....</p>	<p>The authorities of each county are authorized to establish a board of health and appoint a health officer, the board to have jurisdiction outside of incorporated municipalities.</p>		<p>The council of each incorporated city and town is authorized to establish a board of health and appoint a health officer.</p>	
<p>12 Hawaii.....</p>	<p>Territorial board of health.....</p>				<p>Board may appoint agents in such localities as it may deem necessary.</p>
<p>13 Idaho.....</p>	<p>State board of health.....</p>	<p>Board of health.....</p>		<p>The county boards of health are to insist on the organization of municipal boards of health in the incorporated towns and villages.</p>	

*Provisions made for health authorities by State and Territorial laws and regulations—Continued.*

Name of State.	State organization.	Counties.	Townships.	Cities.	Remarks.
14 Illinois.....	State board of health.....	The board of county commissioners in counties not under township organization constitute a board of health, with jurisdiction outside the limits of incorporated municipalities and with power to appoint a health officer for the county.	In counties under township organization the supervisor, assessor, and town clerk of each township constitute a board of health for the township, with jurisdiction outside the limits of incorporated municipalities and with power to appoint a health officer.	The city council in cities and the president and board of trustees in villages have power to appoint a board of health for their respective cities and villages, except in cities incorporated under special acts making other provision.	The city councils and boards of trustees in cities and villages have jurisdiction extending for one-half mile beyond the city or village limits for the purpose of enforcing health and quarantine ordinances and regulations.
15 Indiana.....	1, State board of health; 2, State health commissioner.	County health commissioner.....	.....	Board of health in all incorporated cities, except that in counties having a population of less than 30,000 the county health commissioner may by agreement act also as city health officer in lieu of a city board of health. In incorporated towns the board of town trustees appoints a health officer.	
16 Iowa.....	State board of health.....	.....	The trustees of each township constitute a board of health.	The mayor and council of each municipality constitute a board of health. They appoint a health officer.	The State is divided into health districts.
17 Kansas.....	State board of health.....	The county commissioners in each county constitute a county board of health and elect a health officer.	.....	.....	
18 Kentucky.....	State board of health.....	Board of health.....	.....	Cities having a population of over 2,500 have a board of health and a health officer.	
19 Louisiana.....	State board of health.....	The police jury of each parish is required to appoint a parish board of health and health officer.	.....	Board of health.....	

20	<b>Maine</b> .....	State board of health.....	.....	Board of health in each organized town (township).....	Board of health.....	.....	.....
21	<b>Maryland</b> .....	State board of health.....	The board of county commissioners constitutes a local board of health in each county, with jurisdiction throughout the county, except in cities having charters inconsistent with such extension of jurisdiction. The county board appoints a county health officer.	.....	.....	.....	.....
22	<b>Massachusetts</b> .....	State board of health.....	.....	Board of health.....	Board of health unless other provision is made in the city charter.	The State is divided into 14 health districts, with a State inspector of health in each district.	.....
23	<b>Michigan</b> .....	State board of health.....	.....	The township board constitutes a board of health and appoints a health officer.	The mayor and aldermen of each incorporated city and the president and council or trustees of each incorporated village in which a board of health is organized under its charter constitute a board of health for the city or village.	.....	.....
24	<b>Minnesota</b> .....	State board of health.....	Board of health, with jurisdiction over all unorganized towns.	Every township board of supervisors constitutes a board of health for the township and has jurisdiction outside of cities and villages provided with an organized board of health. The board appoints a health officer.	Villages may and cities must provide for the establishment of a board of health and the appointment of a health officer.	.....	.....
25	<b>Mississippi</b> .....	1, State board of health; 2, the State medical association and all other societies and associations of the State in affiliation with the purposes of its organization are constituted the Mississippi Department of Public Health. Any licensed practitioner may, on application, become a member of the department.	1, The State board of health appoints a health officer in each county, except in inferior counties not wanting a health officer; 2, it is the duty of the bureau of vital statistics of the State department to appoint a county board of health in each county.	.....	Cities may establish a board of health.	.....	.....



*Provisions made for health authorities by State and Territorial laws and regulations—Continued.*

Name of States.	State organization.	Counties.	Townships.	Cities.	Remarks.
26 Missouri.....	State board of health.....	County board of health, with jurisdiction outside of incorporated cities and towns.	.....	St. Louis: Board of health and health commissioner. Cities of first class—board of health and health department. (Cities of the first class are those having a population of from 75,000 to 150,000.)	
27 Montana.....	1, State board of health; 2, State health officer.	1, county board of health; 2, County health officer.	.....	1, incorporated cities and towns have a board of health; 2, towns having less than 5,000 inhabitants may place themselves under the county board of health.	
28 Nebraska.....	State board of health.....	County board of health, with jurisdiction throughout the county, except in cities and villages having power to establish boards of health.	.....	1, cities having a population of over 100,000 have a health commissioner; 2, other cities have power to create a board of health.	
29 Nevada.....	State board of health.....	County board of health, consisting of the county physician, sheriff, and the board of county commissioners.	.....	In incorporated cities and towns the city council has power to create a board of health. The board of county commissioners has the power to establish and maintain a board of health in any town or city.	
30 New Hampshire..	State board of health.....	.....	Board of health.....	The city council constitutes a board of health in cities.	
31 New Jersey.....	State board of health.....	.....	Board of health.....	Every city, borough, and town is required to have a board of health.	
32 New Mexico.....	Territorial board of health .....	County health officer.....	.....	The mayor and council, trustees, or other governing bodies of incorporated cities and towns constitute a board of health.	

<p>33 New York.....</p>	<p>State department of health, at the head of which is a commissioner of health.</p>	<p>.....</p>	<p>Board of health and health officer, with jurisdiction outside the limits of incorporated cities and villages having organized boards of health.</p>	<p>1, cities of the first class (population over 175,000) have a commissioner of health; 2, cities of the second class (population between 50,000 and 175,000), the commissioner of public safety appoints a health officer; 3, cities of the third class (population less than 50,000), board of health and health officer; 4, villages have a board of health and a health officer.</p>	<p>.....</p>
<p>34 North Carolina.....</p>	<p>State board of health and State health officer.</p>	<p>1, board of health; 2, superintendent of health; 3, quarantine officer.</p>	<p>The county quarantine officer may appoint a deputy quarantine officer in each township.</p>	<p>City and town authorities may elect municipal health officers.</p>	<p>.....</p>
<p>35 North Dakota.....</p>	<p>State board of health.....</p>	<p>1, county superintendent of health; 2, county board of health with jurisdiction outside the limits of cities having a city board of health. The county board is under the supervisory control of the State board.</p>	<p>The supervisors of each township constitute a board of health.</p>	<p>1, board of health and health officer in each incorporated city; 2, the trustees of each incorporated village constitute a board of health for the village.</p>	<p>.....</p>
<p>36 Ohio.....</p>	<p>State board of health.....</p>	<p>.....</p>	<p>The trustees of each township constitute a board of health with jurisdiction outside the limits of cities. They appoint a health officer.</p>	<p>1, cities have a board of health and health officer; 2, villages may have a board of health and health officer or only health officer.</p>	<p>.....</p>
<p>37 Oklahoma.....</p>	<p>State board of health "in charge of * * * the State commissioner of health."</p>	<p>The State commissioner of health appoints in each county, a county superintendent of public health.</p>	<p>The board of directors of each township constitute a board of health under the supervision of the county superintendent of public health.</p>	<p>1, in incorporated towns the town board of directors constitutes a town board of health under the supervision of the county superintendent; 2, in cities of the first class (over 2,000 population) the mayor and common council constitute a board of health and are authorized to appoint a city superintendent of public health.</p>	<p>.....</p>

Provisions made for health authorities by State and Territorial laws and regulations—Continued.

Name of State.	State organization.	Counties.	Townships.	Cities.	Remarks.
38 Oregon.....	State board of health and State health officer.	Board of health and health officer.	.....	Board of health and health officer.	
39 Pennsylvania.....	Department of health, consisting of a commissioner of health and an advisory board.	The State department of health has appointed a physician in each county to act as representative of the department.	1, in townships of the first class (population of at least 300 to the square mile) the township commissioners appoint a board of health which elects a health officer; 2, in townships in which there is no organized board of health the State department appoints a local health officer and pays his salary.	1, cities of the first class (population over 1,000,000) have a board of health, the executive officer of which is the director of public health and charities; 2, cities of the second class (population 100,000 to 1,000,000) have a bureau of health under the control of the department of public safety; 3, cities of the third class (population under 100,000) may by ordinance create a board of health; 4, boroughs (incorporated villages with over 300 inhabitants) have a board of health.	The commissioner of health is authorized to appoint districts and to appoint a physician in each district to be health officer and to appoint such assistants to the district health officers as may be necessary.
40 Porto Rico.....	1, director of health, charities, and corrections; 2, insular board of health; 3, director of sanitation.	.....	.....	.....	The island is divided into four sanitary districts with an inspector in charge of each. Each sanitary district is divided into sanitary zones. Each zone has a board of health and is in charge of a health officer.
41 Rhode Island.....	State board of health and commissioner of public health.	.....	In each town (township) the town council or board of aldermen constitutes a board of health and appoints a health officer.	City councils may appoint boards of health.	
42 South Carolina.....	1, State board of health, consisting of the State medical association and the attorney and comptroller general; 2, executive committee recommended by State medical	.....	.....	It is the duty of the mayor orintendent of every incorporated city, town, or village to appoint a board of health. The board of health elects a health officer. It is	The executive committee is authorized to divide the State into health districts, and in districts in which there are no boards of health to ap-

	association and appointed by the governor; 3. State health officer appointed by the governor.			the duty of the State board to appoint boards of health in all unincorporated towns and villages with a population of more than 100.	point subboards of health.
43 South Dakota.....	State board of health.....	Board of health consisting of the State's attorney of the county and 2 physicians appointed by the State board of health, one of whom is superintendent of the county board and the other vice president.	.....	City councils have the power to appoint boards of health for their respective cities.	
44 Tennessee.....	State board of health.....	The county judge, court clerk, and health officer or jail physician constitute a county board of health. It is the duty of the county court in counties having jails to appoint a jail physician or health officer.	.....	Municipalities having 5,000 or more inhabitants are required to organize boards of health.	Boards of health of cities and towns have jurisdiction extending to 1 mile beyond the corporation limits.
45 Texas.....	State board of health and State health officer. The latter is president and executive officer of the board.	County health officer appointed by the commissioner's court.	.....	It is the duty of the authorities of each incorporated city and town to elect a city health officer.	
46 Utah.....	State board of health.....	The county outside of incorporated municipalities is divided into sanitary districts with a health officer in each. The district health officers, together with the county commissioners constitute a county board of health.	.....	It is the duty of the city authorities of every incorporated city and town to establish a board of health.	
47 Vermont.....	State board of health.....	.....	The State board of health appoints a health officer for each town (township). The health officer with the selectmen of the town or board of aldermen of the city constitutes a local board of health.	Board of aldermen and health officer constitute board of health.	

*Provisions made for health authorities by State and Territorial laws and regulations—Continued.*

Name of State.	State organization.	Counties.	Townships.	Cities.	Remarks
48 Virginia.....	1, State board of health; 2, health commissioner.	The State board of health appoints 3 physicians in each county, who with the chairman of the board of supervisors constitute a county board of health.	.....	The State board of health appoints 3 physicians in each incorporated city and town who, with the mayor constitute a city or town board of health (except in cities having charters providing for the creation of a board of health). Each board elects one of its medical members health officer.	
49 Washington.....	1, State board of health; 2, State commissioner of health.	The board of county commissioners constitutes a county board of health and appoints a health officer. The board has jurisdiction outside of cities of the first class (cities having over 20,000 inhabitants).	.....	<b>Health officers in all incorporated cities and towns.</b>	
50 West Virginia.....	State board of health.....	1, county board of health (of which 3 of the 5 members are appointed by the State board of health); 2, county health officer with jurisdiction outside of incorporated cities and towns.	.....	Incorporated cities, towns, and villages have boards of health and health officers independent of the county board and auxiliary to the State board. Of the above local boards of health the State board appoints 3 of the 5 members.	
51 Wisconsin.....	State board of health.....	.....	The town (township) board constitutes a board of health and elects a health officer.	The village board or common council constitute a board of health in cities and villages and appoint a health officer.	
52 Wyoming.....	State board of health.....	The State board of health appoints a physician in each county to be county health officer.	.....	.....	

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**APPENDIX.**

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(107)



# STATE AND TERRITORIAL LAWS WHICH REQUIRE THE REPORTING OF CASES OF SICKNESS.

Compiled in the bureau from the statutes of the several States and Territories, as found in the Law Library of Congress, and from copies of recent laws transmitted by special request by the respective State health authorities.

## ALABAMA.

[Code of 1907.]

SEC. 703. It shall be the duty of county boards of health:

(a) To \* \* \* enforce the law for the collection of vital and mortuary statistics.  
\* \* \* \* \*

SEC. 706. It shall be the duty of the health officer of a county:

(a) To keep \* \* \* also, a book to be styled "The Register of Infectious Diseases," in which book he shall register, so far as reported to him, the name, age, sex, color, race, occupation, and place of residence, together with such other details as may be required by said regulations, of all persons who may be attacked by any of the diseases enumerated in section seven hundred and sixteen of this code; \* \* \*.  
\* \* \* \* \*

(b) To make to the State health officer prompt report of the presence in the county, so far as reported to him, or has come to his knowledge, of any of the diseases enumerated in section seven hundred and sixteen of this code, furnishing such information and at such intervals as the State health officer may require.  
\* \* \* \* \*

SEC. 710. It shall be the duty of the health officer of a municipality:

(a) To keep, under regulations prescribed by the State board of health \* \* \* a book to be styled "The Register of Infectious Diseases," in which he shall register, so far as reported to him, the name, age, sex, color, race, occupation, and place of residence, together with such other details as may be required by said regulations, of all persons who may be attacked by any of the diseases enumerated in section seven hundred and sixteen of this code; \* \* \*.  
\* \* \* \* \*

(g) To make to the mayor and council of the municipality, to the committee of public health of the county board of health, and to the State health officer prompt reports of the presence in the municipality of any of the diseases enumerated in section seven hundred and sixteen of this code, furnishing such information and at such intervals as said authorities may require; \* \* \*.  
\* \* \* \* \*

SEC. 714. Every physician who is called to a case of any of the diseases named in section seven hundred and sixteen of the code shall, as soon thereafter as can be done, make a report thereof to the county, city, or town health officer in whose jurisdiction the case is located, specifying the name of the patient, the locality of the patient, the character of the disease, together with such other details as will furnish adequate information of the conditions and surroundings.



SEC. 715. Whenever a disease appears in a county, incorporated city, or town, suspected by any physician, or midwife, or by any person on whose premises such sick person is, of being one of those enumerated in the next succeeding section, such physician, or midwife, or such person, shall report his or her suspicion to the health officer having jurisdiction over the locality where such case appears, \* \* \*.

SEC. 716. Should the disease prove to be leprosy, cholera, typhus fever, cerebrospinal meningitis, or spotted fever, yellow fever, scarlet fever, bubonic plague, hydrophobia, glanders, smallpox, diphtheria, pulmonary tuberculosis, typhoid fever, Chagres fever, beriberi, or of other nature believed to be grave and at the same time contagious, infectious, or pestilential in character, or if the disease be known to be either one of those just enumerated and be so reported, the health officer of the county, city, or town shall promptly notify in writing the probate judge and commissioners or board of revenue of the county, the mayor or intendant, and the council of the city or town, according to the location of the disease, of the presence and extent of prevalence of the disease, \* \* \*.

\* \* \* \* \*  
 SEC. 7049 (as amended by ch. 446, Acts of 1911). Any head of a family, or other person, upon whose premises a case of infectious or pestilential disease occurs, which is not under the charge of a physician, who refuses or willfully fails to report the same as promptly as can be done, to the health officer, county or municipal, in whose jurisdiction the case is must, on conviction, be fined not less than five nor more than twenty-five dollars.

\* \* \* \* \*  
 SEC. 7052. (as amended by ch. 446, Acts of 1911.) Any physician being called upon to treat a case of infectious or pestilential disease or to whose knowledge the existence of such case comes, who refuses or willfully fails to make to the health officer, county or municipal, in whose jurisdiction the case is located, a full and prompt report thereof, specifying the character of the disease, the name and locality of the patient, together with such other details as may be required by the state board of health, must, on conviction, be fined not less than ten nor more than fifty dollars.

#### ARIZONA.

[ Acts of 1903, ch. 65.]

SEC. 7. \* \* \* The county superintendent of health shall keep a record of all the proceedings of the board and of his official acts, and he shall, at the end of every month, make a full report in writing to the superintendent of public health of the proceedings of the county board of health and of his official acts, and shall, whenever the health of persons is in danger, and when any contagious and infectious disease occurs in his county among persons, immediately report the same to the superintendent of public health.

\* \* \* \* \*  
 SEC. 24. Whenever it shall come to the knowledge of any physician or other person that a contagious, epidemic, or infectious disease exists within the jurisdiction of any local board he shall immediately report to such board in writing the name and place of residence, if known, of every person afflicted with such disease, and if he is the attending physician of such person he shall report not less than twice in each week the condition of each person so afflicted and the state of such disease.

\* \* \* \* \*  
 SEC. 26. Each keeper of any private house, boarding house, lodging house, inn or hotel shall report, in writing, to the local board of health within whose jurisdiction the same may occur, each case of contagious, infectious, or epidemic disease which may occur in his house, inn, or hotel. Such report shall be made within twenty-four hours after the existence of such disease shall have become known to such person and shall state the name of each person afflicted with such disease and the nature thereof.

SEC. 31. It shall be the duty of each local board of health when it shall come to its knowledge that a case of smallpox, scarlet fever, diphtheria, or other infectious or contagious disease exists within its jurisdiction immediately to examine into the facts of the case \* \* \* and shall immediately notify the Territorial board of health of the existence and nature of such disease and of the measures adopted by it with reference thereto.

## ARKANSAS.

[Digest of Statutes, 1904. (Kirby.)]

SEC. 540. It shall be the duty of the State board of health to have general supervision of the State system of \* \* \* the registration of prevalent diseases, said board shall prepare the necessary methods and forms for obtaining and preserving such records and to insure the faithful registration of the same in the several counties. \* \* \* The secretary of said State board of health shall be the superintendent of registration of vital statistics of the State. \* \* \*

## CALIFORNIA.

[Political Code, 1909. (Deering.)]

SEC. 2979a (as amended by sec. 1, ch. 250, Laws of 1911). It is the duty of each coroner and of every county, city and county, city or town health officer, and every member of the local board of health knowing or having reason to believe that any case of cholera, plague, yellow fever, leprosy, diphtheria, scarlet fever, smallpox, typhus fever, typhoid fever, anthrax, glanders, epidemic cerebro-spinal meningitis, tuberculosis, pneumonia, dysentery, erysipelas, uncinariasis or hookworm, trachoma, dengue, tetanus, measles, German measles, chickenpox, whooping cough, mumps, pellagra, beriberi, syphilis, gonococcus infection, rabies, poliomyelitis, or any other contagious or infectious disease exists, or has recently existed, within the city, county, city and county, town or township of which he is such officer, \* \* \* to report at once in writing such cases to the secretary of the State board of health at Sacramento.

It is also the duty of every attending or consulting physician, nurse, or other person having charge of or caring for any person afflicted with any of said contagious diseases to report at once in writing to the local board of health or local health officer the nature of the disease, the name of the person afflicted, and the place of his or her confinement; provided, however, that syphilis and gonococcus infection shall be reported by office number only.

SEC. 2984. \* \* \* It shall be the duty of such board of health or chief executive health officer to report in writing to the State board of health on or before the fifth day of each month all infectious, contagious, and communicable diseases in man or beast which shall come to their or his knowledge upon blanks furnished by the State board of health. Said board of health or chief executive health officer, where there is no board of health, in cases of local epidemic of disease shall report to the State board of health all facts concerning the disease. \* \* \*

SEC. 3061. \* \* \* Every local board of health established in this State must:

Second. Report to the secretary of the State board of health, at Sacramento, at such times as the State board of health may require:

(c) The presence of epidemic or other dangerous, contagious, or infectious disease.

[Acts of 1907, ch. 492.]

SEC. 11. It shall be the duty of every county, city and county, municipal, town, or other health officer or inspector to enforce diligently within the county, city and

county municipality, town or district of which he is such health officer all State laws pertaining to health and sanitary matters; and all orders, rules, and regulations concerning health, \* \* \* prescribed or directed by the State board of health, and all local ordinances, resolutions, orders, and regulations concerning health of the board of supervisors, which shall not be in conflict with the general laws or the orders, rules, and regulations of the State board of health.

Said health officers shall report to the State board of health all violations of the State health laws and all violations of the State laws relating to registration of births, marriages, and deaths which shall come to their knowledge.

Every county health officer and every city and county, city, or town board of health, or chief executive health officer thereof, shall report in writing to the State board of health regularly on or before the fifth day of each month, and also whenever requested by the State board of health or its secretary, all infectious, contagious, and communicable diseases in man or beast which shall come to his knowledge upon blanks furnished by the State board of health; and he shall, in cases of local epidemic of disease, report at such times as shall be requested by the State board of health, or its secretary, all facts concerning the disease. \* \* \*

SEC. 13 (as amended by sec. 3, ch. 339, Laws of 1911). The following rules and requirements shall be strictly observed in all cases of quarantine, subject, however, to such changes and modifications as the State board of health or its secretary may otherwise require and direct.

*Rule 1.*— \* \* \* Said health boards or officers must, within twenty-four hours after quarantine, report fully, in writing, to the secretary of the State board of health all of such cases quarantined: *Provided, however,* That said health officers shall immediately report by telegraph to said secretary of the State board of health every case discovered or known of plague, Asiatic cholera, yellow fever, or typhus fever, and after investigation and within twenty-four hours shall report the cause, source, and extent of contagion and infection, and all acts done and measures adopted in each case, and shall make such further reports as the secretary of the State board of health may require.

*Rule 2.*—In addition to the list of quarantinable diseases given in rule 1 of this section the following is a partial list of contagious, infectious, and communicable diseases, all of which, though not required to be quarantined, must be promptly reported in writing to the State board of health or its secretary by the said local health boards or chief executive health officers, viz: Chicken-pox, erysipelas, pneumonia, uncinariasis or hookworm, epidemic cerebro-spinal meningitis, trachoma, whooping-cough, mumps, dengue, dysentery, tuberculosis, typhoid fever, tetanus, malaria, leprosy, measles, German measles, glanders, and anthrax affecting human beings, rabies, pellagra, beriberi, syphilis, gonococcus infection, and poliomyelitis, and any disease which appears to have become epidemic. \* \* \* This list can be changed at any time by the State board of health or its secretary.

SEC. 16. All physicians, nurses, clergymen, attendants, owners, proprietors, managers, employees, and persons living in or visiting any sick person in any hotel, lodging house, house, building, office, structure, or other place where any person shall be ill of any infectious, contagious, or communicable disease, shall promptly report such fact to the county, city and county, city, or other local health board or health officer, together with the name of the person, if known, and place where such person is confined and nature of the disease, if known.

SEC. 21 (as amended by sec. 4, ch. 339, Laws of 1911). Any person violating any of the provisions of this act, whether acting for himself or as the agent or servant of another person, or of a firm, company, or corporation, or as an officer, agent, employee, or rep-

representative of any municipal corporation, or of the State shall be guilty of a misdemeanor, and upon conviction shall be punished by a fine of not less than twenty-five nor more than five hundred dollars, or by imprisonment for a term of not more than ninety days, or by both such fine and imprisonment. Each day that in violation of any provision of this act shall continue, and each day that any thing forbidden by the terms hereof to be erected, constructed, maintained, operated, or permitted, shall continue to exist, or be maintained, operated, or permitted, shall constitute a separate offense.

[Acts of 1911, Ch. 485.]

SECTION 1. Every medical practitioner attending on or called in to visit a patient whom he believes to be suffering from lead, phosphorus, arsenic or mercury or their compounds, or from anthrax, or from compressed air illness, contracted as a result of the nature of the patient's employment shall send to the State board of health a notice stating the name and full postal address and place of employment of the patient and the disease from which, in the opinion of the medical practitioner, the patient is suffering, and shall be entitled in respect of every bona fide notice sent in pursuance of this section to a fee of fifty cents, to be paid as part of the expense incurred by the State board of health in the execution of this act.

SEC. 2. If any medical practitioner, when required by this act to send a notice, wilfully fails forthwith to send the same, as provided by this act, he shall be guilty of a misdemeanor, and upon conviction of the same shall be fined not more than ten dollars.

SEC. 3. It shall be the duty of the State board of health to enforce the provisions of this act, and it may call upon local boards of health and health officers for assistance and it shall be the duty of all boards and officers so called upon for such assistance to render the same. It shall furthermore be the duty of said State board of health to transmit such data to the commissioner of the bureau of labor statistics.

COLORADO.

[Revised Statutes, 1908.]

SEC. 5025. If a conductor of any railroad discovers on his train a person suffering from cholera, smallpox, diphtheria, scarlet fever, or any other contagious disease, he shall at once communicate, either by telegraph or telephone, with a local railroad official located nearest the point at which the case is discovered, giving the number of his train, the number of the car, the name of the patient, and the nature of the disease suspected. The railroad official so informed must at once give the same intelligence to the nearest member of the State board of health or to the local health officer of his own town or city.

\* \* \* \* \*

SEC. 5070. Whenever any householder shall know that any person within his family is taken sick with smallpox or any other disease dangerous to the public health, he shall immediately give notice thereof to the board of health or health officer of the town, city, or county in which he resides; and if he shall refuse or neglect to give such notice he shall upon conviction be fined in a sum not exceeding one hundred dollars.

\* \* \* \* \*

SEC. 5072. Whenever any physician shall know that any person whom he is called to visit, or who is brought to him for examination, is infected with smallpox, cholera, diphtheria, scarlet fever, or any other disease dangerous to public health, he shall immediately give notice thereof to the health officer, the president or the clerk of the board of health of the county, town, or village in which the sick person may be, and to the householder, hotel keeper, keeper of a boarding house, or tenant within whose house or rooms the sick person may be. The notice to the officer of the board of

health shall state the name of the disease, the name, age, and sex of the person sick, also the name of the physician giving the notice, and shall, by street and number or otherwise, sufficiently designate the house or room in which said sick person may be; and every physician, and person acting as a physician, who shall refuse or neglect immediately to give such notice, shall for each offense, upon conviction, be fined in a sum not less than five nor more than one hundred dollars: *Provided*, That this penalty shall not be enforced against a physician if another physician in attendance has given to the health officer hereinbefore mentioned an immediate notice of such sick person, and the true name of the disease, in accordance with the requirements of this section.

SEC. 5073. Whenever the health officer of any county, city, or village in this State shall receive reliable notice, or shall otherwise have good reason to believe that there is within the county, city, or village of which he is the health officer, a case of smallpox, diphtheria, scarlet fever, or other communicable disease dangerous to the public health, it shall be the duty of the health officer, unless he is or shall have been instructed by the board of health, of which he is an executive officer, to do otherwise; \* \* \* to promptly notify teachers or superintendents of schools concerning families in which are contagious diseases; \* \* \* to keep the president of his own board of health and the secretary of the State board of health constantly informed respecting every outbreak of a disease dangerous to the public health, and of the facts, so far as the same shall come to his knowledge, respecting sources of danger of any such diseased person or infected article being brought into or taken out of the county, city, or village of which he is the health officer.

#### CONNECTICUT.

[General Statutes, 1902.]

SEC. 2508. When in any town, city, or borough, a case of smallpox, cholera, or any epidemic of infectious disease is known to exist, the local health officer of such town, city, or borough shall immediately notify the secretary of the State board of health of the existence of the same, with such facts as to its cause and continuance as may be known. Every person violating this section shall be fined not more than twenty-five dollars.

\* \* \* \* \*  
SEC. 2532. \* \* \* The health officer of every town, city, and borough shall, on or before the eighth day of each month, make a report to the State board of health of all contagious diseases reported to him during the month preceding.

\* \* \* \* \*  
SEC. 2534. Every physician shall report in writing every case of cholera, yellow fever, typhus fever, leprosy, smallpox, diphtheria, membranous croup, typhoid fever, scarlet fever, or other contagious or infectious disease, except those of a venereal nature, occurring in his practice, to the health officer of the town, city, or borough in which such case occurs, within twelve hours after his recognition of the disease. Every person who shall violate any provision of this section shall be fined not more than twenty-five dollars.

SEC. 2535. Should one or both eyes of an infant become inflamed or swollen, or reddened at any time within two weeks after its birth, the midwife, nurse, or attendant having charge of such infant, shall report in writing, within six hours, to the health officer or board of health of the city, town, or borough in which the parents of the infant reside, the fact that such inflammation, swelling, or redness of the eyes exists. Every person violating the provisions of this section shall be fined not more than two hundred dollars.

SEC. 2546. Every hotel or lodging-house keeper, in whose house any lodger becomes sick of any malignant or contagious disease, shall within twelve hours after such lodger becomes sick report in writing to the board of health or health officer the name of such person if known and the nature of his disease.

[Acts of 1907, ch. 170.]

SEC. 1. The health officer or board of health of any town, city, or borough shall, within twenty-four hours after having received information of the existence or supposed existence within such town, city, or borough of the infectious disease known as rabies, give notice thereof to the commissioner on domestic animals. \* \* \*

[Acts of 1909, ch. 79.]

SEC. 1. Tuberculosis is hereby declared to be an infectious and communicable disease dangerous to the public health. It shall be the duty of every physician to report in writing the name, age, sex, color, occupation, place where last employed, if known, and address of every person under his care known by such physician to have tuberculosis, to the health officer of the city, town, or borough in which such person resides, within twenty-four hours after such fact comes to the knowledge of such physician, and it shall be the duty of the officer in charge of any hospital, dispensary, asylum, or other similar institution to report in like manner concerning every patient having tuberculosis who comes under care or observation of such officer, within twenty-four hours thereafter.

DELAWARE.

[Acts of 1899, ch. 240.]

SEC. 4. All physicians, dentists, veterinary surgeons, or others practicing medicine or surgery or any branch thereof under the laws of this State shall be required to give prompt notice to the local or State board of health of any and all cases of contagious or infectious diseases that may come under their professional notice. \* \* \*

[Acts of 1893, ch. 642.]

SEC. 11. (Added by sec. 6, ch. 327, Acts of 1903.) It shall be the duty of the boards of health authorities, and of physicians in rural districts or other localities where there are no health officials, to report to the board of health of the State of Delaware the existence of any case of contagious or infectious diseases which may come under their observation. \* \* \*

[Acts of 1879-81, ch. 345.]

SEC. 17. (Added by sec. 3, ch. 328, Acts of 1903.) Every physician or other person having knowledge of any person who is suffering any disease dangerous to the public health, which the State board of health may require to be reported, shall report the same to the health board or official nearest his place of residence, giving the name, age, sex, and color of the patient and the house or place where he or she may be found. \* \* \*

DISTRICT OF COLUMBIA.

[29 Stat. L., p. 635.]

For the purposes of this act the term "contagious disease" shall be held to mean Asiatic cholera, yellow fever, typhus fever, smallpox (including varioloid), leprosy, the plague, and glanders, or any of these diseases by whatever name it may be designated; the term "case of contagious disease" shall be held to mean any person suffering from any such disease. Any person shall be held to be suffering from a contagious disease who is so infected by such disease as to be capable of transmitting it to others. The presence of the ordinary clinical symptoms of any contagious disease shall be prima facie evidence that such case is or was such a disease; and the presence in such case of the specific bacteria of such disease shall be conclusive evidence that such case is or was such disease. The provisions of this act shall apply to every ship, vessel, steamer, boat, or craft lying or being in the rivers, harbors, or other waters within the

jurisdiction of said District, and to every tent, van, hovel, barn, outhouse, cabin, or other place in said District. The term "person in charge of a case of contagious disease" shall be held to mean, first, the head of the family in which such case belongs; second, in his absence or disability or in case he be the person sick, the nearest relative or relatives of such case present on the premises where such case is, and being in attendance on him; third, in the absence of such relatives everyone in attendance on such person; fourth, in the absence of anyone so in attendance, everyone in charge of the premises where such person is.

SEC. 2. Every physician attending on or called in to visit, or examining any case of contagious disease in the District of Columbia, shall \* \* \* at once send to the health officer of said District a certificate signed by him, which said certificate shall state the name of the disease and the name, age, sex, and color of the person suffering therefrom and shall set forth by street and number, or otherwise sufficiently designate the house, room, or other place in which said person may be located, together with such other reasonable information relating thereto as may be required by said health officer. \* \* \*

\* \* \* \* \*

SEC. 4. Whenever any person in said District is suffering from any contagious disease, or suspected of being suffering from such disease, and no physician is in attendance on or called in to visit, or examine such person, it shall be the duty of the person in charge of such case \* \* \* to send to said health officer certificates relative thereto, in the same manner as is required by this act of physicians attending on or called in to visit, or examining like cases.

[34 Stat. L., p. 889.]

Every person in charge of any patient in the District of Columbia who is suffering from diphtheria, scarlet fever, measles, whooping cough, chicken pox, epidemic cerebro-spinal meningitis, or typhoid fever, immediately after becoming aware of the existence of such disease, shall send to the health officer of said District a certificate written in ink, signed by such person, stating the name of the disease, the name, age, sex, and color of the person suffering therefrom, and the school, which he or she has attended, if any, and setting forth by street and number, or by other sufficient designation, the location of the house, room, or other place in which said patient can be found. When said patient recovers, or dies, said person in charge, as soon as possible thereafter, shall send to the health officer of said District a certificate, written in ink, certifying to that fact. But no person shall certify knowingly or negligently that any person has recovered from any disease aforesaid until such patient is in such condition as to be free from danger of communicating the disease from which he is suffering to other persons.

SEC. 2. The term "person in charge of any patient," as used in this act, shall be held to mean, first, each physician in attendance on, called in to visit, or examining a patient, unless called in to visit or examining the patient solely as a consultant to a physician already in attendance; second, in the absence or disability of any physician aforesaid, or in event of default on the part of such physician, the head of the family to which the patient belongs; third, in the absence or disability of such person, or in event of default on the part of the physician aforesaid, the nearest relative or relatives of such patient present on the premises and in attendance on such patient; fourth, in the absence or disability of all persons aforesaid, or in event of default on the part of the physician aforesaid, every person in attendance on such patient. And in the cases of physicians and of persons acting in the capacity of physicians, attending, visiting, or examining any patient suffering from any disease aforesaid, shall be prima facie evidence that any person so doing was aware of the nature of such disease.

[35 Stat. L., p. 126.]

It shall be the duty of every physician in the District of Columbia to report in writing to the health officer of said District, within one week after the disease is recognized, on forms to be provided by said health officer, the name, age, sex, color, occupation, and address of every person under his care in said District, who, in his opinion, is afflicted with pulmonary or other communicable form of tuberculosis. It shall also be the duty of the officer having charge for the time being of each and every hospital, dispensary, asylum, or other similar public or private institution in said District to report in like manner the name, age, sex, color, occupation, and last address of every person who is in his care or who has come under his observation within one week of such time who, in his opinion, is afflicted with pulmonary or other communicable form of tuberculosis.

## FLORIDA.

[General Statutes, 1906.]

SEC. 1114. It shall be the duty of every practicing or licensed physician in the State of Florida to report immediately to the president of the board of health, by telegram or in the most expeditious manner, every case of yellow fever, smallpox, or cholera that comes within his practice, such telegram to be paid for out of the funds provided for the expenses of said board of health.

\* \* \* \* \*

SEC. 1146. Whenever a physician or other person shall report a suspicious case of disease to the State board of health as required by the provisions of section 3619 of the General Statutes of Florida, he shall also immediately give notice thereof to the city health officer, if there be any health officer, and if not to the mayor of the incorporated city or town in which the sick person may be; or if the sick person resides or be found outside of the limits of a city or town, to the county health physician or his representative, if there be any, and if not, to the chairman of the county commissioners of the county within which the sick person may be.

\* \* \* \* \*

SEC. 3619. Whoever, being a licensed or practicing physician, fails to report immediately to the president of the State board of health by telegram (to be paid for out of the funds to be provided for the expenses of the said board of health), or in the most expeditious manner, every case of yellow fever, smallpox, or cholera that comes within his practice, shall be punished by imprisonment not exceeding six months, or by fine not exceeding one thousand dollars.

SEC. 3620. Any physician, city health officer, mayor, county health physician, or chairman of the board of county commissioners, who shall neglect or fail to comply with the provisions of sections eleven hundred and forty-six to eleven hundred and forty-eight, shall, upon conviction, be liable to a fine of one hundred dollars or imprisonment for thirty days.

## GEORGIA.

[Penal Code of 1895.]

SEC. 499. Any physician or other person who shall conceal a case of smallpox, or varioloid, or any modification of the same, within any incorporated city, town, or in any county, by not giving immediate notice thereof to the mayor, intendant, or health officer, or ordinary, shall be punished as for a disdemeanor.

\* \* \* \* \*

[Political Code of 1895.]

SEC. 1468. Any physician or other person who shall conceal a case of smallpox, or varioloid, or any modification of the same, within any incorporated city, town, or in any county in this State, by not giving immediate notice thereof to the mayor, intendant, or health officer, or ordinary, may be indicted.



[Acts of 1903, ch. 453.]

SEC. 5. It shall be the duty of the local boards of health and of physicians in localities where there are no health authorities, to report to the State board of health promptly upon the discovery thereof, the existence of any of the following diseases, to wit: Asiatic cholera, yellow fever, scarlet fever, smallpox, diphtheria, typhus or typhoid fever, and of such other contagious or infectious diseases as the State board of health from time to time may specify. \* \* \*

## HAWAII.

[Revised Laws, 1905.]

SEC. 988. \* \* \* Said board (Territorial board of health) shall also, during the prevalence of any severe pestilence, or epidemic, publish a weekly report of the public health.

SEC. 1004. (As amended by Laws of 1911, act 125, sec. 1.) Physicians to report. It shall be the duty of every physician having a patient infected with cerebro-spinal meningitis, cholera asiatic, conjunctivitis follicular, diphtheria, dysentery amœbic, enteric (or typhoid) fever, fever para-typhoid, leprosy, measles, dengue, paralysis infantile, pertussis, plague, scarlet fever (or scarlatina), tetanus, trachoma, tuberculosis, typhus fever, varicella, variola, varioloid, yellow fever, or any other infectious or communicable or other disease dangerous to the public health to give immediate notice thereof to the board of health or its nearest agent, in writing, and in like manner to report to said board or its agent every case of death which takes place in his practice from any such disease; provided, however, that whenever a physician has a patient infected with variola, varioloid, scarlet fever, diphtheria, plague, cholera, yellow fever, typhus fever, cerebro-spinal meningitis or amœbic dysentery, such physician, in addition to the notice in writing required to be given as above, shall immediately notify the board of health or its nearest agent either by telephone or by direct oral communication. Every physician who shall refuse or neglect to give such notice or to make such report shall be fined for each offense a sum not less than ten nor more than one hundred dollars.

SEC. 1005. (As amended by Laws of 1911, act 125, sec. 2.) Others to report. It shall be the duty of every householder, keeper of a boarding or lodging house, or master of a vessel to report immediately to the board of health or its nearest agent any person in or about his house or vessel whom they shall have reason to believe to be sick or to have died of any infectious, communicable, or other diseases dangerous to the public health; and all police officers who are aware of any person suffering from any infectious, communicable, or other disease dangerous to the public health shall immediately report the same to the board of health or its nearest agent. Any such householder, keeper of a boarding or lodging house, master of a vessel, or police officer who shall refuse or neglect to so report immediately to the board of health or its nearest agent shall be guilty of a misdemeanor and upon conviction shall be fined not more than one hundred dollars for each offense.

SEC. 1005A. (Added by Laws of 1911, act 125, sec. 3.) Diseases declared infectious and communicable: Cerebro-spinal meningitis, cholera asiatic, conjunctivitis follicular, diphtheria, dysentery amœbic, enteric (or typhoid) fever, fever para-typhoid, leprosy, measles, dengue, paralysis infantile, pertussis, plague, scarlet fever (or scarlatina), tetanus, trachoma, tuberculosis, typhus fever, varicella, variola, varioloid, yellow fever are hereby declared to be infectious and communicable diseases dangerous to the public health, but this enumeration shall not be held to exclude any other disease that is infectious, communicable, or dangerous to the public health, though not specifically named herein.

**SEC. 1124.** It shall be the duty of every police officer or deputy sheriff having reason to believe that any person within his district is afflicted with leprosy, to report the same forthwith to the agent of the board of health in such district, if any, otherwise, to the nearest agent of the board of health.

**SEC. 1125.** Any police officer or deputy sheriff who shall wilfully fail to comply with the provisions of section eleven hundred and twenty-four shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be fined in a sum not less than ten dollars, nor more than two hundred dollars, and shall be dismissed from office.

[Laws of 1909, Act 81.]

**SEC. 3.** Every person who knows, or has reason to believe, that he, or any other person, not already under the care or control of the board of health, is a leper, shall, forthwith report to the board (of health) or its authorized agent, that fact and such other information relating thereto as he may have and the board may require.

[Laws of 1911, Act 118.]

**SEC. 7. Reports by physicians and others.** It shall be the duty of every physician in the Territory to report in writing the name, age, sex, nationality, occupation, place where last employed, if known, and address of every person known by said physician to have tuberculosis to the board of health or its nearest agent within twenty-four hours after such fact comes to the knowledge of said physician. It shall also be the duty of the superintendent in charge of any hospital, dispensary, asylum, or other similar private or public institution, to report in like manner the name, age, sex, nationality, occupation, place where last employed, if known, and previous address of every patient having tuberculosis who comes into his care or under his observation within twenty-four hours thereafter.

\* \* \* \* \*  
**SEC. 15.** Reporting recovery of patient. Upon the recovery of any person having tuberculosis it shall be the duty of the attending physician to make a report of this fact to the board of health or its agent, who shall record the same, and shall relieve said person from further liability to any requirement imposed by this act.

IDAHO.

[Revised Codes, 1908.]

**SEC. 663.** The owner, or agent of the owner, of a house in which a person resides who has the smallpox, diphtheria, scarlet fever, or any other contagious or infectious disease, dangerous to the public health, and the physician called to attend the person or persons so affected shall, within twenty-four hours after becoming cognizant of the fact, give notice thereof to the clerk of the board of trustees of the school district in which said person so afflicted resides. \* \* \*

\* \* \* \* \*  
**SEC. 1108.** Should one or both eyes of an infant become inflamed or swollen or reddened, or should any pus or secretion form in the eyes or upon the edge of the lid, at any time within two weeks after birth, it shall be the duty of any midwife, nurse, or other person having charge of such infant to report, within six hours after discovery of such inflammation, redness, or formation of pus or secretion, to the local health officers, or to some legally qualified practitioner of medicine in the district in which such case shall occur, the fact that such inflammation, swelling, or redness or accumulation in the eye exists. Any failure to comply with the provisions of this section shall be punished by a fine of not to exceed one hundred dollars, or imprisonment not to exceed ninety days, or by both fine and imprisonment, in the discretion of the court.

SEC. 1099. Every physician or other person called to attend any person who is suffering from smallpox, cholera, plague, yellow fever, typhus fever, diphtheria, membranous croup, scarlet fever, typhoid fever, or any other disease dangerous to the public health or required by the State board of health to be reported, shall report the same to the health officers within whose jurisdiction such person is found, giving in such report the name, age, sex, and color of the patient, and the house or place in which such person may be found. \* \* \* In like manner it shall be the duty of the head of the family and of the owner or the agent of the owner of the building in which a person resides who has any of the diseases herein named or provided against, or in which are the remains of a person having died of any such disease, immediately after becoming aware of the fact to give notice thereof to the health officer.

SEC. 1111. It is the duty of every practicing physician to report promptly to the county physician of the county in which he resides, all or any dangerous disease of an infectious or contagious nature under treatment by him. \* \* \* Any person violating the provisions of this chapter \* \* \* is guilty of a misdemeanor.

## ILLINOIS.

[Rev. Stat., 1909, ch. 34.]

SEC. 117. The said (county and township) boards of health shall have the following powers:

\* \* \* \* \*  
Fifth. To require reports of dangerously communicable diseases.

[Rev. Stat., 1909, ch. 38.]

SEC. 510. Should any midwife or nurse having charge of an infant in this State notice that one or both eyes of such infant are inflamed or reddened at any time within two weeks after its birth, it shall be the duty of such midwife or nurse having charge of such infant to report the fact in writing within six hours to the health officer or some legally qualified practitioner of medicine of the city, town, or district in which the parents of the infant reside.

SEC. 511. Any failure to comply with the provisions of this act shall be punishable by a fine not to exceed one hundred dollars or imprisonment not to exceed six months, or both.

[Rev. Stat., 1909, ch. 126a.]

SEC. 2. The State board of health \* \* \* shall have authority to make such rules and regulations and such sanitary investigations as they may from time to time deem necessary for the preservation and improvement of the public health. \* \* \* It shall be the duty of all local boards of health, health authorities, and officers, police officers, sheriffs, constables, and all other officers and employees of the State, or any county, village, city, or township thereof to enforce the rules and regulations that may be adopted by the State board of health.

\* \* \* \* \*  
SEC. 3. The board of health shall \* \* \* make up such forms and recommend such legislation as shall be deemed necessary for the thorough registration of vital and mortuary statistics throughout the State. \* \* \*

\* \* \* \* \*  
SEC. 12. It shall be the duty of the board of health to make an annual report, through their secretary, or otherwise in writing to the governor of this State, on or before the first day of January of each year, and such report shall include \* \* \* such information concerning vital statistics, such knowledge respecting diseases \* \* \* as may be thought useful by the board for dissemination among the people. \* \* \*

**SEC. 2.** Every employer in this State engaged in the carrying on of any process of manufacture or labor in which sugar of lead, white lead, lead chromate, litharge, red lead, arsenate of lead, or Paris green are employed, used, or handled, or the manufacture of brass or the smelting of lead or zinc, which processes and employments are hereby declared to be especially dangerous to the health of the employees engaged in any process of manufacture or labor in which poisonous chemicals, minerals, or other substances are used or handled by the employees therein in harmful quantities or under harmful conditions, shall provide for and place at the disposal of the employees engaged in any such process or manufacture, and shall maintain in good condition and without cost to the employees, proper working clothing to be kept and used exclusively for such employees while at work, and all employees therein shall be required at all times while they are at work to use and wear such clothing; and in all processes of manufacture or labor referred to in this section which are unnecessarily productive of noxious or poisonous dusts, adequate and approved respirators shall be furnished and maintained by the employer in good condition and without cost to the employees, and such employees shall use such respirators at all times while engaged in any work necessarily productive of noxious or poisonous dusts.

**SEC. 3.** Every employer engaged in carrying on any process or manufacture referred to in section 2 of this act shall, as often as once every calendar month, cause all employees who come into direct contact with the poisonous agencies or injurious processes referred to in section 2 of this act, to be examined by a competent licensed physician for the purpose of ascertaining if there exists in any employee any industrial or occupational disease or illness or any disease or illness due or incident to the character of the work in which the employee is engaged.

**SEC. 4.** It is hereby made the duty of any licensed physician who shall make the physical examination of the employees under the provisions of section 3 of this act, to make an immediate report thereof to the State board of health of the State of Illinois upon blanks to be furnished by said board upon request, and if no such disease or illness is found, the physician shall so report, and if any such disease is found, the report shall state the name, address, sex, and age of such employee and the name of such employer, and the nature of the disease or illness with which the employee is afflicted, and the probable extent and duration thereof, and the last place of employment: *Provided*, That the failure of any such physician to receive the blanks of the State board of health for the making of such report, shall not excuse such physician from making the report as herein provided.

**SEC. 5.** The secretary of the State board of health shall, immediately upon receipt of any report from any physician in accordance with the provisions of section 4 of this act, transmit a copy thereof to the Illinois department of factory inspection.

**SEC. 14.** Any person, firm, or corporation who shall, personally or through any agent, violate any of the provisions of this act, or who omits or fails to comply with any of its requirements \* \* \* shall be deemed guilty of a misdemeanor, and on conviction thereof shall be punished for the first offense by a fine of not less than ten dollars (\$10) or more than one hundred dollars (\$100), and upon conviction of the second or subsequent offenses shall be fined not less than fifty dollars (\$50) or more than two hundred dollars (\$200), and in each case shall stand committed until such fine and costs are paid, unless otherwise discharged by due process of law.

INDIANA.

[Burns' Annotated Statutes, 1908.]

**SEC. 7596.** It shall be the duty of the State board of health to collect and tabulate the vital statistics, to study them and endeavor to make intelligent and profitable use of the same for sanitary purposes and the benefit of the people. They shall have

supervision of the system of registration of \* \* \* infectious and contagious diseases, and they shall make up from time to time such blank forms as they may deem necessary for the collection, registration, and report of vital and sanitary statistics throughout the State. \* \* \*

\* \* \* \* \*

SEC. 7607. It shall be the duty of all physicians and midwives in the State to report upon blank forms supplied by the State board of health \* \* \* all cases of contagious and infectious diseases which may occur under their supervision and which are listed as reportable in the rules of the State board of health. The reports of \* \* \* cases of infectious diseases shall be made immediately. \* \* \* Reports of \* \* \* cases of such infectious and contagious diseases as are listed in the rules of the State board of health, which occur in cities and towns, shall be made to health officers of said cities and towns, and when they occur in the country outside of cities and towns they shall be reported to the county health officer or his deputies. \* \* \* When any \* \* \* case of listed infectious or contagious disease may occur with no physician or midwife in attendance, then said \* \* \* case of infectious or contagious disease shall be reported by the householder or other person having said \* \* \* case of infectious or contagious disease in charge to the nearest health officer or his deputy, and the officer to whom the report is made shall make inquiry and inspection \* \* \* and all reports of \* \* \* contagious or infectious diseases as herein commanded shall be made upon blanks furnished by the State board of health. \* \* \* All records of \* \* \* cases of contagious and infectious diseases shall be kept by health officers in record books, the forms of which shall be supplied by the State board of health. Any physician or midwife refusing or neglecting to make \* \* \* infectious or contagious disease reports as herein provided shall, upon conviction, be fined for the first offense in any sum not less than ten or more than fifty dollars, and any physician or midwife who is convicted the second time for the violation of any of the above provisions shall be fined not less than fifty or more than one hundred dollars, and any physician or midwife who is convicted the third time for the violation of any of the above provisions shall be fined one hundred dollars. Householdors and others made responsible in this act and failing to report as herein provided shall, upon conviction, be fined not less than ten nor more than fifty dollars for each offense. \* \* \*

\* \* \* \* \*

SEC. 7612. Any physician called upon to attend a sick person and who finds the cause of such sickness to be of a contagious or infectious character, or if the disease is ordered to be reported in the rules of the State board of health, such physician shall immediately report the facts to the secretary of the board of health having jurisdiction.

SEC. 7613. Whenever any person knows or has reason to believe that any member of his or her family or household (boarder, roomer, or visitor) has either smallpox, diphtheria, membranous croup, scarlet fever, measles, or any other communicable disease listed in the rules of the State board of health, he or she shall immediately, from the time the existence of the disease is known, if no physician is in attendance, give notice thereof to the local health officer of the town or city in which the disease occurs, or the health officer if the case is without the corporation of cities or towns, and such notice shall be given either verbally or by written communication, mailed or delivered to such health officer or board.

[Acts of 1911, ch. 129.]

SEC. 3. Should one or both eyes of an infant become inflamed, swollen, or reddened, or show any unnatural discharge or secretion at any time within two weeks after its birth, and no legally qualified physician is in attendance upon the infant at that time, it shall be the duty of its parents, or, in their absence, whoever is caring for said infant,

to report the fact in writing, within six hours after discovery, to the health officer having jurisdiction: provided, said report to said health officer need not be made from recognized hospitals.

SEC. 5. Any violation of the provisions of this act shall be punished by a fine of not less than ten dollars and not more than fifty dollars.

## IOWA.

[Code of 1897.]

SEC. 1027. It shall be the duty of such clerk and physician [to the board of health in cities under special charters] to report at least once a year to the State board of health \* \* \* such other facts as may be required in blanks in accordance with instructions received from the State board. They shall also make special reports whenever required so to do by the State board.

SEC. 1028. The local board of health [in cities under special charters] shall make such rules and regulations and orders respecting \* \* \* the prompt report of contagious or infectious diseases; \* \* \* causes of sickness within their jurisdiction, and on all boats in its ports and harbors, or railroad cars passing through such city; \* \* \* and shall, from time to time, report to the city council ordinances for carrying such rules, regulations, and provisions into effect. \* \* \*

SEC. 2565. The board (State board of health) shall have \* \* \* authority to make such rules and regulations and sanitary investigations as it from time to time may find necessary for the preservation and improvement of the public health, which when made shall be enforced by local boards of health and peace officers of the State. It shall \* \* \* by its secretary make biennial reports to the governor, which shall include \* \* \* such information concerning vital statistics, such knowledge respecting diseases \* \* \* as may be thought useful for dissemination among the people. \* \* \*

SEC. 2568. \* \* \* The quarantine authorized by this section in case of infectious or contagious diseases may be declared or terminated by the mayor of any city or town, or the township clerk outside of such city or town, in cases required by regulations of the State board of health, upon written notice given by any practicing physician of the existence of such disease, or termination of the cause for quarantine, as the case may be.

[Acts of 1896, ch. 57. 1]

SECTION 1. Should one or both eyes of an infant become inflamed, or swollen, or reddened at any time within two weeks after its birth, it shall be the duty of the midwife, parent, guardian, or nurse, or other person having charge of such infant, to report within six (6) hours after the discovery thereof by such person in charge of such infant to the health officer or some legally qualified practitioner of the city, town, or district in which the parents of the infant reside, that such inflammation, or swelling, or redness of the eyes exists.

SECTION 3. Any failure to comply with the provisions of this act shall be punished by a fine of not less than twenty-five dollars or more than one hundred dollars or imprisonment in the county jail not to exceed thirty days, or both.

<sup>1</sup> Omitted from code of 1897. Sec. 27, ch. 20, acts of 1897, declares that the code is "the authoritative publication of the existing laws of the State."

## KANSAS.

[General Statutes, 1909.]

SEC. 8031. The State board of health shall supervise \* \* \* the registration of forms of disease prevalent in the State, and the secretary of said board shall superintend the registration of the vital statistics of the State. \* \* \*

SEC. 8061. Tuberculosis is hereby declared to be an infectious and communicable disease, dangerous to the public health. It shall be the duty of every physician in the State of Kansas to report in writing, on a form to be furnished as hereinafter provided, the name, age, sex, color, occupation, place where last employed if known, and address of every person known by said physician to have tuberculosis, to the county health officer; or in cities of the first class, to the city health officer, in which said person resides, within twenty-four hours after such fact comes to the knowledge of said physician. It shall also be the duty of the chief officer having charge for the time being of any hospital, dispensary, asylum, or other similar private or public institution in said State of Kansas to report in like manner the name, age, sex, color, occupation, place where last employed, if known, and previous address of every patient having tuberculosis who comes into his care or under his observation, within twenty-four hours thereafter.

SEC. 8074. Whenever any physician shall know or have reason to believe that any person whom he is called to visit, or any person sick within his knowledge without the care of a physician, is sick with or has died of cholera, smallpox, scarlet fever, diphtheria, epidemic cerebrospinal meningitis, or any disease dangerous to the public health, he shall immediately give notice thereof to the nearest board of health or health officer. \* \* \*

SEC. 8075. Whenever any householder shall know that any of his family is sick with or has died of smallpox, cholera, scarlet fever, diphtheria, epidemic cerebrospinal meningitis, or any disease dangerous to the public health, he shall immediately give notice thereof to the nearest board of health or health officer. \* \* \*

SEC. 8076. Any municipal or county board of health or health officer having knowledge of any infectious or contagious disease, or of a death from such disease, within their jurisdiction, shall immediately exercise and maintain a supervision over such case or cases during their continuance. \* \* \* The local board of health or health officer shall communicate without delay all information as to existing conditions to the State board of health.

## KENTUCKY.

[Russell's Statutes, 1909.]

SEC. 1743. \* \* \* and it shall be the duty of physicians practicing their profession in any county in which a local board is organized to report all or any of the above-mentioned diseases [cholera, smallpox, yellow fever, scarlet fever, diphtheria, and other epidemic and communicable diseases] under their special treatment to such local board, and it shall likewise be the duty of heads of families to report any of said diseases, when known by them to exist in their respective families, to such local board, or to some member thereof, within twenty-four hours from his or her knowledge of the existence of such disease, and such local board shall make report to the State board of health at least once in every three months.

First. Of the character of the infectious, epidemic, and communicable diseases prevailing in their county.

Second. The number reported as afflicted with such disease.

\* \* \* \* \*

SEC. 1764 (as amended by ch. 11, Acts of 1910). The sum of thirty thousand dollars per annum \* \* \* is appropriated for the following purposes \* \* \*:

\* \* \* \* \*

(c) To establish and maintain a bureau of vital statistics, that the causes of sickness and mortality may be known and utilized.

SEC. 1770. \* \* \* Any physician or head of a family who shall fail or refuse to report to the local board of health cases of cholera, smallpox, yellow fever, scarlet fever, diphtheria, and other epidemic diseases, as provided for in section two thousand and fifty-five of the act mentioned in the title of this act, shall be fined not less than five dollars for each day he neglects or refuses to report.

\* \* \* \* \*

[ Acts of 1910, ch. 37.]

SEC. 18. The State board of health shall prepare, print, and supply to all registrars suitable blanks and forms used in registering, recording, and preserving the returns or in otherwise carrying out the purposes of this act; and shall prepare and issue such detailed instructions as may be required to secure the uniform observance of its provisions and the maintenance of a perfect system of registration. And no other blanks shall be used than those supplied by the State board of health. The State registrar shall carefully examine the certificates received monthly from the local registrars, and if any such are incomplete or unsatisfactory, he shall require such further information to be furnished as may be necessary to make the record complete and satisfactory. And all physicians, midwives, or undertakers, connected with any case, are hereby required to furnish such information as they may possess regarding any birth, sickness or death, upon demand of the State registrar in person, by mail, or through the local registrar. He shall further arrange, bind, and permanently preserve the certificates in a systematic manner, and shall prepare and maintain a comprehensive and continuous card index of all births, sickness, and deaths registered, the cards to show the name of child, deceased, place and date of birth, sickness or death, number of certificate, and the volume in which it is contained. He shall inform all registrars what diseases are to be considered as infectious, contagious, or communicable and dangerous to the public health, as decided by the State board of health, in order that when sickness and deaths occur from such diseases proper precautions may be taken to prevent the spreading of dangerous diseases.

LOUISIANA.

[ Act No. 192, 1898.]

SEC. 3 (as amended by Act 150, 1902). \* \* \* It [the State board of health] shall prepare or cause to be prepared a sanitary code for the State of Louisiana, \* \* \* said code shall cover and provide for \* \* \* the reporting \* \* \* of cases of infectious and contagious diseases. \* \* \*

SEC. 8. In the event that any case shall be reported to or come to the knowledge of any local board, which is either deemed to be a case of contagious or infectious disease, or suspected of so being, the local board shall immediately \* \* \* communicate the fact by the most expeditious means at hand to the State board of health. \* \* \*

[Sanitary Code, 1909.]

62. (a) Whenever in any community of this State, any nurse, midwife, or other person not a legally qualified practitioner of medicine shall notice inflammation of the eyes or redness of the lids in a newborn child under his or her care, it shall be the duty of such person to report the same to the town or parish health officer within twelve hours of the time the disease is first noticed.

\* \* \* \* \*



[Rev. Stat., 1903, ch. 18.]

SEC. 30. \* \* \* It [the local board of health] shall report to the State board of health promptly facts which relate to infectious and epidemic diseases, and every case of smallpox, varioloid, diphtheria, scarlet fever, typhoid fever, cerebrospinal meningitis, measles, membranous croup so called, whooping cough, and pulmonary tuberculosis or consumption, as it is commonly termed, occurring within the limits of its jurisdiction, and such notification shall be in accordance with the requirements of the blanks furnished by the said State board. \* \* \*

\* \* \* \* \*

SEC. 33 (as amended by ch. 78, Acts of 1909). Whenever any householder knows or has reason to believe that any person within his family or household has smallpox, diphtheria, scarlet fever, cholera, typhus or typhoid fever, cerebrospinal meningitis, measles, membranous croup so called, or whooping cough, he shall within twenty-four hours give notice thereof to the health officer of the town in which he resides, and such notice shall be given either at the office of the health officer or by a communication addressed to him and duly mailed within the time above specified, and in case there is no health officer to the secretary of the local board of health, either at his office or by communication, as aforesaid.

\* \* \* \* \*

SEC. 36. Whenever any physician knows or has reason to believe that any person whom he is called upon to visit is infected with any of the diseases mentioned in section thirty-three, such physician shall, within twenty-four hours, give notice thereof to the secretary of the local board of health or the health officer of the town in which such person lives.

\* \* \* \* \*

SEC. 90. If one or both eyes of an infant become reddened or inflamed at any time within four weeks after birth, the midwife, nurse, or person having charge of said infant shall report the condition of the eyes at once to some legally qualified practitioner of medicine of the city, town, or district in which the parents (of the infant) reside. Any failure to comply with the provisions of this section shall be punishable by a fine not to exceed one hundred dollars or imprisonment not to exceed six months.

[Acts of 1909, ch. 78.]

SEC. 1. The State board of health of Maine shall keep a register of all persons in this State who are known to be affected with tuberculosis. The State board of health shall have sole and exclusive control of said register and shall not permit inspection thereof nor disclose any of its personal particulars except to its own agents or to local officials when in the interest of the public health and safety it is deemed necessary to do so.

SEC. 2. Tuberculosis is hereby declared to be an infectious and communicable disease, dangerous to the public health. It shall be the duty of every physician in the State of Maine to report in writing, on forms to be furnished by the State board of health, the name, age, sex, color, occupation, place where last employed if known, and address of every person known by said physician to have tuberculosis to the secretary of the State board of health within forty-eight hours after such fact comes to the knowledge of said physician. The name of the householder where the tuberculous person lives or boards and such other facts as may be called for on the blank reports issued from the office of the State board of health shall also be included in the report. It shall also be the duty of the chief officer having charge for the time being of any hospital, dispensary, asylum, sanatorium, or other similar private or public institution in the State of Maine to report to the State board of health in like manner the name, age, sex, color, occupation, place where last employed if known, and previous address

of every patient having tuberculosis who comes into his care or under his observation within forty-eight hours thereafter. It shall also be the duty of said physician or chief officer to give notice to the secretary of the State board of health of the change of address of any tuberculous patient who is or has lately been under his care if he is able to give such information.

MARYLAND.

[Code of 1904, art. 27.]

SEC. 231. If at any time within two weeks after the birth of any infant one or both of its eyes, or the eyelids, be reddened, inflamed, swollen, or discharging pus, the midwife, nurse, or person other than a legally qualified physician, in charge of such infant, shall refrain from the application of any remedy for the same, and shall immediately report such condition to the health commissioner or to some legally qualified physician in the city, county, or town wherein the infant is cared for. Any person or persons violating the provisions of this section shall, on conviction, be punished by a fine not to exceed one hundred dollars, or by imprisonment in jail not to exceed six months, or by both fine and imprisonment.

[Code of 1904, art. 43.]

SEC. 21 B (created by ch. 560, acts of 1910). The bureau of communicable diseases [of the State board of health] shall secure accurate and complete returns of communicable diseases in Maryland. \* \* \*

SEC. 29. \* \* \* He [any local or county health officer] shall promptly notify the secretary of the State board of health of the existence of any epidemic or unusual sickness or mortality that may come to his knowledge within his own sanitary jurisdiction or contiguous thereto. \* \* \*

SEC. 50. Whenever any householder knows that a person within his family or house is sick of smallpox, diphtheria, membranous croup, scarlet fever, typhoid fever, typhus fever, measles, mumps, whooping cough, or any other infectious or contagious disease dangerous to the public health, he shall immediately give notice thereof to the board of health of the city or county in which he dwells. \* \* \*

SEC. 51. Whenever any physician knows that any person whom he is called to visit is infected with smallpox, diphtheria, membranous croup, scarlet fever, typhoid fever, typhus fever, yellow fever, measles, whooping cough, or any other contagious or infectious disease dangerous to public health, he shall immediately give notice thereof in writing over his own signature, to the board of health of the city or town or county in which such disease exists; and if he refuses or neglects to give such notice he shall be fined not less than fifty nor more than two hundred dollars.

SEC. 52. The boards of health in the several cities, towns, and counties shall cause a record to be kept of all reports received in pursuance of sections fifty and fifty-one and such record shall contain the names of all persons who are sick with infectious or contagious diseases, the localities in which they live, the disease with which they are affected, together with the date and names of the persons reporting any such cases, and the record of quarantine, isolation, disinfection, and other preventive measures. \* \* \*

SEC. 53. When any board of health has had notice of the occurrence, within its sanitary jurisdiction, of a case of smallpox, or any other contagious or infectious disease dangerous to public health, such board of health shall, within twenty-four hours after the receipt of such notice, notify the State board of health of the same.

SEC. 56. The State board of health of Maryland shall keep a register of all persons in this State who are known to be affected with tuberculosis. The State board of health shall have sole and exclusive control of said register, and shall not permit inspection thereof nor disclose any of its personal particulars except to officials authorized under the laws of Maryland to receive such information.

SEC. 57. The superintendent or other person in charge or control of any hospital, dispensary, school, reformatory, or other institution deriving the whole or any part of its support from the public funds of the State of Maryland or any city, town, or county in the State of Maryland, having in charge or under care or custody any person or persons suffering with pulmonary or laryngeal tuberculosis shall within forty-eight hours after recognition of such disease make or cause to be made in the manner and form prescribed by the State board of health a record of the name, age, sex, color, occupation, social condition, and residence of the person or persons so affected, together with such other information as may seem necessary or important. And all such records shall be delivered under seal to the State board of health on Monday of the week immediately following that in which the records were made. \* \* \*

SEC. 58. Whenever any physician knows that any person under his professional care is affected with pulmonary or laryngeal tuberculosis he shall transmit to the secretary of the State board of health within seven days and upon blanks provided by the State board of health for that purpose the name, age, sex, color, occupation, social condition, and residence of such person, and any physician failing or refusing to comply with the requirements of this section shall be deemed guilty of a misdemeanor and on conviction thereof shall be subject to a fine of ten dollars.

\* \* \* \* \*

SEC. 67. Whenever any hotel keeper, keeper of a boarding or lodging house, superintendent, manager, or director of a private or public institution of any kind, shall know or be informed by a physician, or shall have reason to believe that any guest, inmate, or other person in the hotel, boarding house, lodging house, or institution over which he or she may have control or supervision, or on the premises thereof, is sick with or convalescing from smallpox, cholera, yellow fever, typhus or typhoid fever, scarlet fever, leprosy, or any other contagious or infectious disease, the said owner, proprietor, manager, or other person having charge shall immediately give notice thereof in writing to the health officer of the city or town in which the infected house or premises is located, or to the secretary of the State board of health if there is no local health officer who can efficiently deal with the case; said notice shall state the name and place of residence of the person sick, the name of the disease, the name of the owner, proprietor, or manager of the house, and the locality of said house. \* \* \*

SEC. 68. Any person or persons who shall neglect or refuse to comply with the provisions of the two foregoing sections shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof in a court of competent jurisdiction, be fined not more than fifty dollars for every such offense.

MASSACHUSETTS.

[Revised Laws, 1902, ch. 75.]

SEC. 49 (as amended by Acts of 1910, ch. 269). A householder who knows that a person in his family or house is sick of smallpox, diphtheria, scarlet fever, or any other infectious or contagious disease declared by the State board of health to be dangerous to the public health shall forthwith give notice thereof to the board of health of the city or town in which he dwells. \* \* \* Should one or both eyes of an infant become inflamed, swollen, and red, and show an unnatural discharge at any time within two weeks after its birth it shall be the duty of the nurse, relative, or other attendant having charge of such infant to report in writing within six hours thereafter to the board of health of the city or town in which the parents of the infant reside the fact that such inflammation, swelling, and redness of the eyes and unnatural discharge exist. \* \* \*

SEC. 50 (as amended by Acts of 1907, ch. 480). If a physician knows that a person whom he is called to visit is infected with smallpox, diphtheria, scarlet fever, or any other disease declared by the State board of health to be dangerous to the public health, or if one or both eyes of an infant whom or whose mother he is called to visit become inflamed, swollen, and red, and show an unnatural discharge within two weeks after the birth of such infant, he shall immediately give notice thereof in writing over his own signature to the selectmen or board of health of the town; and if he refuses or neglects to give such notice he shall forfeit not less than fifty nor more than two hundred dollars for each offense.

SEC. 51. The board of health shall keep a record, in blank books to be provided by the secretary of the Commonwealth, of all reports received pursuant to the two preceding sections, which shall contain the name and location of all persons who are sick, their disease, the name of the person who reports the case, and the date of such report. Said board shall give immediate information to the school committee of all contagious diseases so reported to them.

SEC. 52 (amended by Acts of 1907, ch. 480). If the board of health of a city or town has had notice of a case of smallpox, diphtheria, scarlet fever, or of any other disease declared by the State board of health to be dangerous to the public health therein, it shall within twenty-four hours thereafter give notice thereof to the State board of health stating the name and location of the patient so afflicted, and the secretary thereof shall forthwith transmit a copy of such notice to the State board of charity.

SEC. 53 (amended by Acts of 1902, ch. 213). If such board refuses or neglects to give such notice, the city or town shall forfeit its claim upon the Commonwealth for the payment of expenses as provided in section one of chapter two hundred and thirteen of the acts of the year nineteen hundred and two.

[Acts of 1907, ch. 183.]

SEC. 1. The State board of health is hereby authorized and directed to define what diseases shall be deemed to be "dangerous to the public health," as the term is used in chapter two hundred and thirteen of the acts of the year nineteen hundred and two.

MICHIGAN.

[Compiled Laws of 1897.]

SEC. 4452. Whenever any householder, hotel keeper, keeper of a boarding house, or tenant shall know, or shall be informed by a physician, or shall have reason to believe that any person in his family, hotel, boarding house, or premises is taken sick with smallpox, cholera, diphtheria, scarlet fever, or any other disease dangerous to the public health, he shall immediately give notice, in writing, thereof to the health officer of the township, city, or village in which he resides. Said notice shall state the name of the person sick, the name of the disease, if known, the name of the householder, hotel keeper, keeper of boarding house, or tenant giving the notice, and shall, by street and number, or otherwise, sufficiently designate the house in which he resides or the room in which the sick person may be; and if he shall refuse or wilfully neglect immediately to give such notice, he shall be deemed guilty of a misdemeanor, and upon conviction thereof he shall be punished by a fine of not exceeding one hundred dollars and costs of prosecution; or in default of payment thereof, by imprisonment not exceeding ninety days in the county jail, in the discretion of the court \* \* \*.

SEC. 4453. Whenever any physician shall know that any person whom he is called to visit, or who is brought to him for examination, is infected with smallpox, cholera, diphtheria, scarlet fever, or any other disease dangerous to the public health, he shall immediately give notice thereof to the health officer of the township, city, or village in which the sick person may be; and to the householder, hotel keeper, keeper of a

boarding house, or tenant within whose house or rooms the sick person may be. The notice to the officer of the board of health shall state the name of the disease, the name, age, and sex of the person sick, also the name of the physician giving the notice; and shall, by street and number, or otherwise, sufficiently designate the house or room in which said person sick may be. \* \* \*

SEC. 4434. For each complete notice in writing to an officer of the board of health, in full compliance with the preceding section, requiring from physicians, or other person, notices of diseases dangerous to the public health, the physician who gave the notice shall be entitled, on duly certifying that each notice was correct, and when the bill has been duly audited by the board of health, to receive from the township, city, or village, in which the notice was given, the sum of ten cents.

\* \* \* \* \*

SEC. 4460. Whenever the health officer of any township, city, or village in this State shall receive reliable notice or shall otherwise have good reason to believe that there is within the township, city, or village of which he is the health officer, a case of small-pox, diphtheria, scarlet fever, or other communicable disease dangerous to the public health, it shall be the duty of said health officer, \* \* \* to keep the president of his own board of health, and the secretary of the State board of health constantly informed respecting every outbreak of a disease dangerous to the public health, and of the facts so far as the same shall come to his knowledge, respecting sources of danger of any such diseased person or infected article being brought into or taken out of the township, city, or village of which he is the health officer.

\* \* \* \* \*

SEC. 4475. Should one or both eyes of an infant become inflamed or swollen, or reddened, or should any pus or secretion form in the eyes or upon the edge of the lids, at any time within two weeks after birth, it shall be the duty of any midwife, nurse, or other person having charge of such infant to report in writing within six hours after discovery of such inflammation, redness, or formation of pus or secretion, to the local health officer or some legally qualified practitioner of medicine in the city, town, or district in which such case shall occur, the fact that such inflammation, swelling, or redness, or accumulation in the eyes exists.

[Public acts of 1909, No. 27, as amended by Act 317, 1909, and Act 80, 1911.]

SEC. 1. Tuberculosis is hereby declared to be an infectious and communicable disease. It shall be the duty of every physician in the State of Michigan to report in writing on a form to be furnished as hereinafter provided, the name, nativity, age, sex, color, occupation, place where last employed if known, and address, of every person known by said physician to have tuberculosis, to the health officer of the township, city, or village in which said person resides, within twenty-four hours after such fact comes to the knowledge of said physician. It shall also be the duty of the chief officer having charge for the time being of any hospital, dispensary, asylum, or other similar private or public institution in said State of Michigan, to report in like manner the name, nativity, age, sex, color, occupation, place where last employed, if known, and previous address of every patient having tuberculosis who comes into his care or under his observation, within twenty-four hours thereafter.

SEC. 2. This report shall be upon a blank form furnished by the State board of health, and such blank, in addition to the name, color, age, sex, nativity, occupation, place where last employed, and present address, as stated above, shall give also the evidence upon which the diagnosis of tuberculosis has been made, the part of the body affected, and the stage of the disease. \* \* \*

"SEC. 4. *Protection of records.*—It shall be the duty of every health officer of a township, city, or village to cause all reports made in accordance with the provisions of the first section of this act, and also all results of examinations showing the presence

of the bacilli of tuberculosis made in accordance with the provisions of the third section of this act, to be recorded in a register to be furnished by the State board of health, of which he shall be the custodian, and a copy of which he shall transmit quarterly to the State board of health. Such register shall not be open to inspection by any person other than the health authorities of the State and of the said township, city, or village, and said health authorities shall not permit any such report or record to be divulged so as to disclose the identity of the person to whom it relates, except as may be necessary to carry into effect the provisions of this act. The cost of all blanks, vouchers, and registers by this act required to be furnished or issued by the State board of health shall be paid for by the board of State auditors out of the general fund in the State treasury, on presentation of vouchers approved by the secretary of the State board of health.

“SEC. 11. *Penalty for failure of physician to perform duties or for making false reports.*—Any physician or person practicing as a physician who shall fail to report any case of tuberculosis or who shall knowingly report as affected with tuberculosis any person who is not so affected, or who shall wilfully make any false statement concerning the name, nativity, age, sex, color, occupation, place where last employed, if known, or address of any person reported as affected with tuberculosis, or who shall certify falsely as to any of the precautions taken to prevent the spread of infection, shall be deemed guilty of a misdemeanor and on conviction thereof shall be subject to a fine of not more than one hundred dollars.

“SEC. 12. *Reporting recovery of patient.*—Upon the recovery of any person having tuberculosis, it shall be the duty of the attending physician to make a report of this fact to the local health officer, who shall record the same in the records of his office, and shall relieve said person from further liability to any requirements imposed by this act.

“SEC. 12a. In addition to the requirements of the reports hereinbefore provided, such reports shall comprehend the occupation at the time disease was contracted and the date thereof, as near as can be, the time thereafter continued at such occupation and all subsequent occupations and term of each to the time of the death or recovery of any person having tuberculosis, and it shall be the duty of every health officer of township or village or city to cause all reports to be made in accordance with the first section of this act, and this section and record copy transmitted as required by section four, and upon the receipt of the full quarterly report by the State board of health, said State board of health shall compile such report to show the number and location of each case, the number of deaths and number of recoveries, the age, sex, color, occupation at time person contracted, the disease, the time continued in the occupation when disease was contracted and all subsequent occupations and term of each up to death or recovery of such person, and so classify same, showing percentage of deaths in each trade or occupation from tuberculosis, as compared with the whole number of deaths in such trade or occupation as shown by the latest reports of local physicians to the local health boards as reported to the State board of health: *Provided*, That such compilation shall be published once every year in the reports of said State board of health; that such reports so made up shall be at all times open to the inspection of the public: *Provided further*, That the names of the persons so diseased shall not be published.

“SEC. 13. *General penalty.*—Any person violating any of the provisions of this act shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished, except as herein otherwise provided, by a fine of not less than five dollars nor more than fifty dollars.

“SEC. 14. *Repealing all acts, et cetera.*—All acts and parts of acts contrary to or inconsistent with the provisions of this act are hereby repealed.”

[Public Acts of 1909, No. 293.]

SEC. 1. \* \* \* The said State board of health is hereby expressly authorized to designate what diseases are dangerous communicable diseases and what diseases are contagious diseases, and it shall be the duty of every local board of health and health officer to observe such rules in relation to dangerous communicable diseases and contagious diseases as may be prescribed by the said State board of health.

[Laws of 1911, act 119.]

SECTION 1. Every physician attending or called upon to treat a patient whom he believes to be suffering from poisoning from lead, phosphorus, arsenic, or mercury, or their compounds, or from anthrax, or from compressed air illness, contracted as a result of the nature of the patient's employment, shall send to the State board of health, who shall transmit to the commissioner of labor a notice stating the name, post-office address, and place of employment of the patient, the length of time of such employment, and the disease from which, in the opinion of the physician, the patient is suffering.

SEC. 2. Any physician who shall fail to make any report required by the preceding section, or who shall wilfully make any false statement in such report, shall be deemed guilty of a misdemeanor, and on conviction thereof shall be punished by a fine of not more than fifty dollars.

SEC. 3. It shall be the duty of the commissioner of labor and of the prosecuting attorney of the county where anyone violating the provisions of this act may reside, to prosecute all violations of the provisions of this act which shall come to the knowledge of them or either of them.

MINNESOTA.

[Revised Laws of 1905.]

SEC. 2130. The board [State board of health] shall \* \* \* gather and diffuse proper information upon all subjects to which its duties relate. It shall gather, collate, and publish medical and vital statistics of general value \* \* \*

SEC. 2131. The board [State board of health] may adopt, alter, and enforce reasonable regulations of permanent application throughout the whole or any portion of the State, or for specified periods in parts thereof, for the preservation of the public health. Upon the approval of the attorney general, and the due publication thereof, such regulations shall have the force of law, except in so far as they may conflict with a statute or with the charter or ordinances of a city of the first class upon the same subject. In and by the same the board may control \* \* \* any of the following matters:

\* \* \* \* \*  
7. \* \* \* the reporting of sicknesses and deaths therefrom.

\* \* \* \* \*  
SEC. 2135. All local boards of health and health officers shall make such \* \* \* reports, and obey such directions concerning communicable diseases, as the State board may require or give. \* \* \*

MISSISSIPPI.

[Code of 1906, ch. 34.]

1645. The duties of the bureau on vital statistics of the department shall be (1) to appoint a county board of health in each county of the State, consisting of one physician of skill from each supervisor's district, for the purpose of collecting vital, mortuary, and sanitary statistics, of which board the county health officer shall be chairman; and said board may keep books of register for \* \* \* infectious diseases, in which may be kept a register of all the \* \* \* infectious diseases that may occur in the county.

(2) To carry out the rules and regulations as to the collection of vital, mortuary, and sanitary statistics in the State that shall be adopted by the State board of health.

\* \* \* \* \*

2498. Every practicing or licensed physician shall report immediately to the secretary of the State board of health every case of yellow fever, cholera, dengue, smallpox or other virulent epidemic contagious diseases that occurs within his practice, unless the State board of health shall otherwise direct. \* \* \*

2505. Any municipality may \* \* \* enforce the collection and registration of \* \* \* health and mortuary statistics; but the same shall be subject to and not inconsistent with the rules and regulations of the State board of health touching the health interests of the county in which such city, town, or village is situated.

[Acts of 1910, ch. 130.]

SEC. 1. It shall be the duty of all practicing physicians in this State to report to the secretary of the State board of health any and all cases of tuberculosis, consumption or other pulmonary diseases, which they shall be called on to examine or treat, within ten days after receiving knowledge of such cases. \* \* \*

SEC. 3. Any practicing physician who shall fail to make the reports provided for in section 1 of this act, shall be guilty of a misdemeanor, and, upon conviction, shall be fined not less than ten dollars nor more than fifty dollars.

#### MISSOURI.

[Annotated Codes of 1906.]

SEC. 7520. The State board of health shall \* \* \* recommend to the municipal authorities of any city, or to the county courts of any county, the adoption of any rules that they may deem wise or expedient for the protection and preservation of the health of the citizens thereof.

SEC. 7528. It shall be the duty of the board of health to make annual report, through its secretary or otherwise, in writing, to the governor of this State, on or before the first day of January of each year, and such report shall include \* \* \* such information concerning vital and mortuary statistics, such knowledge respecting diseases \* \* \* as may be thought useful by the board for dissemination among the people. \* \* \*

#### MONTANA.

[Revised Codes, 1907.]

SEC. 1486. \* \* \* He [the secretary of the local board of health] shall keep accurate records of all communicable diseases reported to him, and for this purpose each local board of health shall provide, at the expense of the city or town, a book printed in proper blank form for the notation of such facts and data as may be prescribed by the regulations of the State board of health. \* \* \*

\* \* \* \* \*  
SEC. 1495. \* \* \* He [the local and county health officer] shall on or before the fifth day of each month, transmit to the secretary of the State board of health, on blanks provided therefor, a complete report of all communicable diseases reported to him during the previous month, giving all the details regarding each case as indicated by the blank forms provided by the State board of health. \* \* \*

\* \* \* \* \*  
SEC. 1500. The term "communicable disease" as used in this act, shall be understood to include the following diseases: Smallpox, diphtheria, membranous croup, so-called scarlet fever, sometimes called scarlet rash or scarlatina, cholera, bubonic plague, yellow fever, "spotted" or "tick" fever, typhus fever, enteric or typhoid fever, cerebro spinal meningitis and measles.

SEC. 1501. Whenever any householder knows or has reason to believe that any person within his family or household has any communicable disease, he shall immedi-



ately give notice thereof to the health officer of the town or city in which he resides, if within the corporate limits of a town or city, or to the county health officer if without the corporate limits of a town or city, and such notice shall be given at the office of the local or county health officer within the shortest possible time and by the most direct means of communication.

SEC. 1502. Whenever any physician knows that any person whom he is called upon to visit is infected with any communicable disease, such physician shall immediately give notice of such disease to the local health officer, if within the corporate limits of a town or city, or to the county health officer if without the corporate limits of a town or city.

## NEBRASKA.

[Compiled Statutes, 1881, 14th ed., 1909.]

SEC. 4403. The State board of health \* \* \* shall collect and preserve such information as may be useful in the discharge of its duties, and for dissemination among the people.

SEC. 4404. It shall be the duty of all boards of health now in existence or that may hereafter be created, and of physicians in localities where there are no health authorities, or where such health authorities fail to act, to report to the State board of health promptly upon the discovery thereof, the existence of any one of the following diseases, viz, Asiatic cholera, yellow fever, smallpox, scarlet fever, diphtheria, typhus and typhoid fever and such other contagious and infectious diseases as the State board of health may from time to time specify; and each and every member of any such board of health, or other officer or physician, who knowing of the existence of any such disease shall fail promptly to report the same in accordance with the provisions of this section, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than ten dollars nor more than one hundred dollars for each and every such offense.

## NEW HAMPSHIRE.

[Public Statutes, 1891, ch. 110.]

SEC. 3 (as amended by Acts of 1901, ch. 13). It shall be the duty of every physician who attends upon any person infected with the smallpox, the malignant cholera, diphtheria, scarlet fever, or other malignant pestilential disease, immediately to report the same to the health officers, or in their absence to the selectmen of the town. If any physician shall neglect so to do, he shall be fined one hundred dollars, or be imprisoned not exceeding ninety days, or both.

[Acts of 1901, ch. 16.]

SEC. 2. Whenever any person knows or has reason to believe that any member of his family or household (boarder, roomer, or visitor) has either smallpox, diphtheria, membranous croup, scarlet fever, typhoid fever, measles, or any other malignant communicable disease, he shall, within twenty-four hours, if no physician is in attendance, give notice thereof to the local board of health of the town or city in which he resides, and such notice shall be given either verbally to one of the health officers, or by a communication addressed to the board of health and duly mailed within the time specified.

\* \* \* \* \*

SEC. 5. Upon the appearance of either of the diseases named in section 2 in any town or city in the State, the board of health shall make an immediate report to the State board of health upon blanks furnished for that purpose, and shall thereafter make a weekly report as long as the disease continues, stating number of cases, number of infected houses, fatality, and such other facts as may be required by the State board of health.

[Acts of 1903, ch. 45.]

SEC. 1. It shall be the duty of every physician who attends upon any person whom he suspects is infected with smallpox to immediately report the same to the health officers of the town in which said person then resides, or if there be no health officers, then to the selectmen of the town. \* \* \*

[Acts of 1911, ch. 6.]

SEC. 1. It shall be the duty of every physician practicing medicine or surgery in the State of New Hampshire to report in writing to the State board of health, within one week after the disease is recognized, on forms to be provided by the said board, the name, age, sex, color, occupation, and address of every person under his care in this State who in his opinion is infected with pulmonary or other form of tuberculosis. It shall also be the duty of the officer having charge for the time being of each and every hospital, dispensary, asylum, or other public or private institution in the State to report in like manner the name, age, sex, color, occupation, and last address of every person in his care, or who has come under his observation within one week of such time, who in his opinion is infected with pulmonary or other form of tuberculosis.

\* \* \* \* \*

SEC. 3. The State board of health shall cause all cases showing the presence of tubercle bacilli to be recorded in a register, of which the board shall be the custodian and which shall not be open to inspection, nor shall the board permit any such record to be divulged in any manner to disclose the identity of the person to whom it relates except to a health officer, if deemed necessary, to carry out the provisions of this act.

\* \* \* \* \*

SEC. 5. Upon the recovery of any person who has been found to be infected with tuberculosis a report to that effect shall be made to the State board of health by the attending physician and shall be recorded in the register aforesaid, and shall relieve the said person from further liability to any requirement imposed by this act.

\* \* \* \* \*

SEC. 7. Any person violating the provisions of this act shall, upon conviction thereof, be deemed guilty of a misdemeanor and shall be punished by a fine of ten dollars, or imprisonment for thirty days, or both.

[Acts of 1911, ch. 17.]

SEC. 1. Upon the appearance of smallpox, typhoid fever, or any other dangerous communicable disease in any unincorporated locality in this State it shall be the duty of any person having knowledge thereof immediately to notify the State board of health of the appearance of such disease, provided there is no local board of health having jurisdiction in the locality.

\* \* \* \* \*

SEC. 3. Any person violating the provisions of this act or any regulation established thereunder, shall be fined ten dollars for each offense.

NEW JERSEY.

[General Statutes, 1895, p. 1676.]

SEC. 1. Should one or both eyes of an infant become inflamed, swollen, or reddened, or show any unnatural discharge at any time within two weeks after its birth and no legally qualified practitioner of medicine be in attendance upon the infant at the time, it shall be the duty of the midwife, nurse, attendant, or relative having charge of such infant to report the fact in writing, within 6 hours, to the local board of health of the city, township, or other municipality in which the parents of the infant reside.

[Acts of 1911, ch. 380.]

A supplement to an act entitled "An act for the protection of the public health," approved March twenty-second, one thousand eight hundred and ninety-five.

SEC. 1. Every physician who shall attend any person sick with typhoid fever, dysentery, scarlet fever, diphtheria, or tuberculosis, on any dairy premises where milk is produced for sale or distribution, shall report to the secretary of the State board of health within twelve hours after he first ascertained that any such person is sick with any of said diseases, which report shall be in writing, and shall state the nature of the disease, the name of the person who is ill with said disease, and the location of the place where such person is ill as aforesaid, and the name of the owner or manager of said dairy premises if the same can be ascertained.

SEC. 2. Every physician who shall attend any person sick with any of the diseases mentioned in section one, who shall have knowledge of the fact that any member of the family of such person ill as aforesaid, or any person living in the same family, is employed on any dairy premises where milk is produced for sale or distribution, shall report to the secretary of the State board of health in writing, within twelve hours after he first ascertained that any such person is sick as aforesaid, or within twelve hours after gaining the information above mentioned as aforesaid, which report shall state the name of the person who is ill with said disease, the nature of the disease, and the location of the place where such person is sick as aforesaid, and shall further specify the name of the member of the family of such person or of the person living in the same family as the person ill as aforesaid who is employed on dairy premises as aforesaid, and the name of the owner or manager thereof if the same can be ascertained, and the location of the dairy premises where said person is employed.

SEC. 3. Every person who shall fail to make the report provided for by sections one and two of this act in the manner and within the time therein mentioned, shall, for every such failure, forfeit the sum of fifty dollars, to be recovered in the manner provided for the recovery of penalties in the act to which this act is a supplement.

[Acts of 1911, ch. 381.]

An act to amend an act entitled "An act for the protection of the public health," approved March twenty-second, one thousand eight hundred and ninety-five.

SEC. 1. Section one of the act to which this act is amendatory be, and the same hereby is, amended so that it shall read as follows:

"SEC. 1. Every physician shall, within twelve hours after his first professional attendance upon any person who is suffering from cholera, yellow fever, typhus fever, leprosy, plague, trichinosis, smallpox, varioloid, enteric or typhoid fever, diphtheria, membranous croup, scarlet fever, malaria, tuberculosis in any of its manifestations, trachoma, hydrophobia, glanders, anthrax, chicken-pox, anterior poliomyelitis or infantile paralysis, or any other contagious, infectious, or communicable disease which may hereafter be publicly declared by the State board of health to be preventable and specially dangerous to the public health, report such sickness to the assessor of the township in which such sickness may be; if such sickness be within the limits of the jurisdiction of any local board of health other than the local board of health of any township, then such physician shall report such sickness to the secretary of the local board of health having jurisdiction over the territory within which such sickness may be, if such board has a secretary; if such board has no secretary, then to the clerk of such board; provided, however, that any local board of health may designate some officer of such board, other than the clerk, secretary, or township assessor, to receive such reports, in which case all such reports shall be made to such officer; such report shall be in writing, signed by such physician, and shall set forth the name, age, and precise location of the person suffering from such disease; and every house owner or householder who has reason to believe that any person living, dwelling, or being in any building under his control is affected by any of the contagious, infectious, or

communicable diseases hereinabove specified or referred to, shall, when no physician has professionally attended such sick person, within twelve hours after discovering the same, report the fact in writing to the same person and in the same manner as any physician attending such sick person would be required to do as hereinabove set forth; and on the thirtieth day of June and the thirty-first day of December in each and every year every physician, house owner, and householder making any report or reports, as in this section required, shall be entitled to receive from the officer to whom such report or reports shall have been made during the preceding six months, a certificate in writing under the hand of such officer, setting forth the number of names of persons reported to have been affected with any of the diseases hereinabove specifically named or referred to, which certificate when presented by such physician, house owner, or householder to the proper disbursing officer of the city, borough, town, or other local municipal government or township within which such affected person may have been, shall entitle such physician, house owner, or householder to receive from such disbursing officer the sum of ten cents for each and every name by such certificate certified to have been reported, unless such notification shall be found to have been erroneous; and any physician, house owner, or householder who shall fail to perform the above-mentioned duty at the time and in the manner above provided shall be liable to a penalty of fifty dollars for each such failure."

SEC. 2. Section two of the act of which this act is amendatory be, and the same hereby is, amended so that it shall read as follows:

"SEC. 2. That the facts contained in every report filed pursuant to the provisions of the first section of this act shall be entered by the officer to whom the same shall be delivered in a book kept exclusively for that purpose, which book shall be subject to the inspection of the local board of health and its proper officers and to the State board of health and its officers only; the officer to whom such report shall be delivered, and whose duty it is to make record of same, as in this section above set forth, shall also, at least once in each week, and daily when required by the State board of health, transmit the facts stated therein by mail to the secretary of the board of health of the State of New Jersey, at Trenton, and shall upon request by the said State board of health or any of its officers give full information concerning the measures which are employed by the local board of health to prevent the spread of the disease in such reports mentioned, which facts and information shall be conveyed to the secretary of the said State board of health in writing; any officer whose duty it is to make any report to said State board of health or the secretary thereof, as in this section above provided, and who fails to perform such duty at the time and in the manner above provided, shall be liable to a penalty of fifty dollars for each and every such failure of duty. Proof that the secretary of said State board of health has not received the report of such facts or such information from any such officer shall be prima facie evidence that such facts and information have not been transmitted to said secretary by such officer. Every officer whose duty it is to receive the reports mentioned in section one of this act shall, during the month of October in each year, upon presentation of a certificate signed by the secretary of the State board of health stating the whole number of such cases reported as aforesaid from each municipality or township by such officer to the State board of health during the preceding year, be entitled to receive, from the proper disbursing officer of the township, city, borough, town, or other local municipal government within the limits of which the sickness so reported occurred, the sum of ten cents for each case reported, as aforesaid, to the secretary of the State board of health: *Provided, however,* That such officer shall not be entitled to any payment for or on account of any such case unless report of such case was received by the secretary of the said State board of health within ten days after the date such said case was reported to the officer transmitting the same, and no such case shall be included in such certificate unless so received. Such certificates shall be sent to the officers above mentioned during the month of October of each year."

SEC. 3. This act shall take effect immediately.

[Acts of 1910, ch. 160.]

**SEC. 1.** Tuberculosis is hereby declared to be an infectious and communicable disease, dangerous to the public health. It shall be the duty of every physician in the State of New Jersey to report in writing, signed by him, the name, age, sex, color, occupation, place where last employed, if known, and address of every person known by said physician to have tuberculosis to the local board of health of the city, borough, town, or other municipality in this State in which said person resides, within forty-eight hours after such fact comes to the knowledge of said physician. It shall also be the duty of the chief officer having charge for the time being of any hospital, asylum, prison, or other private or public institution in said State of New Jersey to report in like manner the name, age, sex, color, occupation, place where last employed, if known, and previous address of every patient having tuberculosis who comes into his care or under his observation within forty-eight hours thereafter.

NEW MEXICO.

[Acts of 1903, ch. 103.]

**SEC. 19.** Whenever any physician or other person shall know that any person is sick with smallpox or other contagious or infectious disease \* \* \* dangerous to the public health, he shall at once give notice thereof, if within the limits of any incorporated city, town, or village, to the health officer for the county in which such city, town, or village is situated; and if not within such city, town, or village, then to the justice of the peace in the precinct in which such disease \* \* \* exists. Whenever such notice is given to any justice of the peace it shall be his duty to at once notify the health officer of the county. Any physician, justice of the peace, or other person failing, neglecting, or refusing to perform any duty imposed upon him by this section shall be guilty of a misdemeanor \* \* \*.

**SEC. 20.** Whenever any householder shall know that any person in his family is sick with smallpox or other contagious disease dangerous to the public health he shall immediately give notice thereof required by the last preceding section, and upon failure to give such notice shall be deemed guilty of a misdemeanor, and punished upon conviction as in said section provided.

\* . \* \* \* \*

NEW YORK.<sup>a</sup>

[Consolidated Laws, 1909, ch. 45.]

**SEC. 5.** There shall be in the State department of health a bureau of vital statistics for the registration of births, marriages, deaths, and prevalent diseases, which shall be under the general charge and supervision of the commissioner of health. He shall prescribe and prepare the necessary methods and forms for obtaining and preserving such statistics and to insure the prompt and faithful registration of the same in the several municipalities and in the State bureau. \* \* \* If defects exist in any registration under the supervision of a local board of health the commissioner shall notify the local board that such defects must be amended and prevented within 10 days from the date of the notice. If such defects are not so amended or prevented, the commissioner shall take control of such registration and record thereof and enforce the rules and regulations in regard thereto, and secure a complete registration in such municipality, and such control shall continue until the local board satisfies the commissioner that it will make such record and registry complete, as required by law.

\* \* \*

\* \* \* \* \*

<sup>a</sup> See also page 156.

**SEC. 12.** The commissioner of health shall annually on or before the first Monday in February make a written report to the governor upon the vital statistics and sanitary conditions \* \* \* of the State. \* \* \*

\* \* \* \* \*

**SEC. 25.** \* \* \* Every physician shall immediately give notice of every case of infectious and contagious or communicable disease required by the State department of health to be reported to it, to the health officer of the city, town, or village where such disease occurs; and no physician being in attendance on such case it shall be the duty of the superintendent or other officer of an institution, householder, hotel, or lodging-house keeper, or other person where such case occurs, to give such notice. The physician or other person giving such notice shall be entitled to the sum of twenty-five cents therefor. \* \* \* Every such local board of health shall report to the State department of health, promptly, the facts relating to infectious and contagious or communicable diseases, and every case of smallpox or varioloid within the municipality. Health officers of cities, villages, and towns shall report in writing once a month to the State department of health all cases of such infectious and contagious or communicable diseases as may be required by the State department of health, and for such reporting the health officer of a village or town shall be paid by the municipality employing him \* \* \* a sum not to exceed twenty cents for each case so reported. The reports of cases of tuberculosis made pursuant to the provisions of this section shall not be divulged or made public, so as to disclose the identity of the persons to whom they relate, by any person; except insofar as may be necessary to carry out the provisions of this section. \* \* \* The health officer, commissioner of health, or boards of health of the cities of the first class shall report promptly to the State department of health all cases of smallpox, typhus and yellow fever, and cholera and the facts relating thereto.

\* \* \* \* \*

**SEC. 127.** The health officer shall keep the department of health of the city of New York informed of the number of cases of quarantinable diseases and the character of the same held at quarantine, and he may receive any vessel or merchandise sent to him by the health authorities of New York which in his opinion is dangerous to the public health.

**SEC. 129.** The quarantinable diseases are yellow fever, plague, cholera, typhus or ship fever, and smallpox, and any other infectious disease which has been or may be determined to be quarantinable by the health officer. \* \* \*

**SEC. 320.** Tuberculosis is hereby declared to be an infectious and communicable disease, dangerous to the public health. It shall be the duty of every physician in the State of New York to report in writing, on a form to be furnished as hereinafter provided, the name, age, sex, color, occupation, place where last employed, if known, and address, of every person known by said physician to have tuberculosis, to the health officer of the city, town, or village in which said person resides, within twenty-four hours after such fact comes to the knowledge of said physician. It shall also be the duty of the chief officer having charge for the time being of any hospital, dispensary, asylum, or other similar private or public institution in said State of New York to report in like manner the name, age, sex, color, occupation, place where last employed, if known, and previous address of every patient having tuberculosis who comes into his care or under his observation, within twenty-four hours thereafter.

\* \* \* \* \*

**§ 322. Protection of records.**—It shall be the duty of every health officer of a city, town, or village to cause all reports made in accordance with the provisions of section three hundred and twenty, and also all results of examinations showing the presence of the bacilli of tuberculosis, made in accordance with the provisions of section three

hundred and twenty-one, to be recorded in a register, of which he shall be the custodian. Such register shall not be open to inspection by any person other than the health authorities of the State and of the said city, town, or village, and said health authorities shall not permit any such report or record to be divulged so as to disclose the identity of the person to whom it relates, except as may be necessary to carry into effect the provisions of this article.

§ 329. *Penalty for failure of physician to perform duties or for making false reports.*—Any physician or person practicing as a physician who shall knowingly report as affected with tuberculosis any person who is not so affected, or who shall wilfully make any false statement concerning the name, age, sex, color, occupation, place where last employed if known, or address of any person reported as affected with tuberculosis, or who shall certify falsely as to any of the precautions taken to prevent the spread of infection, shall be deemed guilty of a misdemeanor, and on conviction thereof shall be subject to a fine of not more than one hundred dollars.

§ 330. *Reporting recovery of patient.*—Upon the recovery of any person having tuberculosis, it shall be the duty of the attending physician to make a report of this fact to the local health officer, who shall record the same in the records of his office, and shall relieve said person from further liability to any requirements imposed by this article.

§ 331. *General penalty.*—Any person violating any of the provisions of sections three hundred and twenty to three hundred and thirty, both inclusive, of this article, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished, except as in this article otherwise provided, by a fine of not less than five dollars nor more than fifty dollars.

§ 332. *Application of provisions.*—No portion of sections three hundred and twenty and three hundred and thirty-one, both inclusive, shall apply to the city of New York, nor shall the passage of said sections modify or repeal any of the provisions of the charter of the city of New York, or any rule or regulation issued by the department of health of said New York City.

NORTH CAROLINA.

[Revisal of 1905.]

SEC. 4439. Bulletins of the outbreak of disease dangerous to the public health shall be issued by the State board whenever necessary, and such advice freely disseminated to prevent and check the invasion of disease into any part of the State.

\* \* \*

[Acts of 1911, ch. 62.]

SEC. 16. All laws pertaining to the reporting, recording \* \* \* of the diseases mentioned in section eighteen, \* \* \* shall be faithfully enforced by the quarantine officer. \* \* \*

SEC. 17. If a householder knows that a person within his family is sick with smallpox, diphtheria, scarlet fever, measles, whooping cough, yellow fever, typhus fever, cholera, or bubonic plague he shall immediately give notice thereof to the quarantine officer or the deputy quarantine officer.

SEC. 18. If a physician suspects that a person whom he is called to visit is infected with smallpox, diphtheria, measles, whooping cough, scarlet fever, typhus fever, yellow fever, cholera, or bubonic plague \* \* \* he shall immediately give notice thereof to the quarantine officer or deputy quarantine officer.

SEC. 19. The quarantine officer shall record on duplicate forms supplied by the State board of health and in accordance with instructions furnished therewith, all diseases reported in pursuance of sections eighteen and nineteen. The said officer receiving notice of the diseases named in sections eighteen and nineteen shall make the following report: First, the quarantine officer shall notify the secretary of the State board of health, by telegram, within twenty-fours after receiving information

of the presence of yellow fever, cholera, typhus fever, or bubonic plague, of the existence of every case of the aforesaid diseases; second, the quarantine officer shall notify the teacher or principle in the school attended by members of the family of the sick child, on blank forms furnished by the State board of health, within twenty-four hours after receiving information of the presence of yellow fever, cholera, typhus fever, bubonic plague, diphtheria, scarlet fever, measles, or whooping cough, of the existence of every case of the said diseases; third, the quarantine officer shall mail to the secretary of the State board of health, not later than the fifth day of the following month, the original record of all cases of yellow fever, smallpox, measles, cholera, typhus fever, bubonic plague, diphtheria, scarlet fever, and whooping cough, for the preceding month: *Provided*, That the quarantine officers are hereby empowered to appoint, if they desire, one deputy quarantine officer in each township of the county; the tenure of office of such deputy shall be terminable at the pleasure of the quarantine officer. The deputy quarantine officer, upon receiving notice of the existence of any of the diseases mentioned in sections eighteen and nineteen, shall at once notify the quarantine officer, upon suitable blank forms supplied him for this purpose. \* \* \* The quarantine officer shall be liable for the neglect or refusal of his deputy to carry out the provisions of this act. Any householder, physician, quarantine officer, or any other person who violates the provisions of this section shall be guilty of a misdemeanor, and upon conviction thereof shall be liable to a fine of not less than ten dollars nor more than fifty dollars, or imprisonment for not less than ten nor more than thirty days, and shall be liable to a penalty of twenty-five dollars in favor of any person who shall sue for the same. The chairman of the board of county commissioners shall be responsible for the enforcement of sections eighteen, nineteen, \* \* \* of this act in his jurisdiction. Failure on his part to enforce its provisions shall be a misdemeanor, and he shall be liable to a fine of not less than ten dollars nor more than fifty dollars. \* \* \*

SEC. 21. The county, town, or city treasurer, as the case may be, shall pay twenty-five cents each, or more if necessary, for the execution of this act, to the quarantine officer upon presentation of a certified statement from the secretary of the State board of health of the number of cases of the diseases mentioned in section nineteen reported to the said secretary for the preceding month. \* \* \*

#### NORTH DAKOTA.

[Revised Codes of 1905.]

SEC. 257. The superintendent of public health shall on the first day of December of each even numbered year make a full report to the governor, which report shall show \* \* \* the character and extension during such time of all contagious and infectious diseases that have been reported to him \* \* \*

\* \* \* \* \*  
SEC. 260. \* \* \* The county superintendent of health shall \* \* \* whenever any contagious or infectious disease occurs in his county, either among persons or domestic animals, immediately report the same to the superintendent of public health.  
\* \* \* \* \*

SEC. 275. Whenever it shall come to the knowledge of any physician or other person that a contagious, epidemic, or infectious disease exists within the jurisdiction of any local board, he shall immediately report to such board in writing the name and place of residence, if known, of every person afflicted with such disease, and if he is the attending physician of such person he shall report not less than twice in each week the condition of each person so afflicted and the state of such disease.  
\* \* \* \* \*

SEC. 277. Each keeper of any private house, boarding house, lodging house, inn, or hotel shall report in writing to the local board of health within whose jurisdiction the same may occur each case of contagious, infectious, or epidemic disease which may



occur in his house, inn, or hotel; such report shall be made within twenty-four hours after the existence of such disease shall become known to such person, and shall state the name of each person afflicted with such disease and the nature thereof.

\* \* \* \* \*  
 Sec. 282. \* \* \* Whenever it shall come to its knowledge that a case of smallpox, scarlet fever, diphtheria, or other infectious or contagious disease exists within its jurisdiction, \* \* \* the local board of health shall \* \* \* immediately notify the State board of health of the existence and nature of such disease. \* \* \*

Sec. 288. The health officer of each city, the clerk of each civil township, and in counties not organized into civil townships, the county commissioner of such county for the district for which he was elected, and the superintendent of the county board of health of each county in the State, shall obtain and register the following facts concerning the \* \* \* contagious and infectious diseases occurring therein, separately numbering and recording the same in the order in which he obtains them, designating in separate columns, viz, \* \* \*; in the registry of infectious and contagious diseases, the name of the person affected, the sex, color, and age of the person, the nature of the disease, and the date of record. The county auditor of each county shall furnish each officer within his county, charged with the duties herein provided, at the expense of the county, a book in which to register the facts concerning \* \* \* infectious and contagious diseases as herein provided. The superintendent of each county board of health shall keep his records in the office of the county judge of said county.

Sec. 289. Where no physician is employed, it shall be the duty of the parents to give notice to the proper office within whose jurisdiction they reside, \* \* \* of the presence of any infectious or contagious disease occurring within their household, within twenty-four hours, \* \* \* and the oldest person next of kin, the keeper or other proper officer of every workhouse, poorhouse, reform school, jail, prison, hospital, asylum, or other public or charitable institution, shall give like notice of any \* \* \* infectious or contagious disease occurring among the persons under his charge. \* \* \*

Sec. 290. \* \* \* Any physician attending a case of infectious or contagious disease shall immediately notify the health officer within whose jurisdiction such disease exists, giving the name of patient, place of residence, and the character of the disease, and shall in addition thereto, for the purpose of keeping the record of vital statistics complete, certify the facts to the clerk of the civil township within whose district such disease occurred, or in counties not organized into civil townships then to the county commissioner having the proper jurisdiction, giving the name of the patient, place of residence, and character of the disease. \* \* \*

Sec. 291. It shall be the duty of the health officer of each city and the clerk of each organized civil township of each county in this State, and in counties not organized into civil townships, the county commissioner of such county for the district for which he was elected, to make and send a copy of the registry of \* \* \* infectious and contagious diseases to the superintendent of the county board of health of each county in the State not later than the 10th of each month a certified copy of the registry of \* \* \* infectious or contagious diseases occurring within the preceding month; and the superintendent of the county board of health of each county in this State shall make and send to the State superintendent of health on or before the fifteenth day of each month a copy of the records showing all \* \* \* infectious or contagious diseases reported to him for the preceding month within his county. \* \* \*

Sec. 292. The superintendent of each county board of health shall, on or before the fifteenth day of each month, transmit to the superintendent of the State board of health, upon blanks furnished him by the State board of health, a certified copy of the registry of \* \* \* infectious and contagious diseases which have occurred in said county within the calendar month immediately preceding, as reported to him

by the officers charged with the collection of vital statistics within his county. For obtaining, registering, and returning the facts herein required the county superintendent of health shall receive a sum of ten cents for each separate record of \* \* \* infectious and contagious diseases so made and reported, to be paid out of the general fund of such county in the same manner as other bills and accounts against said county are allowed and paid. For neglect to perform such duties as are herein required the county superintendent of health shall forfeit a sum not exceeding fifty dollars for each offense, to be collected as other fines are collected by law.

[Acts of 1911, ch. 188.]

SEC. 3. Should one or both eyes of an infant become inflamed, swollen, or reddened or show any unnatural discharge or secretion at any time within two weeks after its birth, and no legally qualified physician is in attendance upon the infant at that time, it shall be the duty of its parents or, in their absence, whoever is caring for said infant, to report the fact in writing within six hours after discovery to the health officer having jurisdiction: *Provided*, Said report to said health officer need not be made from recognized hospitals.

\* \* \* \* \*

SEC. 5. Penalty.—Any violation of the provisions of this act shall be punished by a fine of not less than ten dollars nor more than fifty dollars.

\* \* \* \* \*

OHIO.

[General Code, 1910.]

SEC. 1243. Boards of health, health authorities or officials, and physicians in localities where there are no health authorities or officials shall report to the State board of health promptly upon the discovery thereof the existence of any one of the following diseases: Asiatic cholera, yellow fever, smallpox, scarlet fever, diphtheria, membranous croup, typhus or typhoid fever, and such other contagious or infectious diseases as the State board specifies.

\* \* \* \* \*

SEC. 4427. Each physician or other person called to attend a person suffering from smallpox, cholera, plague, yellow fever, typhus fever, diphtheria, membranous croup, scarlet fever, or typhoid fever, or any other disease dangerous to the public health, or required by the State board of health to be reported, shall report to the health officer within whose jurisdiction such person is found, the name, age, sex, and color of the patient, and the house and place in which such person may be found. In like manner, the owner or agent of the owner of a building in which a person resides who has any of the diseases herein named or provided against, or in which are the remains of a person having died of any such disease, and the head of the family, immediately after becoming aware of the fact, shall give notice thereof to the health officer.

SEC. 4428. When complaint is made or a reasonable belief exists that an infectious or contagious disease prevails in a house or other locality which has not been so reported the board shall cause such house or locality to be inspected by its health officer, \* \* \*

SEC. 12787. Whoever, being a midwife, nurse, or relative in charge of an infant less than ten days old, fails within six hours after the appearance thereof to report in writing to the physician in attendance upon the family, or if there be no such physician to a health officer of the city, village, or township in which such infant is living, or, in case there be no such officer, to a practitioner of medicine legally qualified to practice, that such infant's eye is inflamed or swollen or shows an unnatural discharge, if that be the fact, shall be fined not less than five dollars nor more than one hundred dollars or imprisoned not less than thirty days nor more than six months, or both.

## OKLAHOMA.

[Snyder's Compiled Laws, 1909.]

SEC. 349. It shall be the duty of all practicing physicians in each county to make a report to the county superintendent of public health for said county, upon forms as prescribed and furnished by the State board of health, of all the cases of infectious and contagious diseases. Such report shall be made by said physician as soon as the disease is discovered, and upon failure on the part of the physician to so report said disease as herein provided, he shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in a sum not less than ten dollars and not more than twenty-five dollars. \* \* \*

SEC. 350. It shall be the duty of any practicing physician in cities of the first class, in counties of this State, to make a report to the city superintendent of public health, upon forms prescribed and furnished by the State board of health, of all cases of infectious and contagious diseases, as soon as discovered by him or coming to his knowledge. Any failure upon the part of said physician to report said disease as herein provided, shall be deemed guilty of misdemeanor, and upon conviction thereof, shall be fined in the sum of not less than twenty-five dollars nor more than one hundred dollars. \* \* \* It shall be the duty of said city superintendent of public health to make a full report from time to time to the State board of health as to all cases of contagious and infectious diseases existing within said city at such times and under such rules and regulations that said State board of health may require. \* \* \*

## OREGON.

[Acts of 1903, p. 82.]

SEC. 8. \* \* \* It shall be the duty of the county board of health \* \* \* to report to the secretary of the State board of health monthly, not later than the tenth day, all infectious diseases, \* \* \* that may have been reported to said board of health during the preceding month, excepting cities wherein vital statistics are collected, and in such cases the health officer, or other persons whose duty it is to collect said statistics, must send to the secretary of the State board of health, not later than the tenth day of the month, a transcript of his monthly records of deaths \* \* \* and all infectious diseases reported to him.

\* \* \* \* \*

SEC. 12. \* \* \* Every physician, or other person, under whose charge any infectious or epidemic disease occurs, must report the same to the county or city health officer immediately. \* \* \*

## PENNSYLVANIA.

[Purdon's Digest, 13th ed., p. 1886.]

78. Should one or both eyes of an infant become inflamed, or swollen and reddened, at any time within two weeks after birth, it shall be the duty of the midwife or nurse or other person having the care of such infant, to report in writing within six hours after the discovery thereof to the health officer, or legally qualified practitioner of the city, town, or district in which the mother of the child resides, the fact that such inflammation, or swelling, or redness exists.

[Acts of 1909, ch. 658.]

SEC. 1. Every physician, practicing in any portion of this Commonwealth, who shall treat or examine any person suffering from, or afflicted with, actinomycosis, anthrax, bubonic plague, cerebrospinal meningitis (epidemic), (cerebrospinal fever, spotted fever), chicken pox, Asiatic cholera, diphtheria (diphtheritic croup, membranous croup, putrid sore throat), epidemic dysentery, erysipelas, German measles, glanders (farcy), rabies (hydrophobia), leprosy, malarial fever, measles, mumps,

pneumonia (true), puerperal fever, relapsing fever, scarlet fever (scarlatina, scarlet rash), smallpox (variola, varioloid), tetanus, trachoma, trichiniasis, tuberculosis in any form, typhoid fever, typhus fever, whooping cough, or yellow fever, shall, if said case shall be located in a township of the first class, a borough, or a city, forthwith make a report in writing to the health authorities of said township, city, or borough; and, if said case shall be located in a township of the second class, or a city, borough, or township of the first class not having a board of health or body acting as such, to the State department of health, upon blanks supplied for that purpose; in which report he shall, over his or her own signature, state the name of the disease, and the name, age, sex, color, nativity, and occupation, if any, of the person suffering therefrom, together with the street and house number of the premises in which said person may be located, or otherwise sufficiently designate the same, the date of the onset of the disease, the name and occupation of the householder in whose family the disease may have occurred, the number of children in said household attending school, and the name or names of the school or schools so attended, together with such other information relating so said case as may be required by said health authorities and the State department of health.

\* \* \* \* \*

SEC. 9. Blanks whereon to make the reports \* \* \* required by this act shall be supplied in cities, boroughs, and townships of the first class by the health authorities thereof, respectively; and in townships of the second class, and in cities, boroughs, and townships of the first class not having boards of health or bodies acting as such, by the State department of health.

SEC. 10. It shall be the duty of the health authorities of cities, boroughs, and townships of the first class, respectively, to furnish daily, by mail or otherwise, to principals, superintendents, teachers, and other persons in charge of public, private, parochial, Sunday, and other schools, a printed or written bulletin containing the name, location, and disease of all persons suffering from any of the diseases mentioned in sections three, four, five, six, and seven of this act, upon receipt by them of reports of such cases from physicians, as required by section one of this act; and such bulletin shall be daily furnished to such persons in charge of such schools in townships of the second class, and in cities, boroughs, and townships of the first class, not having boards of health or bodies acting as such, by the State department of health.

\* \* \* \* \*

SEC. 23. The health authorities of the several cities, boroughs, and townships of the first class shall, at the end of each week and for the fraction of each week occurring at the end of each month, report to the State department of health, upon blanks supplied for that purpose, a list of all cases of communicable diseases mentioned in section one of this act which have been reported to them during said period, which report shall contain the name of each person suffering therefrom, respectively, and his or her age, sex, color, and nativity, together with the name of the disease and the date of the onset thereof; and in the event of no reports of any of said diseases having been received by the aforesaid health authorities, respectively, during any said period, that fact shall be reported to the State department of health. All superintendents and other persons in charge of asylums, hospitals, or other institutions located in townships of the second class shall at the end of each week and portion of a week occurring at the end of each month report to the State Department of health on blanks to be supplied for that purpose, a list of the inmates of such institutions, respectively, who may have suffered from any of the diseases enumerated in section one of this act, together with the above-mentioned data relative to each inmate, with the date of his or her admission to the institution, and the name of the city, borough, or township from which he or she was admitted.

\* \* \* \* \*

SEC. 24. \* \* \* Any physician, \* \* \* or any other person or persons, who shall fail, neglect, or refuse to comply with, or who shall violate any of the provisions of this act shall, for every such offense, upon conviction thereof in a summary proceeding before any magistrate or justice of the peace of the county wherein said offense was committed, be sentenced to pay a fine of not less than twenty (\$20) dollars or more than one hundred (\$100) dollars, to be paid to the use of said county, or to be imprisoned in the county jail for a period of not less than ten nor more than thirty days, or both, at the discretion of the court.

PORTO RICO.

[Laws of 1911, act 68.]

SEC. 25. \* \* \* Physicians shall report to the nearest health officer any of the following diseases: Exanthematic typhus, typhoid fever, smallpox, varioloid, scarlet fever, diphtheria, yellow fever, Asiatic cholera, bubonic plague, beriberi, epidemic dysentery, cerebro-spinal meningitis, whooping cough, epidemic parotiditis, malaria, tuberculosis, glanders, leprosy, cutaneous syphilis, and hookworm disease, or uncinariasis.

SEC. 26. It shall be the duty of practicing physicians to report to the local health officer all cases of infectious or contagious diseases treated by them, and it shall be the duty of health officers to immediately report all such cases to the director of sanitation. It shall be likewise the duty of veterinarians to report to the director of sanitation any disease of the animals under their care, such as bacteroid carbuncle, tuberculosis, actinomycosis, gangrenous septicaemia, glanders, or any other epidemic disease.

RHODE ISLAND.

[General Laws, 1909, ch. 96.]

SEC. 10 (added by acts of 1909-10, ch. 386). It shall be the duty of the State board of health to keep a register of all persons in this State who are known to be affected with laryngeal or pulmonary tuberculosis. The State board of health shall have sole exclusive control of said register and shall not permit the inspection thereof nor disclose any of its personal particulars except to officials authorized under the laws of this State to receive such information.

SEC. 11 (added by acts of 1909-10, ch. 386). The superintendent, or other person, in charge or control of any hospital, school, reformatory, or other institution, deriving the whole or any part of its support from the public funds of the State of Rhode Island, having in charge or under his care and custody any person or persons suffering with pulmonary or laryngeal tuberculosis, shall, within forty-eight hours after recognition of such disease, make, or cause to be made, in the manner and form prescribed by the State board of health, a record of the name, age, sex, color, occupation, social condition, and residence of the person or persons so affected, together with such other information as may be determined by the State board of health. Said information to be furnished on blanks supplied by the State board of health, and said information shall be forwarded each week to the office of the secretary of the State board of health on said blanks. \* \* \*

SEC. 12 (added by acts of 1909-10, ch. 386). Whenever any physician knows that any person under his professional care is affected with pulmonary or laryngeal tuberculosis, he shall transmit to the secretary of the said State board of health within seven days, and upon blanks provided by the State board of health for that purpose, the name, sex, age, color, occupation, social condition, and residence of such person. \* \* \*

## [General Laws, 1909, ch. 110.]

SEC. 13. Every **householder** or person shall immediately inform the town council of the town wherein he dwells, of any person in the house or tenement occupied by him, who has been taken sick of the smallpox, or any other contagious or infectious distemper, or suspected to be so.

\* \* \* \* \*

SEC. 19. Every **physician, householder, or other person**, having knowledge of the existence of smallpox in any town, shall immediately give information thereof to the town clerk of the town in which the person is sick with the smallpox, and in cities shall give like information to the superintendent of health.

SEC. 20. Whenever the town clerk of any town shall have knowledge or shall have received information as provided in the preceding section of the existence of smallpox in his town, he shall forthwith give or cause notice thereof to be given to the town council of such town, at the expense of the town, to be audited and allowed by the town council.

## [General Laws of 1909 (ch. 343).]

SEC. 25. Should any midwife or nurse, or person acting as nurse, having charge of an infant in this State, notice that one or both eyes of such infant are inflamed or reddened at any time within two weeks after its birth, it shall be the duty of such midwife or nurse, or person acting as nurse, so having charge of such infant, to report the fact in writing within six hours to the health officer, or some qualified practitioner of medicine, of the city or town in which the parents of the infant reside.

\* \* \* \* \*

SEC. 27. Every person who shall fail to comply with the provisions of the two sections next preceding shall be fined not exceeding one hundred dollars, or imprisoned not exceeding six months, or both.

## [Acts of 1911, ch. 728.]

SECTION 1. Any physician who may discover a case or cases of anterior poliomyelitis, tubercular meningitis, or cerebrospinal meningitis shall immediately report the existence of each and every case of said diseases to the secretary of the State board of health, together with such information as said secretary may require.

## SOUTH CAROLINA.

## [Criminal Code, 1902.]

SEC. 331. Should one or both eyes of an infant become reddened or inflamed at any time after birth, it shall be the duty of the midwife or nurse or person having charge of said infant to report the condition of the eyes at once to the local board of health of the city or town in which the parents of the infant reside.

Any failure to comply with the provisions of this section shall be punishable by a fine not to exceed twenty-five dollars or imprisonment not to exceed one month, or both.

This section shall not apply to towns or cities of less than one thousand inhabitants.

## [Act No. 395, 1910.]

SEC. 1. In all cases of known or suspected contagious or infectious diseases occurring within any incorporated city or town of this State, it shall be the duty of the attending physician to report such disease to the secretary of the board of health of each city or town within twenty-four hours, stating the name and address of the patient, and the nature of the disease.

SEC. 2. It shall be the duty of the secretary of each local board of health to report to the secretary of the State board of health all such cases of infectious and contagious

diseases as have been reported to him during the preceding months, such reports to be made upon blanks furnished by the State board of health, and not later than the fifth day of each month.

SEC. 3. It shall be the duty of the attending physician in all cases of known or suspected contagious or infectious diseases outside of incorporated cities and towns, to report such cases to the secretary of the State board of health within twenty-four hours after they have come under his observation, said reports to be made upon blanks furnished by the State board of health.

SEC. 4. The State board of health is hereby authorized to name the diseases it considers contagious and infectious.

SEC. 5. Any physician or secretary of a local board of health, failing to comply with the provisions of this act, shall be deemed guilty of a misdemeanor, and upon conviction shall be fined in a sum not less than five dollars nor more than twenty-five dollars, or be imprisoned in the county jail for a period not exceeding thirty days.

SOUTH DAKOTA.

[Political Code, 1903.]

SEC. 248. \* \* \* The superintendent of the county board of health shall be ex-officio secretary of the board of health of his county, \* \* \* and shall at the end of every month make a full report in writing to the superintendent of the State board of health \* \* \* of the condition of the public health, and whenever any contagious or infectious disease occurs in his county shall immediately report the same to the superintendent of the State board of health.

\* \* \* \* \*

SEC. 253 \* \* \* Any practicing physician or other person who shall fail to report to the superintendent of the county board of health the existence of any contagious or infectious disease, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not more than one hundred dollars, or by imprisonment in the county jail for not more than six months, or by both such fine and imprisonment, in the discretion of the court.

TENNESSEE.

[Acts of 1905, ch. 519.]

SEC. 1. Whenever any case of smallpox, yellow fever, cholera, bubonic plague, typhus fever, diphtheria, membranous croup, scarlet fever, or other communicable diseases exist (except it shall not embrace any venereal disease, such as gonorrhoea or syphilis), or is even suspected to exist in any household, it shall be the duty of the head of said household, or any other person in such household possessing knowledge of said facts, to immediately notify the municipal or county health authorities of the town or county wherein such disease or diseases exist or may be supposed to exist.

SEC. 2. Whenever any physician, surgeon, or practitioner of medicine shall know or suspect that any person or persons, whom they have been called to visit, or who has been brought to them for examination, or any other suspicious information received relative thereto, is or are infected, or even suspected, with any of the aforementioned diseases, he shall, and it shall be his duty to, immediately notify the health authorities of the town or county in which said diseased person or persons are found.

\* \* \* \* \*

SEC. 11. It shall be the duty of each and every municipal or county board of health in this State, upon receiving information of the existence or suspected existence in their respective jurisdiction of any case of smallpox, cholera, yellow fever, scarlet fever, diphtheria, or other disease dangerous to the public health, to immediately notify the State board of health of the fact, and, in addition, on the first of each and every month make a written report and forward the same without delay to said board

of all communicable diseases occurring in their respective jurisdictions for the last month preceding, setting forth in said report in separate columns the age, color, and sex of the individual, name of each disease, number of cases, number of deaths, together with such other information as said State board of health may desire.

[Acts of 1911, ch. 10.]

**SECTION 1.** Be it enacted by the General Assembly of the State of Tennessee, that a person who, being a midwife, nurse, or other person having the care of an infant within the age of 2 weeks, neglects or omits to report immediately to the health officers or to a legally qualified practitioner of medicine of the city, town, or place where such child is being cared for, the fact that one or both eyes of such infant are inflamed or reddened whenever such shall be the case, or who applies any remedy therefor without the advice or except by the direction of such officer or physician, or neglects, refuses, or omits to comply with the above requirements shall be guilty of a misdemeanor.

TEXAS.

[Acts of 1911, ch. 95.]

*Rule 1.*—Every physician in the State of Texas shall report in writing or by an acknowledged telephone communication to the local health authority immediately after his or her first professional visit, each patient he or she shall have or suspect of suffering with any contagious disease, and if such disease is of a pestilential nature he shall notify the president of the State board of health at Austin by telegraph or telephone at State expense. \* \* \*

*Rule 2.*—For the purpose of these regulations the phrase "local health authority" shall be held to designate the city or county health officer, or local board of health, within their respective jurisdictions.

*Rule 3.*—The phrase "contagious disease" as used in these regulations shall be held to include the following diseases, whether contagious or infectious, and as such shall be reported to all local health authorities and by said authorities reported in turn to the president of the State board of health: Asiatic cholera, bubonic plague, typhus fever, yellow fever, smallpox, scarlet fever (scarlatina), diphtheria (membranous croup), epidemic cerebrospinal meningitis, dengue, typhoid fever, epidemic dysentery, trachoma, tuberculosis, and anthrax.

*Rule 4.*—City and county health authorities shall keep a careful and accurate record of all cases of contagious diseases as reported to them, with the date, name, age, sex, race, location, and such other necessary data as may be prescribed by the State board of health. And they shall also make a monthly report of all contagious diseases, of which they may be cognizant, to the president of the State board of health before the fifth of the following month upon blank forms provided by the State board of health. The reports on tuberculosis are to be privately kept and are to be considered in the light of a confidential communication, not for the purpose of isolation, but with the object of education in sanitary precautions and to supply literature of the State board of health.

\* \* \* \* \*

*Rule 22.* Whenever any nurse, midwife, or other person not a legally qualified practitioner of medicine shall notice inflammation of the eyes or redness of the lids in a newborn child under his or her care, it shall be the duty of such person to report the same to the local health authority, or in his absence any reputable physician, within twelve hours of the time the disease is first noticed.

*Rule 23.*—Every hotel proprietor, keeper of a boarding house, or inn, and householder or head of family in a house wherein any case of reportable contagious disease (including tuberculosis) may occur shall report the same to the local health authority



within twelve hours of the time of his or her first knowledge of the nature of such disease unless previous notice has been given by the physician in attendance. \* \* \*

Any person who shall violate any of the rules, regulations, or provisions of the sanitary code of Texas, as herein set forth, shall be deemed guilty of a misdemeanor, and upon conviction shall be fined in any sum not less than ten dollars and not more than one thousand dollars.

UTAH.

[Compiled Laws, 1907.]

SEC. 1108. Every local board of health or health officer shall report to the secretary of the State board of health at such times as the State board may require. \* \* \* It shall be the duty of the local health officer to make a monthly report to the State board of health, on or before the fifth day of each month, of all cases of scarlet fever, smallpox, diphtheria, membranous croup, typhoid fever, whooping cough, measles, chicken pox, pneumonia, and tuberculosis which have occurred within his jurisdiction during the previous month; and upon receipt of the notification of the existence of any case of either of said diseases in any family, a member of which is in attendance upon any public or private school, he must at once report the existence of such disease to the principal of the school so attended. \* \* \*

SEC. 1111. All physicians or other persons having knowledge of the existence of any contagious or infectious disease, or having reason to believe that any such disease exists, are hereby required to report the same forthwith to the local board of health.

1113x11 (as amended by laws of 1911, ch. 75, sec. 1). It shall be the duty of every physician or other person caring for the sick in the State of Utah, to make a report to the local board of health immediately after such person becomes aware of the existence of any case of scarlet fever, diphtheria, membranous croup, whooping cough, smallpox, typhoid fever, measles, tuberculosis, Asiatic cholera, rubella (rotheln), chicken pox, typhus fever, plague, cerebro spinal meningitis, infantile paralysis, leprosy, or pneumonia, in his or her charge, and it shall be the duty of every person, owner, agent, manager, principal, or superintendent of any public or private institution, or dispensary, hotel, boarding house, or lodging house to make a report in like manner of any inmate, occupant, or boarder, suffering from any of the said infectious or contagious diseases; and in case such physician or other person shall fail to report in twenty-four hours, said person shall be deemed guilty of a misdemeanor.

SEC. 1113x27. It shall be the duty of every physician in the State, every superintendent of hospital or public institution in the State, to immediately report to the State board of health every case of tuberculosis which he is called upon to treat or which is in such hospital or public institution; each and every physician or superintendent shall make such reports as may be called for by the rules and regulations of the State board of health, and must comply with all rules and regulations made by said board to prevent the spread of such disease.

Any person violating any provision of this act shall be guilty of a misdemeanor.

[Acts of 1911, ch. 61.]

SECTION 1. It shall be the duty of every physician and every midwife attending a case of childbirth to report to the local board of health every case where the newly born child has inflammation of the eyes attended by a discharge therefrom. Such report to be made within six hours after the appearance of such disease. It shall be the duty of such physician or midwife to treat the eyes of the child so affected in accordance with the rules of the State board of health. Every physician and midwife failing to comply with the provisions of this act shall be guilty of a misdemeanor.

[Laws of 1911, ch. 90.]

**SECTION 1. Physicians and superintendents of hospitals to report cases.**—It shall be the duty of every physician in this State, every superintendent or manager of a hospital or public institution in this State, to immediately report to the local board of health, every case of venereal disease, which he is called upon to treat or which is in such hospital or public institution, and each and every physician, superintendent or manager of such hospital or institution shall make such reports as may be called for by the rules and regulations of the State boards of health of this State and must comply with all the rules and regulations made by said boards to prevent the spread of venereal diseases: *Provided*, That the report of such venereal disease shall not include the name of the person affected.

**SEC. 2. Rules and regulations.**—It shall be the duty of all boards of health to enact and enforce rules and regulations necessary to prevent the spread of venereal diseases.

**SEC. 3. Penalty.**—Any person violating any of the provisions of this act shall be guilty of a misdemeanor.

## VERMONT.

[Public Statutes, 1906.]

**SEC. 5446.** The State board of health shall have power to designate a health officer of a town adjoining an unorganized town or gore as the health officer of such unorganized town or gore; and said health officer shall report to the secretary of said board every case of contagious disease mentioned in this chapter of which he has information or knowledge as existing in such unorganized town or gore. \* \* \*

**SEC. 5447.** The head of a family in such unorganized town or gore in whose home there occurs a case of infectious or contagious disease dangerous to the public health shall immediately give notice to said health officer. A physician who knows or suspects that a person in such unorganized town or gore whom he has been called to attend is sick or has died of a communicable disease dangerous to the public health shall at once quarantine and report to said health officer the place where such case exists, the name, degree of virulence, and cause or source of the disease. \* \* \* The head of a family or a physician who fails to give reasonable notice to said health officer of the existence of such a disease shall be fined not more than fifty dollars nor less than ten dollars, with costs of prosecution.

\* \* \* \* \*  
**SEC. 5450.** A physician who is consulted by a person subject to tuberculosis shall submit the name and address of such person to the secretary of the State board of health upon such blanks as it may furnish. \* \* \*

\* \* \* \* \*  
**SEC. 5453.** Each health officer shall report to the secretary of the State board of health, immediately after receiving information or knowledge thereof, every case of smallpox, varioloid, Asiatic cholera, typhus fever, or yellow fever within the jurisdiction of such local board. \* \* \*

**SEC. 5454.** The head of a family in whose home there occurs a case of infectious or contagious disease dangerous to the public health shall immediately give notice thereof to the local health officer of the town in which he lives. A physician who knows or suspects that a person whom he has been called to attend is sick or has died of a communicable disease dangerous to the public health shall immediately quarantine and report to the health officer the place where such case exists, and the name, degree of virulence, and cause or source of the disease. \* \* \*

**SEC. 5455** (as amended by acts of 1910-11, ch. 217). A health officer shall, upon receiving notice of a case of infectious or contagious disease dangerous to the public health, investigate and ascertain, if possible, the source or cause of the disease, \* \* \* and immediately report the facts to the secretary of the State board of health. When

a communicable disease prevails or becomes epidemic, said health officer shall make weekly reports concerning such disease or diseases to the secretary of the State board of health. \* \* \*

## VIRGINIA.

[Pollard's Code of 1904.]

SEC. 1713d. \* \* \*

11. The State board of health may require any local board of health to furnish periodically to said State board such facts connected with vital statistics in its city, county, or town as said State board of health may prescribe.

12. The State board of health shall annually, on or before the first day of January in each year, make a written report to the governor upon the vital statistics and sanitary conditions and prospects of the State. \* \* \*

[Acts, 1910, ch. 307.]

1. Every physician practicing in this Commonwealth who shall know or suspect that any person whom he or she is called upon to visit, or who comes to him or her for examination or treatment, is suffering from any infectious, contagious, communicable or dangerous disease shall make report in writing, on blanks to be furnished for that purpose by the State board of health, to the executive officer of the board of health of the county, town, or city in which such person may be located, over his or her own signature, stating the name of the disease, and the name, color, sex, and age of the person suffering therefrom, together with the street and number or such other sufficient designation of the house, room, or other place in which said person may be located, and such other information as may be deemed necessary by said health authorities.

2. The State board of health is hereby authorized to prepare and promulgate from time to time a list of diseases considered as infectious, contagious, communicable, or dangerous within the meaning of this act, and to prescribe the manner and time of the report called for by the preceding section.

3. For failure to comply with the provisions of this act the physician so failing shall be fined not less than one nor more than five dollars for each offense.

[Acts of 1910, ch. 340.]

SEC. 7. It shall be the duty of the local authorities of the cities, towns, and counties of the State to report weekly to the State board of health all cases of infectious, contagious, communicable, or dangerous diseases which have occurred under their jurisdiction, except that it shall be their duty to report immediately any case or cases of smallpox, yellow fever, cholera, typhus fever, or bubonic plague that may occur within their jurisdiction. \* \* \*

## WASHINGTON.

[Remington &amp; Ballinger's Annotated Codes and Statutes, 1910.]

SEC. 5407. It shall be the duty of the local board of health, health authorities, or officials, and of physicians in localities where there are no local health authorities or officials, to report to the State board of health, promptly upon discovery thereof, the existence of any one of the following diseases which may come under their observation, to wit: Asiatic cholera, yellow fever, smallpox, scarlet fever, diphtheria, typhus, typhoid fever, bubonic plague or leprosy, and of such other contagious or infectious diseases as the State board may from time to time specify. \* \* \*

SEC. 5536. It shall be the duty of every health officer appointed under the provisions of this chapter, or by the provisions of special charters, upon the appearance of smallpox, diphtheria, scarlet fever, Asiatic cholera, or dangerous contagious disease

in the town or city under his supervision, \* \* \* to make full report thereof to the board of health of which he is an executive officer, and also to the State board of health. \* \* \* The term "dangerous contagious disease" as used in this chapter shall be construed and understood to mean such diseases as the State board of health shall designate as contagious and dangerous to the public health. \* \* \*

SEC. 5540. It shall be the duty of every health officer appointed under the provisions of this chapter \* \* \* to report to the State board of health any information he may receive of any case of smallpox, cholera, yellow fever, or typhus fever within three days after receiving any notification or information of the existence of such disease; and any health officer \* \* \* who shall fail or neglect to comply with the provisions of this section shall be liable to a penalty of not less than ten dollars nor more than one hundred dollars for each day of such neglect or refusal to comply with the provisions of this section.

SEC. 5544. \* \* \* All city health officers except those of cities of the first class shall report immediately to the State board of health every new outbreak of any contagious or infectious disease and shall make weekly reports to the county health officer of all contagious or infectious diseases occurring within the city.

It shall be the duty of all health officers, upon the appearance of any dangerous, contagious, or infectious diseases within their jurisdiction, \* \* \* to make a full report thereof, as required above. \* \* \*

SEC. 5545. Whenever any physician shall attend any person sick with any dangerous, contagious, or infectious disease, or with any diseases required by the State board of health to be reported, he shall, within twenty-four hours, give notice thereof to the health officer within whose jurisdiction such sick person may then be.

\* \* \* \* \*

SEC. 5547. The term "dangerous, contagious, or infectious disease," as used in this chapter shall be construed and understood to mean such disease or diseases as the State board of health shall designate as contagious or infectious and dangerous to the public health.

SEC. 5548. Any health officer who shall refuse or neglect \* \* \* to make prompt and accurate reports to the county health officer or to the State board of health may be removed as health officer by the State board of health, and shall not again be reappointed except with the consent of the State board of health.

\* \* \* Any physician who shall refuse or neglect to report to the proper health officer within twelve hours after first attending any case of contagious or infectious disease or any disease required by the State board of health to be reported, or any case suspicious of being one of such diseases, shall be guilty of a misdemeanor, and upon conviction shall be fined not less than ten dollars nor more than two hundred dollars for each case that is not reported.

\* \* \* \* \*

SEC. 5550. All practicing physicians in cities of the first and second class in said State are hereby required to report to the local boards of health of such cities, in writing, the name, age, sex, occupation, and residence of every person having tuberculosis who has been attended by, or who has come under the observation of such physician for the first time, within five days of such time.

SEC. 5551. All local boards of health of cities of the first and second class in this State are hereby required to receive and keep a permanent record of the reports required by section five thousand five hundred and fifty to be made to them; such records shall not be open to public inspection, but shall be submitted to the proper inspection of other local and State boards of health alone, and such records shall not be published nor made public.

\* \* \* \* \*

SEC. 5553. Any practicing physician who shall wilfully fail to comply with the provisions of section five thousand five hundred and fifty shall be guilty of a misdemeanor,

and on conviction thereof may be fined for the first offense not exceeding five dollars and for any subsequent offense not exceeding one hundred dollars.

## WEST VIRGINIA.

[Supplement to Code, 1909.]

SEC. 4383. \* \* \* The said local board of health shall make and establish for their county, or for any district, or place therein, such sanitary regulations or rules as they may deem proper to prevent the outbreak and spread of cholera, smallpox, scarlet fever, diphtheria, tuberculosis, and other endemic, epidemic, infectious, and contagious diseases, \* \* \*. It shall be the duty of every practicing physician in any county in which there is such local board of health to report promptly all or any diseases of the above-named character under treatment by him, and said local board shall once at least in every three months report to the State board of health the character of all such infectious, contagious, and epidemic diseases, the number of persons reported as infected with such diseases, naming the same, the action taken by the local board to arrest the progress of every such disease and the visible effects, if any, of such action.

\* \* \* \* \*

## WISCONSIN.

[Annotated Statutes, 1898.]

SEC. 925—111b. It shall be the duty of every physician practicing in any city which has adopted this chapter (cities under general law) to report in writing to the commissioner of public health every patient he shall have who is sick with smallpox, scarlet fever, diphtheria, typhoid fever, Asiatic cholera, or any other dangerous contagious disease, within twenty-four hours after he shall ascertain or suspect the nature of such disease. The reports shall be in such form as may be prescribed by the State board of health, and shall state the name, sex, age, and place of residence of the person whose sickness is reported, the nature of the disease and such additional facts as said board may prescribe. Any practicing physician who shall refuse or neglect to perform the duties required of him by this section, or who shall make a false return of the facts required, shall be punished by a fine not less than twenty-five dollars nor more than one hundred dollars for each offense, or by imprisonment in the county jail for a period not exceeding sixty days, or by both fine and imprisonment.

\* \* \* \* \*

SEC. 1409a-2. (Added by acts of 1909, ch. 59.) \* \* \* Should one or both eyes of an infant become inflamed, swollen, and red, and show an unnatural discharge at any time within two weeks after its birth, nurse, parents, or other attendant having charge of such infant shall report in writing, within six hours thereafter, to the board of health of the city, incorporated village, or town in which the parents of the infant reside the fact that such inflammation, swelling, redness, or unnatural discharge exists.

\* \* \* \* \*

SEC. 1412. It shall be the duty of every health officer, chosen under the provisions of the preceding section, or under any village or city charter, upon the appearance of any dangerous contagious disease in the territory within the jurisdiction of the board of which he is a member, to immediately investigate all the circumstances attendant upon the appearance of such disease, make a full report to such board, and also to the State board of health. \* \* \*

SEC. 1412a (as amended by Acts of 1909, ch. 85). Whenever any physician practicing in this State shall know or have good reason to believe that any person whom he treats or visits is sick with a dangerous, contagious, or infectious disease, he shall, immediately after obtaining such knowledge or forming such belief, give notice thereof in writing, stating the name, sex, age, and place of residence of person whose sickness is

reported, the nature of the disease and such additional facts as said board may prescribe to the board of health of the town, city, or village in which such sick person shall then be, and if he shall fail to so do for a period of twenty-four hours thereafter, he shall forfeit not less than five nor more than twenty-five dollars for each day of such failure after the expiration of said twenty-four hours, provided such notice may be sent by mail, or, except in cities, may be given to, or left at the residence of, any member of the board of health. When any person is sick with any such disease, and no physician is in attendance upon such person, the provisions of this section shall apply to the responsible head of the family of which he is a member, or if the sick person is not a member of the family occupying the house or building in which he may be, the person in charge thereof. \* \* \*

\* \* \* \* \*  
 SEC. 1416—1 (Acts of 1905, ch. 192, as amended by Acts of 1907, ch. 93). It shall be the duty of every physician to report to the department of health in every town, incorporated village, or city, in writing, the full name, age, and address of every person suffering from any one of the infectious or contagious diseases following, to wit: Measles, smallpox, diphtheria (membranous croup), scarlet fever (scarlatina), typhoid fever, tuberculosis (of any organ), rubella (rotheln), chicken pox, typhus fever, plague, erysipelas, Asiatic cholera, whooping cough, cerebro-spinal meningitis, yellow fever; and it shall be the duty of every person, owner, agent, manager, principal, or superintendent of any public or private institution or dispensary, hotel, boarding or lodging house, in any such town, incorporated village, or city to make a report in like manner and form of any inmate, occupant, or boarder suffering from any of the said infectious or contagious diseases.

\* \* \* \* \*  
 SEC. 1416—3 (amended by Acts of 1907, ch. 93). It shall be the duty of every person having knowledge of the existence of any person afflicted with any one of the following infectious or contagious diseases, to wit: Measles, diphtheria (membranous croup), scarlet fever, typhoid fever, tuberculosis, smallpox, Asiatic cholera, typhus fever, rubella (rotheln), plague, and whooping cough, or has reason to believe that any person is so afflicted, to at once report to the health department of such town, incorporated village, or city all facts in regard to the case. \* \* \*

SEC. 1416—4 (amended by Acts of 1907, ch. 93). It shall be the duty of every physician, or person, or owner, agent, manager, principal, or superintendent of each and every public or private institution or dispensary, hotel, boarding or lodging house, in any such city to report to the department of health thereof, in writing, or to cause such report to be made by some proper and competent person, the name, age, sex, occupation, and latest address of every person afflicted with tuberculosis, who is in their care, or who has come under their observation, within one week of such time.

#### WYOMING.

[Compiled statutes, 1910.]

SEC. 2934. \* \* \* It shall be their [State board of health] duty to investigate regarding all contagious and infectious diseases that are a menace to public safety, and they shall collect such information in respect to these matters as may be useful in the discharge of their duties and contribute to the promotion of health and security of life in this State.

\* \* \* \* \*  
 SEC. 2936. \* \* \* When in any county a case of smallpox, cholera, typhoid fever, scarlet fever, diphtheria, or other epidemic or contagious or infectious disease is known to exist, it shall be the duty of the county health officer of such county to immediately notify the secretary of the State board of health of the existence of the same, with such facts as to its cause and continuance as may then be known.

SEC. 2942. It shall be the duty of every practicing or licensed physician in the State of Wyoming to report immediately to the secretary of the State board of health and county health officer, by telegram or telephone, or in the most expeditious manner, every case of smallpox, cholera, scarlet fever, diphtheria, or contagious or infectious disease that is a menace to public health, and such telegram shall be paid for out of the funds provided for the expenses of said State board of health.

SEC. 2943. Any practicing or licensed physician who shall fail to report to said secretary any such case in the manner provided in the preceding section, or shall willfully make any false report regarding any such case, shall be guilty of a misdemeanor, and upon conviction thereof shall be fined in the sum of not less than one hundred dollars and not more than one thousand dollars, or imprisoned in the county jail not less than six months nor more than one year.

NEW YORK.

[Laws of 1911, ch. 258.]<sup>a</sup>

SEC. 1. Article four of the labor law, entitled "An act relating to labor, constituting chapter thirty-one of the consolidated laws," is amended by the addition of a new section numbered fifty-eight, to read as follows:

§ 58. *Industrial poisonings to be reported.*—1. Every medical practitioner attending on or called in to visit a patient whom he believes to be suffering from poisoning from lead, phosphorus, arsenic or mercury or their compounds, or from anthrax, or from compressed air illness, contracted as the result of the nature of the patient's employment, shall send to the commissioner of labor a notice stating the name and full postal address and place of employment of the patient and the disease from which, in the opinion of the medical practitioner, the patient is suffering, with such other and further information as may be required by the said commissioner.

2. If any medical practitioner, when required by this section to send a notice, fails forthwith to send the same, he shall be liable to a fine not exceeding ten dollars.

3. It shall be the duty of the commissioner of labor to enforce the provisions of this section, and he may call upon the State and local boards of health for assistance.

SEC. 2. This act shall take effect September first, nineteen hundred and eleven.

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<sup>a</sup> Copy of law received too late for insertion in proper order.

## SOME COURT DECISIONS HAVING A BEARING ON THE NOTIFICATION OF DISEASE.<sup>1</sup>

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### IOWA.

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2. The statute requires the collection of statistics pertaining to the population of the State and the health of the people which may impart information useful in the enactment of laws and valuable to science and the medical profession, to whom the people look for remedies for disease and for means tending to preserve health. The objects of the statutes are within the authority of the State, and may be attained in the exercise of its police power. Similar objects are contemplated by statutes requiring a census to be periodically taken, the constitutionality of which we have never heard questioned.

3. We need not inquire whether the requirements of the statute are unjust or oppressive. These are matters for the consideration of the legislative part of the Government. We may observe that it is difficult to discover oppression or injustice in requiring the medical profession to make known to the world statistics which may promote and are promoting the public health.

4. One ground of the demurrer is that defendant, under the statute, is required to do that which it is impossible for him to perform. The law requires of no man impossibilities. If the information sought from defendant could not have been obtained by him in the bona fide exercise of reasonable diligence, the law will not punish him for not imparting it. A physician should honestly endeavor to obtain and report all information required by the regulations of the statute and the board of health. This is his duty as a surgeon and is imposed as an obligation by the ethics of the useful and honorable profession of which he is a member. \* \* \* (Robinson, Clerk, etc., v. Hamilton, 14 N. W. Rep., 202; 60 Iowa, 134.)

### MICHIGAN.

\* \* \* It is true that the evidence showed that a week or ten days after these children had been pronounced by the defendant as suffering from diphtheria, he stated to the health officer, Mr. John, as the health officer testifies, that "they had diphtheria at Lotharias' and Heft's," and that immediately after the board of health took steps to prevent its spread. Yet this was not the notice required by the statute, which is to be in writing, giving the name, place of residence, and nature of the disease. Upon this branch of the case the court directed the jury that it was a question for them to determine whether the defendant failed to report the cases within a reasonable time after he discovered the existence of the disease, and that in cases like diphtheria, where the disease is virulent and rapid in its action, eight days were not a reasonable time. There was no error in this charge, and we think the court would have been justified in saying that no notice was given at all, as required by the statute. \* \* \* (People v. Brady, 51 N. W. Rep., 537; 90 Mich., 459.)

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<sup>1</sup> No attempt has been made to compile all court decisions on the subject, but those at hand have been inserted because of their possible interest.



## CONNECTICUT.

The ordinance of the city of Bridgeport requiring every physician having any patient within the city limits sick with smallpox or varioloid, or other contagious or pestilential disease, to report the fact to the mayor or to the clerk of the board of health, together with the name of the patient and the street and number of the house where treated, under a penalty not exceeding \$50 for each violation of the ordinance was held to be valid and not conflicting with the constitutional rights of the citizens, the legislature having power to authorize its enactment by the common council.

"The inequality of burden of which the defendant complains is only in seeming. Persons offering their services to the public as healers of disease and requiring pecuniary compensation therefor thereby assert their ability to detect the presence of it when the great mass of the people can not. The people accede to the truth of their assertion, and in the matter of life surrender themselves to their keeping. Of course an ordinance in the interest of life must detect the presence of a fatal contagious disease at the earliest possible moment. Therefore with impartial action it compels that member of the community who is the first to have sight and knowledge of it to give note of warning to others from whom its presence is hidden. It would be idle to require, indeed there would be danger in accepting, this service from those who can not see or do not know. The burden is made to rest upon every member of the only class which is in a condition to contribute anything to the accomplishment of the purpose of the ordinance." (State v. Wordin, 14 Atl. Rep., 801; 56 Conn., 216.)

## LIST OF PUBLIC HEALTH BULLETINS.

The following is a list of the Public Health Bulletins that have been issued:

- \*1. Report on Trichinæ and Trichinosis. By W. C. W. Glazier. 1881. 212 pages. 87 il. 1 map. Paper. Senate Executive Document No. 9, Forty-sixth Congress, third session. Out of print.
- \*2. Report on the Etiology and Prevention of Yellow Fever. By George M. Sternberg. 1890. 271 pages. 21 pl. 20 il. Cloth. Out of print.
3. Mortality Statistics in the United States for the year ending December 31, 1897. From Annual Report Marine-Hospital Service, 1898. 24 pages. Paper.
4. Yellow Fever: Its Nature, Diagnosis, Treatment, and Prophylaxis and Quarantine Regulations Relating thereto. By officers of the Marine-Hospital Service. Reprint from Annual Report Marine-Hospital Service, 1898. 176 pages. 1 il. Paper.
- \*5. Shipment of Merchandise from a Town Infected with Yellow Fever. By H. R. Carter. 1899. 15 pages. Paper. Out of print.
6. Report of Commission of Medical Officers Detailed by Authority of the President to Investigate the Cause of Yellow Fever. By Eugene Wasdin and H. D. Geddings. July, 1899. 98 pages. 26 charts. 2 il. Paper.
- \*7. The Bubonic Plague. By Walter Wyman. January, 1900. 50 pages. Paper. Superintendent of Documents, 5 cents.
- \*8. Report of Commission Appointed by the Secretary of the Treasury for the Investigation of Plague in San Francisco. By Prof. Simon Flexner, Prof. F. G. Novy, and Prof. L. F. Barker. January 23, 1901. 23 pages. 1 map. Paper. Out of print.
- 9\*. Report Relating to the Origin and Prevalence of Leprosy in the United States. By a Commission of Medical Officers of the U. S. Marine-Hospital Service. 1902. 119 pages. 25 il. Paper. Senate Document No. 269, Fifty-seventh Congress, first session. Superintendent of Documents. Cloth, \$1.00.
- \*10. Plague Conference. Containing a copy of the address of the chairman, and resolutions passed by a conference called in accordance with requests from a number of State Boards of Health, and under authority of section 7, act of Congress approved July 1, 1902, to consider the plague situation. Reprint from P. H. R. No. 4, Vol. XVIII, January 23, 1903. 9 pages. And February 6, 1903. 41 pages. Paper. Out of print.
11. Transactions of the First Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. June, 1903. 120 pages. Cloth.
12. Transactions of the Second Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. June, 1904. 95 pages. Cloth.
13. The Public Health and Marine-Hospital Service of the United States. A Brief History. Prepared for the Louisiana Purchase Exposition. December, 1904. 16 pages. Paper.
- \*14. Sanatorium for Consumptives, Fort Stanton, N. Mex. By P. M. Carrington. Reprint from Annual Report Public Health and Marine-Hospital Service, 1904. 19 pages. Paper. Out of print.

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\* Exhausted and not for distribution.

15. Transactions of the Third Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. May, 1905. 52 pages. Cloth.
16. How to Prevent Yellow Fever—No Mosquitoes, No Yellow Fever. By Walter Wyman. July 31, 1905. 3 pages. Circular.
17. Transactions of the Fourth Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. May, 1906. 75 pages. Cloth.
18. Transactions of the Fifth Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. May, 1907. 47 pages. Cloth.
19. Trachoma, Its Character and Effects. By Taliaferro Clark and J. W. Scherschewsky. 1907. 34 pages. 6 il. Paper.
- \*20. The Public Health and Marine-Hospital Service of the United States. A Brief History. Prepared for the Jamestown Ter-Centennial Exposition. 1907. 12 pages. Paper. Out of print.
21. Transactions of the Sixth Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. April, 1908. 79 pages. Cloth.
- \*22. The Present Pandemic of Plague. By J. M. Eager. 1908. 30 pages. Paper. Out of print.
23. Pellagra—A Precipis. By C. H. Lavinder. July 24, 1908. 22 pages. 1 il. Paper.
24. The Marine-Hospital Sanatorium, Fort Stanton, N. Mex. Prepared for the International Congress on Tuberculosis, held in Washington, September, 1908. 32 il. 56 pages. Paper.
- \*25. Hookworm Disease. Reprint from Annual Report P. H. and M. H. S., 1908. 5 pages. Paper. Out of print.
26. Studies upon Leprosy.
  - I. The Present Status of the Leprosy Problem in Hawaii.
  - II. The Reaction of Lepers to Moro's "Percutaneous" Test.
  - III. A Note Upon the Possibility of the Mosquito Acting in the Transmission of Leprosy. By W. R. Brinckerhoff. 1908. Investigations made in accordance with the act of Congress approved March 3, 1905. 24 pages. Paper.
27. Studies upon Leprosy.
  - IV. Upon the Utility of the Examination of the Nose and the Nasal Secretions for the Detection of Incipient Cases of Leprosy. By W. R. Brinckerhoff and W. L. Moore. 1909. Investigations made in accordance with the act of Congress approved March 3, 1905. 29 pages. Paper.
28. Studies upon Leprosy.
  - V. A Report upon the Treatment of Six Cases of Leprosy with Nastine (Deycke). By W. R. Brinckerhoff and J. T. Wayson, Honolulu, T. H.
  - VI. Leprosy in the United States of America in 1909. By W. R. Brinckerhoff. 1909. Investigations made in accordance with the Act of Congress approved March 3, 1905. 25 pages. Paper.
29. The Prevalence of Rabies in the United States. By J. W. Kerr and A. M. Stimson. 1909. 16 pages. Paper.
30. The Rat and its Relation to the Public Health. By various authors. 1910. 254 pages. 60 figs. 6pls. Paper.
  1. Introduction. By Walter Wyman.
  2. Natural History of the Rat. By D. E. Lantz.
  3. Plague Infection in Rats. By G. W. McCoy.

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\* Exhausted and not for distribution.

30. **The Rat and its Relation to the Public Health—Continued.**
4. Rat Leprosy. By W. R. Brinckerhoff.
  5. Bacterial Diseases of the Rat other than Plague. By D. H. Currie.
  6. Organic Diseases of the Rat. By G. W. McCoy.
  7. Ecto Parasites of the Rat. By N. Banks.
  8. Intestinal Parasites of Rats and Mice in their Relation to Diseases of Man. By C. W. Stiles.
  9. Rodents in Relation to the Transmission of Bubonic Plague. By Rupert Blue.
  10. Rodent Extermination. Rats and Mice. By W. C. Rucker.
  11. Natural Enemies of Rats. By D. E. Lantz.
  12. Rat-Proofing as an Antiplague Measure. By R. H. Creel.
  13. Inefficiency of Bacterial Viruses in the Extermination of Rats. By M. J. Rosenau.
  14. Plague Eradication in Cities by Section Extermination of Rats and General Rat-Proofing. By Victor G. Heiser.
  15. The Rat in Relation to Shipping. By W. C. Hobdy.
  16. The Rat as an Economic Factor. By D. E. Lantz.
  17. The Rat in Relation to International Sanitation. By J. W. Kerr.
31. Transactions of the Seventh Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. June, 1909. 86 pages. Cloth.
32. Hookworm Disease (or Ground-Itch Anemia), its Nature, Treatment, and Prevention. By Prof. C. W. Stiles. 1910. 40 pages. Paper.
33. Studies upon Leprosy. 1910. 25 pages. Paper.
- VII. A Statistical Study of an Endemic Focus of Leprosy. By W. R. Brinckerhoff and A. C. Reinecke.
  - VIII. A Palliative Treatment for Leprous Rhinitis. By J. T. Wayson and A. C. Reinecke.
34. Maritime Quarantine. By L. E. Cofer. 1910. 25 figs. 64 pages. Paper. Appendix: Disinfectants Authorized by United States Quarantine Regulations and the Proper Method of Generating and Using Same.
35. The Relation of Climate to the Treatment of Pulmonary Tuberculosis. By F. C. Smith. 1910. 17 pages. Paper.
36. Tuberculosis: Its Nature and Prevention. By F. C. Smith. 1910. 12 pages. 1 plate. Paper.
37. The Sanitary Privy: Its Purpose and Construction. By Prof. C. W. Stiles. 1910. 24 pages. 12 figs. Paper.
38. General Observations on the Bionomics of the Rodent and Human Fleas. By M. B. Mitzmain. 1910. 34 pages. Paper.
39. Studies upon Leprosy. September, 1910. 50 pages. Paper.
- IX. Mosquitoes in Relation to the Transmission of Leprosy.
  - X. Flies in Relation to the Transmission of Leprosy. By D. H. Currie.
  - XI. Heredity Versus Environment in Leprosy. By H. T. Hollmann.
40. Transactions of the Eighth Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. November, 1910. 101 pages. Paper.
41. Studies upon Leprosy. November, 1910. 32 pages. Paper.
- XII. Notes on the Study of Histories of Lepers from the Standpoint of Transmission. By D. H. Currie.
  - XIII. A Contribution to the Study of Rat Leprosy. By D. H. Currie and H. T. Hollmann.

42. Disinfectants. Their Use and Application in the Prevention of Communicable Diseases. By T. B. McClintic. December, 1910.
43. I. Studies upon Plague in Ground Squirrels. II. A Plague-like Disease of Rodents. By George W. McCoy. February, 1911. 71 pages. 7 pls. Paper.
44. Acute Anterior Poliomyelitis (Infantile Paralysis). By Wade H. Frost. February, 1911. 52 pages. Paper.
45. A Digest of the Laws and Regulations of the Various States Relating to the Reporting of Cases of Sickness. By John W. Trask.

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TREASURY DEPARTMENT

Public Health and Marine-Hospital Service of the United States

PUBLIC HEALTH BULLETIN No. 46

SEPTEMBER, 1911

TRANSACTIONS OF THE

Ninth Annual Conference of State  
and Territorial Health Officers with  
the United States Public Health  
and Marine-Hospital Service

SAN FRANCISCO, CAL.

JUNE 24, 1911



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## LETTER CALLING NINTH ANNUAL CONFERENCE.

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The following letter was addressed to the health authorities of each State, Territory, and the District of Columbia :

TREASURY DEPARTMENT,  
PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE,  
*Washington, February 27, 1911.*

DEAR DOCTOR: I have the honor to inform you that the Ninth Annual Conference of State and Territorial Health Authorities with the Public Health and Marine-Hospital Service will be held at the St. Francis Hotel, San Francisco, Cal., June 24, 1911, at 10 a. m. In accordance with the act approved July 1, 1902, each State and Territory will be entitled to one delegate, and it is respectfully urged that there be full representation, as important matters in relation to morbidity statistics, transportation of the dead, antiplague measures, and other subjects will be brought before the conference.

I have to request that I be informed in advance of the name of the delegate who will represent your health organization.

Respectfully,

WALTER WYMAN,  
*Surgeon General.*

(5)



# Ninth Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service.

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## TRANSACTIONS.

### MORNING SESSION.

JUNE 24, 1911.

The Ninth Annual Conference of State and Territorial Health Authorities with the Public Health and Marine-Hospital Service was called to order at the St. Francis Hotel, San Francisco, Cal., by Asst. Surg. Gen. J. W. Kerr at 10.20 a. m., the following being present:

Public Health and Marine-Hospital Service: Asst. Surg. Gen. J. W. Kerr; Surg. Rupert Blue; Passed Asst. Surgs. F. E. Trotter, M. W. Glover, G. W. McCoy, Hugh de Valin, R. E. Ebersole, and Prof. Reid Hunt; Asst. Surg. H. E. Hasseltine, and Acting Asst. Surg. G. M. Converse.

Arizona: Dr. E. S. Godfrey.

California: Dr. Martin Regensburger, Dr. James H. Parkinson, and Dr. William F. Snow.

Idaho: Dr. George E. Hyde.

Kansas: Dr. S. J. Crumbine.

Maryland: Dr. J. S. Fulton.

Minnesota: Dr. H. M. Bracken.

Montana: Dr. T. D. Tuttle.

Massachusetts: Dr. Mark W. Richardson.

Ohio: Dr. C. O. Probst and Dr. Oscar Hazencamp.

Oregon: Dr. Calvin S. White.

Oklahoma: Dr. J. C. Mahr.

Rhode Island: Dr. Gardner T. Swartz and Dr. Rufus Darrah.

Washington: Dr. Elmer E. Heg.

Unofficial guests: J. F. Leinen, assistant to secretary California Board of Health; G. H. Leslie, statistician California Board of Health; Prof. J. W. Ritchie, Williamsburg, Va.; Dr. N. K. Foster, ex-secretary California State Board of Health; and Dr. Roger Lee, Boston.

Dr. J. W. KERR. In the absence of the Surgeon General, it becomes my duty to call to order this the Ninth Annual Conference of State

and Territorial Health Authorities with the Public Health and Marine-Hospital Service. It is a matter of great regret to me that the Surgeon General was unable to be present, but he was detained at the last moment by official matters of great urgency. On account of his unavoidable absence he desired me to express his regret, and addressed a letter to the conference which I shall ask Dr. Blue to read.

Dr. Blue thereupon read the following letter:

*To the members of the Conference of State and Territorial Health Authorities with the Public Health and Marine-Hospital Service, San Francisco, Cal.*

GENTLEMEN: For the first time since the enactment of the law of 1902 calling for these conferences, I am unable to meet with you. Until recently I had expected to join you in San Francisco and receive from you personally and collectively the stimulation for further endeavor in the matter of public health, and to convey to you such information as might seem proper concerning public-health matters which come under the purview of the Public Health and Marine-Hospital Service. Recently, however, official matters of great urgency and importance have arisen, particularly with reference to the personnel bill of the service, and other matters, which make it imperative that I should not be absent from Washington the length of time which a trip to the Pacific coast would require. When arrangements were made for holding this conference on the Pacific coast, there was no thought by me of a special session of Congress, or that any other matters would probably interfere with my being present. I will add that, within the last day or two, the cholera situation in Italy and the arrival of a cholera patient at the New York Quarantine Station make it impracticable for me to leave my official station. I have therefore requested that Asst. Surg. Gen. J. W. Kerr, with whom you are all acquainted, should represent me at this conference, and I trust that, in addition to the interesting discussions which you will hold, the visits to the several fields of operation in San Francisco and vicinity, such as the quarantine station on Angel Island, the immigration station, the Federal plague laboratory, and particularly the inspection of the field work of the service in the eradication of plague-infected squirrels, will all be interesting and profitable.

Dr. Kerr will outline to you some of the more important incidents connected with the public-health work by the service during the past year. It is expected that the officers on duty in San Francisco will also be present and will take pleasure in explaining the scope and character of their work. Features of the service work in California are so important that later, after the adjournment of Congress, and if epidemic conditions permit, it is my intention to visit San Francisco and vicinity, and to make the same observations which you are about to make. In the meantime, Dr. Kerr will report to me such facts of interest and importance as may seem desirable to you to comment upon.

Dr. J. W. KERR. It is my pleasure to welcome so many delegates and guests, some of whom have attended practically all previous conferences convened under the law of July 1, 1902. When it was decided that this conference should be held in San Francisco, I was particularly pleased at the prospect of again visiting this city where my first official duties were performed, and where I first had opportunity of becoming acquainted with plague and the practical measures necessary for its prevention. San Francisco in that day was a goodly city, but since that time two notable improvements

have been brought about—one, the physical transformation of the city following the great fire of 1906, and the other the changed and advanced attitude of the people as citizens with respect to the plague situation and the necessity of improved sanitation for its control. The unfortunate attitude of a decade ago has given place to a wise policy of cooperation, and whereas there was lack of cooperation then there is now complete understanding and cordiality. As a result much has been accomplished for the improvement of sanitary conditions. Plague has been eradicated from the city, and these things have been brought about as a result of the hearty cooperation of the local, State, and Federal health agencies. This latter is perhaps the chief cause of pleasure in holding this conference in San Francisco.

This is one of the most important American seaports, both from economic and sanitary standpoints, and it is here that a great deal of work has been accomplished by the service.

During the day opportunity will be given the delegates and guests of the conference to inspect the service operations at this port, and it is hoped that a favorable idea will be gained of their value, not only to the Pacific coast but to the country as a whole.

The State of California, as previously stated, has taken a very active part in these measures for the improvement of sanitary conditions. The State board of health was anxious that the health authorities of other States and Territories should become familiar with the work done, and it was partly in response to an invitation of the board that this conference is being held in California. It will be a pleasure, therefore, to hear a few words of welcome from Dr. Martin Regensburger, president of the State board of health.

Dr. REGENSBURGER. I wish to state that Gov. Johnson has sent word that he would be unable to be present to-day, and I was asked to represent him. The governor is right with us on this whole situation. He knows that for the past 10 years the eyes of the different State boards of health have been upon us, and he is glad to have you come here and see what we are doing. Dr. Foster, our former secretary, has assured us that everything is being done and will be done to eradicate plague. The work that has been done here for the eradication of plague has been gigantic. San Francisco 10 years ago was a plague-ridden city; 4 to 5 per cent of the rats caught were plague rats, whereas within the last three or four years there have been no plague rats in San Francisco. This is due to the efficiency of the work of the Federal authorities. I wish to say that I do not think that any of you know the work that has been done by the Federal authorities in California and San Francisco. If any of you had come in contact with them in the way that we have, I think that

you would very much appreciate their work. There has never been any friction between the present State board of health and the Federal authorities. There has always been harmony. As Dr. Kerr has stated, the former State Board of Health of California was antagonistic to anything relating to plague and denied its existence. The first question that Gov. Pardee in appointing me asked me was, "Do you believe that there is plague in California?" I said, "Why, certainly," and he replied that he did not want any man on this board who did not believe in plague. I wish that you could remain here longer in order to get an idea of what not only San Francisco but California is doing. Dr. Blue has arranged a trip for you to-morrow to Contra Costa County, and you will be shown the gigantic work performed by the Public Health and Marine-Hospital Service.

In behalf of the people of California and the governor, I welcome you and wish that you may remain with us a long while, in order that you may become acquainted with California and the Californians.

Dr. KERR. The Surgeon General desired me to outline briefly certain matters of importance that have engaged the attention of the service generally since the last conference. There has been an absence of the prevalence of all the major quarantinable diseases, except smallpox. This disease is unfortunately too prevalent, reports having been received of about 30,352 cases occurring in 37 States and the District of Columbia during 1910. On account of conditions in Alaska and because of the occurrence of smallpox in the Northwestern States, interstate quarantine regulations were put in practice requiring vaccination of all unvaccinated persons leaving continental ports for the District of Alaska. Previous experience had shown that the introduction of the infection into Alaska was followed by disastrous results, and it was with the view to preventing such results during the present season that this requirement was made.

An important matter since the last conference was the presence of cholera in Europe. As you all know, this disease has been gradually approaching our shores for the last five years. It has spread throughout the Orient and to some extent over Europe. Last year the disease was severe in Russia and Italy, a considerable number of cases having appeared in the latter country. The great danger of the introduction of cholera into the United States was realized and lines of defense were established as follows: First, inspections of ships and passengers and detention of emigrants at foreign ports for five full days prior to sailing; second, sanitary supervision of passengers en route by ships' surgeons under special instructions; third, medical inspections on arrival at domestic quarantine stations, and, where indicated, microscopic examinations of the dejecta of patients; fourth, special inspections at immigration stations for the

detention of mild or previously unrecognized cases of cholera; and fifth, the notification of State health authorities regarding the final destination of immigrants. Although the first four lines of defense mentioned were more complete than had ever been maintained before, it was thought that notification regarding the destination of immigrants was a wise additional precaution in view of the possible danger of bacillus carriers. By this means also State and local health authorities could be kept in touch with the situation, and in case of the occurrence of any suspicious outbreak in any part of the United States the service was prepared to send officers at a moment's notice who would cooperate with the States in making a final diagnosis.

It was realized that in some localities it would be difficult, if not impossible, for local authorities to maintain adequate surveillance over arriving aliens, nevertheless it was thought that with such information at hand, and in the event of the death of such persons, the local health authorities would be in position to verify the statements contained in the death certificate rendered. Two or three suspicious cases were reported in different parts of the country but fortunately on investigation they were proven not to be cholera.

Cholera serum has been secured and investigations of the disease taken up in the Hygienic Laboratory, and the bureau is prepared to send officers expert in the diagnosis of cholera to any part of the United States upon telegraphic notice from the health authorities. Since leaving Washington I understand that two ships have arrived in New York with cholera cases aboard, and that is one of the reasons why the Surgeon General was not able to be present at this conference. We must not forget that the danger of cholera to this country is probably greater now than it has ever been in the past 25 years. The cholera situation in Europe is serious, and it will be necessary for every health authority to be on the alert to guard against the disease during the coming summer.

A number of other important matters have engaged the attention of the service during the year, but time will permit of mention of only a few of them.

You were all interested in securing the establishment of the leprosy-investigation station in Hawaii. Great progress has been made there during the year in studies of leprosy. The bacillus has been grown on artificial media and the disease reproduced in monkeys. Important studies have been made as to the rôle of flies and mosquitoes in the transmission of the disease, and there has been some encouragement following treatment with newly prepared preparations.

Studies have been made in the Hygienic Laboratory of measles, and by means of blood inoculations the disease has been reproduced in monkeys and transferred from one monkey to another.



Investigations of typhoid fever have been conducted in different parts of the country, at Huntsville, Ala., Omaha, Nebr., Williamson, W. Va., Chicago, Ill., and other localities on the Great Lakes. In these latter, which are intended to include all of the Lakes, the studies have been made with the view to determining the influence of pollution of those waters on the incidence of typhoid fever in lake cities and towns. Passed Asst. Surg. A. J. McLaughlin has completed a sanitary survey of Lake Erie and the Niagara River, and the results are contained in Hygienic Laboratory Bulletin No. 77.

The bureau is cooperating with the State Board of Health of Washington in the investigation of a typhoid situation in the Yakima Valley, and arrangements have been made to make extensive studies of rural typhoid in cooperation with the State Board of Health of Virginia. It is felt that, from the public-health standpoint, research and administrative action for the prevention of typhoid fever are the most important matters that can engage the attention of health officials generally.

Investigations are also being carried on in cooperation with the State Board of Health of Montana to determine the practicability of the eradication of Rocky Mountain spotted fever, which investigations will be continued beyond this year.

Acute poliomyelitis has likewise engaged attention, studies of the disease having been made in Iowa, New York, and in the Hygienic Laboratory. Reports have been received from 31 States, the District of Columbia, and Hawaii, showing that during the year 1910 there were 5,093 cases and 825 deaths. Since this disease prevails mostly during the summer season it is probable that further opportunity will be given for studies, and that some administrative action looking to its prevention will have to be decided on by the several State authorities.

Lack of suitable cases of pellagra and other diseases for study emphasized the desirability of making provision whereby such cases could be admitted into the several marine hospitals. On request, the Sixty-second Congress at its last session accordingly granted authority to admit for purposes of scientific study not to exceed 10 cases of any infectious diseases into any one hospital at any one time. In view of this authority, systematic studies of pellagra have been begun at the marine hospital at Savannah, Ga., and similar studies of parasitic diseases have been undertaken at the marine hospital at Wilmington, N. C.

To-night we shall consider the subjects of poliomyelitis and anti-plague measures, and I hope that everybody here will be able to be present and participate in the discussions. You will observe that the program is rather long, but it is not intended to enter into the

discussion of the subjects except along certain lines. I hope the members of the conference will feel free to take active part in the discussions. We will now call for the report of the committee on regulations for the disposal of the dead. The matter of disposal of the dead came up at the last conference and members of the committee were appointed to consider questions in relation to the regulation of the transportation of dead bodies in interstate traffic, and particularly those bodies arriving at quarantine stations from abroad.

#### REPORT OF COMMITTEE ON REGULATIONS FOR THE DISPOSAL OF THE DEAD.

[Read by Dr. H. M. BRACKEN, Minnesota.]

During discussions of the question of the disposal and transportation of the dead, at the last annual conference, it was apparent that there was some lack of uniformity regarding the requirements with respect to this matter. An analysis of the laws and regulations presented at that time showed that in four States the provisions regulating the transportation of dead bodies were actually contained in laws, and that in the remaining States, Territories, and the District of Columbia the subject is covered by rules issued by the State boards of health and State boards of embalming, or both in cooperation.

As stated by the Surgeon General, the chief reason for presenting the question of the transportation of the dead for consideration at the last annual conference was, however, to facilitate the transportation of bodies of persons who had died abroad, through quarantine to their destination in the United States. Some of the difficulties heretofore encountered in authorizing the landing and speedy transportation through several States was pointed out by one of us, difficulties which are not only annoying from an administrative standpoint, but working hardship to the family or friends of deceased persons, and which should be overcome by some simplification of procedure.

The question of the requirements for the preparation of dead bodies was also a subject of discussion, which brought out the fact that there are several differences in this matter in the several jurisdictions, due principally to the interpretation of the term "approved disinfectant," used in the amended regulations adopted by the Conference of State and Provincial Health Officers of North America in 1897 and amended in 1903. The extensive studies of chemical fluids used in the disinfection and embalming of bodies by the several boards, particularly the State Board of Health of Minnesota, and the investigations conducted during the past two years in the Hygienic Laboratory indicate that uniformity regarding the composition of these fluids is now entirely practicable, and might be made the subject of definite recommendations.

In view of the foregoing your committee believes that the following points are of primary importance from the standpoint of this report:

(1) The advisability of the adoption of a regulation making proper provision for the preparation of bodies and their transportation without interruption to their destination after inspection and the giving of pratique at the maritime quarantine stations.

(2) The determination of the essential ingredients that shall be required to be contained in an approved disinfectant and the method of use.

(3) The advisability of so amending existing regulations as to bring about uniformity which will permit of the shipment of dead bodies without interruption on the certificate of State health authorities.

## TRANSPORTATION OF BODIES FROM ABROAD TO POINTS IN THE UNITED STATES.

Paragraph 86 of the United States Quarantine Regulations revised October, 1910, requires that the body of any person dead of quarantinable disease other than yellow fever shall not be allowed to pass through quarantine until one year has elapsed since death, and such bodies must be transported in hermetically sealed coffins, the outsides of which have been carefully disinfected. The diseases contemplated in this paragraph are plague, cholera, smallpox, typhus fever, and leprosy. In the transshipment of bodies dead of other contagious and infectious diseases, it has been the invariable rule of the Public Health and Marine-Hospital Service to require the carrying out of the provisions of the regulations adopted by the Conference of State and Provincial Health Officers of North America, and the importation of bodies under other conditions is not allowed. Notwithstanding this fact, the Assistant Surgeon General in charge of maritime quarantine states that it has been the invariable rule, in order to avoid possible delay in transportation and embarrassment and additional expense to friends of deceased persons, to communicate with the health authorities in every State through which the body would pass, so as to insure its speedy arrival at destination. The difficulties represented by one item alone, the amount of correspondence, is just cause for action that will bring about cooperation in this matter.

Your committee recommends, therefore, that when a body shall have arrived at a maritime quarantine station and found by the quarantine officer to have been prepared in accordance with existing rules for the preparation of dead bodies, that its transportation to destination be permitted in the several jurisdictions through which it must pass, on the certificate of the said quarantine officer, based on documentary evidence of a consular officer and inspection, that the body is properly prepared and will not endanger the public health. This provision would properly be embodied in a rule or regulation to be adopted by the several States and Territories, and in addition issued as an amendment to the United States Quarantine Regulations.

## REQUIREMENTS REGARDING THE PREPARATION OF DEAD BODIES.

The recent investigations of the best methods for the preparation of dead bodies have developed results, which, in the opinion of the committee, might be made the basis for a regulation that would bring about uniformity of requirement with respect to this matter. It is observed that the regulations adopted by most of the States and Territories require the embalming of bodies dead of contagious and infectious diseases, and of bodies that can not reach their destination within 30 hours. These regulations, however, are not specific as to the methods of preparation, nor the essential ingredients of the fluids used for embalming purposes. The studies made by the State Board of Health of Minnesota have definitely determined that a fluid containing 5 per cent of formaldehyde is the most satisfactory from a public-health standpoint. The character of additional ingredients to this fluid, added for cosmetic purposes, makes no difference so long as they do not interfere with the effectiveness of the formaldehyde solution. The investigations conducted in the Hygienic Laboratory have given similar results, and in a report on this subject the director stated that "it would seem that an approved disinfecting fluid for use in the transportation of the dead should contain as its essential agent at least 5 per cent of formaldehyde gas, and for legal and medical reasons should contain no arsenic, zinc, mercury, copper, lead, silver, antimony, chloral, or any compound of them or any poisonous alkaloid." The extensive experiments made by the Assistant Director of the Hygienic Laboratory and reported at the last annual meeting

of the National Funeral Directors' Association indicate that an embalming fluid must contain at least 12½ per cent of 40 per cent formaldehyde solution and that the amount of fluid injected must be 15 per cent of the body weight. These investigations also indicate that a definite method of injection should be practiced, and that by so doing the body can be thoroughly disinfected and preserved almost indefinitely. The technique of injection is determined by a number of actual determinations as follows:

	Per cent body weight.
Inject each femoral artery toward toes with.....	2
Inject each brachial artery toward fingers with.....	1
Inject one carotid artery toward head with.....	2
Inject same carotid artery toward heart with.....	7
Total amount of fluid.....	15

With the method of injection outlined it is not necessary to withdraw blood from the veins, or to inject fluid into the abdominal or thoracic cavities, and should the face become distended with the fluid it is only necessary to dispel it with massage. The additional measures that have suggested themselves, and have been found in the above experiments to be necessary, are practically identical with existing requirements, as follows:

The plugging of the orifices with cotton saturated with the embalming fluid; the washing of the entire body, including exposed surfaces with the embalming fluid; the wrapping of the entire body in cotton saturated with embalming fluid, and holding it in place by the necessary bandages and a sheet securely fastened; the treatment of autopsied cases in the same way, with the addition of a liberal amount of cotton soaked in the embalming fluid, and placed in the cavities of the abdomen, thorax, and skull.

From the results of experiments made it is evident that a body dead of any communicable disease can by the above means be so sterilized and preserved as to insure its keeping indefinitely, and bodies so sterilized have been actually kept in an incubator at blood temperature for 60 days, with no evidence of the original infection or change apparent to an experienced undertaker. It is evident from this that such a body could not continue to be infectious.

It appears to your committee from the work already done on this subject that a regulation might be adopted embodying specific requirements as to disinfection of bodies which would render them entirely harmless from the standpoint of the public health, and not interfere with the cosmetic effect aimed at by undertakers.

#### MODIFICATION OF METHODS OF HANDLING DEAD BODIES IN THE INTEREST OF UNIFORMITY.

In view of the foregoing the question arises whether some modification of existing practices can not be made in the interest of uniformity. This is a question, however, that must be carefully considered not only by the health authorities themselves, but in conjunction with the funeral directors and railway authorities. The shipment of a dead body should be facilitated by every means possible consistent with the safety of the public health, and there is nothing that will contribute to this end more than a clear understanding of requirements and cooperation of the State health authorities in their enforcement. That the danger of the transmission of contagious and infectious diseases depends in large measure on live persons infected with those diseases is apparent, and in comparison dead bodies are of minor importance. Besides, there is assurance

that such bodies can be so disinfected as to render them safe, and so prepared for shipment as to avoid their becoming a nuisance.

Your committee suggests, therefore, that this phase of the subject be further considered with a view, if practicable, to simplifying the requirements and rendering them the same for bodies dead of all contagious diseases and all bodies to be transported which can not reach their destination within a certain specified time. By such means it might be practicable to formulate regulations which would be acceptable to those States and Territories which have adopted the transportation rules amended in 1903; those still adhering to the original rules adopted in 1897; and those that remain outside of either group and have special rules of their own. In the event, furthermore, of the formulation of such uniform rules, they could serve as the basis of regulations contemplated in section 3 of the Federal quarantine act of February 15, 1893.

H. M. BRACKEN.

W. R. BATT.

J. Y. PORTER.

GUILFORD H. SUMNER.

J. H. TOWNSEND.

L. E. COFER.

Dr. Swarts moved that the report be received and placed on file. Motion seconded by Dr. Parkinson.

Dr. Fulton moved that a committee be appointed to consider whether it should be the recommendation of the conference to take definite action upon the regulation of transportation of dead bodies crossing our boundaries.

Dr. SWARTS. Would it not be well for us to appoint a committee to formulate suggestions to the conference in Los Angeles?

Dr. PARKINSON. Could not the present committee act in this way?

Dr. KERR. We could adopt the report and invite the attention of the Conference of State and Provincial Health Authorities to it, and any amendments that might seem necessary could be incorporated later. If the committee's report was adopted by this conference, the chairman, Dr. Bracken, could bring it to the attention of the above-mentioned conference at Los Angeles. As far as taking final action on the methods of embalming bodies and the revision of existing regulations, these would necessarily need to be considered later, as it is not the object to take full action upon this matter until after it has been considered by the Conference of State and Provincial Health Authorities. I think a good plan would be to adopt this report now, so that the committee could be continued and the issue of regulations considered by the Surgeon General.

Dr. SWARTS. I withdraw my motion which is before the house as I do not think we are prepared to adopt this report, not enough action having been taken in regard to methods of embalming.

Dr. HEG. We get many bodies from South America and Asiatic ports in which the question of embalming is rather a dubious one, and I think that the regulations of the Treasury Department should

be specific along those lines. We get many bodies from Alaska, where there are not many undertakers, and these bodies come with a certificate from a doctor to the effect that they have died, and this is all the information that can be gotten from those certificates. There was so much of this that we now require all bodies that have not been shipped under the certificate of an embalmer licensed by our board, of whom a few live in Alaska, shall be turned over to a licensed embalmer before we will transport them. However, we have been accepting bodies from the Army surgeons and from the surgeons of the Public Health and Marine-Hospital Service.

Dr. SWARTS. I understand from this report that a body should be permitted to pass on the certificate of a quarantine officer, based on documentary evidence from abroad. I would like to ask what documentary evidence can be obtained from abroad and whether a declaration upon paper is sufficient to render the inspection of a body unnecessary.

Dr. KERR. No body is allowed to be shipped from a foreign port unless those interested receive a certificate from the American consul to the effect that disinfection has been essentially what is required in the United States. When we know what regulations are required in different States we can incorporate them in our regulations. When bodies regarding which there is doubt arrive at a maritime quarantine station autopsies are done, the object being not to allow ashore any bodies that would in any way be a menace to the public health. This matter has been brought before the conference simply for the purpose of facilitating the shipment of bodies. Under the present system friends and relatives are given much trouble, and it often causes embarrassment to the Government when the body of a foreign officer is shipped from a foreign country to or through the United States. If this conference could agree upon the advisability of uniform requirements that would be complied with by health authorities, and if the statements of the quarantine officers as to the safety of bodies would be accepted by them, that would meet the situation.

Dr. TUTTLE. I think it is absolutely proper that a body should be shipped on a quarantine officer's certificate. I got a letter from a railroad in Alaska asking for a permit as they wanted to ship a body, and all the certificate stated that came with the body was that the man had died. It was perfectly evident that he had died—that there was no question—but it did not state of what he had died. All we can now do is to watch for the dangerous ones and, if possible, catch them.

Dr. GODFREY. Last year at the Conference of State and Provincial Boards of Health the shipping of dead bodies was under discussion, and the question arose as to whether or not such bodies are at all dangerous to public health. A committee had been appointed to

report on the revision of the regulations, but had not considered this phase of the subject; this committee was continued and requested to obtain whatever information it could regarding this question and report to the meeting this year. It seems to me that the subject now under discussion is dependent upon that information in a large measure, and that perhaps we had better hold it over until we hear from that committee.

Dr. BRACKEN. Mr. Chairman, I suggest that yourself, Dr. Heg, and a third man act as a committee to formulate regulations to submit to the Conference of State and Provincial Health Authorities. My object is to bring together on this committee men who know of these things. This committee could formulate regulations to be passed on at the conference at Los Angeles.

Dr. SWARTS. If a committee is appointed why can you not give it the authority to confirm this action?

Dr. KERR. If there is no objection I might designate a committee to report later in the day upon the action that should be taken; their recommendations could be submitted to the conference later.

Dr. SWARTS. The consensus of opinion is that it will not be possible to make a report until action has been taken by the boards of health.

Dr. KERR. This conference should certainly be able to decide whether it is feasible to place in the hands of quarantine officers the authority to issue certificates for the transmission of bodies into other States, which certificates would be honored by local authorities, and this is the point in which we are particularly interested. Every State should have a uniform blank, which the Federal Government could also use and furnish American consuls. If suitable we could use the blank adopted by the conference in Los Angeles. This conference should take action so that the other conference in making its regulations will understand that it is our desire to have a satisfactory and uniform method of disposing of these bodies.

Dr. PARKINSON. I move that a committee of three be appointed by the Chair to report at a later session.

Motion seconded by Dr. T. D. Tuttle. Carried.

Dr. Kerr appointed the following to serve on this committee: Dr. E. E. Heg, Dr. C. O. Probst, and Dr. H. M. Bracken.

#### REPORT OF COMMITTEE ON MORBIDITY REPORTS.

The report of the committee appointed at the last conference to consider methods for securing improved morbidity statistics was then called for and presented by Dr. M. W. Richardson. The membership of the committee was as follows: Drs. Richardson, S. J. Crumbine, W. F. Snow, E. G. Williams, F. W. Shumway, and Asst. Surg. Gen. J. W. Trask.

The report is as follows:

Disease is no respecter of county or State boundaries, and for much the same reason that it is desirable that all counties within a State should report to the State authorities information in regard to the existence of certain diseases it is also desirable that the States report to some common authority in regard to the existence of certain diseases within the States, and that this data be made currently available for the information and protection of other States and for the assistance it will give in the study and solution of many epidemiological questions otherwise difficult or impossible of solution.

It is believed that the public interests would be conserved by adopting, in so far as possible, certain uniform practices in regard to the reporting of sickness, and that the conference could with advantage agree upon and recommend a plan which could be accepted as a standard of minimum requirements to be adopted in the various States, as opportunity afforded, by new enactment of law, the amendment of existing law, or by regulation. This plan might include the following:

- (1) A list of diseases which present knowledge indicates should be reported in the interests of the community.
- (2) The minimum information to be given for each case reported.
- (3) The time and frequency for the reporting of cases:
  - (a) By the physician or householder to the local or State authorities.
  - (b) By the local authorities to the State authorities.
- (4) (a) The diseases which the State authorities should report to the central authority.
  - (b) The information which should be included in the report.
  - (c) The frequency of these reports.
  - (d) The manner and frequency of publication of this information by the central authority.
- (e) Whether the State authorities should make these reports to the central authority on their own responsibility, furnishing the necessary clerical work, or the central authority (the Federal Government) should pay for the labor necessary.

These points might be treated somewhat as follows:

### I.

The list of diseases might include cerebro-spinal meningitis, cholera, diphtheria, dysentery, leprosy, malaria, measles, ophthalmia neonatorum, pellagra, plague, poliomyelitis, Rocky Mountain spotted fever, scarlet fever, smallpox, tuberculosis, typhoid fever, typhus fever, and yellow fever.

### II.

The minimum information to be reported for each case should be made to include: Name of disease, name, age, sex, color, occupation, and residence of the patient, and in the case of smallpox, the vaccination history, and in tuberculosis the type (pulmonary, laryngeal, glandular, etc.).

### III.

The time and frequency for the reporting of cases:

- (a) By the physician or householder to the local authorities: Immediately (daily).
- (b) By the local to the State authorities: Immediately, by telegraph, cholera, plague, typhus fever, and yellow fever. Daily, by mail, the other diseases.



## IV.

(a) The diseases to be reported by the State authorities to the Public Health and Marine-Hospital Service. Cerebro-spinal meningitis, leprosy, plague, poliomyelitis, typhus fever, yellow fever, scarlet fever, tuberculosis, cholera, malaria, pellagra, Rocky Mountain spotted fever, smallpox, diphtheria, measles, and typhoid fever.

(b) Information to be included in report made by States: The number of cases of each disease by counties and by cities having over 8,000 population. (For the securing of epidemiological data it might be of marked advantage to report the age, sex, color, and occupation of each patient.) In reporting smallpox the vaccination history of the case should be given; in tuberculosis, the type.

(c) Frequency of reports: Immediately, by telegraph, cholera, plague, typhus fever, and yellow fever. Monthly, other diseases.

(d) Manner and frequency of publication: The first case of the disease reported by telegraph might be telegraphed immediately to each State authority and published weekly in the Public Health Reports. The diseases reported monthly should be published monthly and annual summaries made.

(e) Responsibility for reports: The value of the reports to the States might warrant their assuming all responsibility for the forwarding of the reports to the bureau at Washington, which would really act merely as a common agent for the States, or a clearing house for epidemiological information. On the other hand the bureau might, with certain advantages, employ an agent to forward these reports. There would then be less embarrassment in some cases in securing the forwarding of the reports. The latter is believed to be preferable.

Dr. KERR. What shall we do with this report? This subject is important enough to keep us occupied during the entire day. Dr. Trask thought it would be well to decide upon the number of diseases to be reported and the manner of reporting them. The question now is, therefore, whether it would be advisable at this conference to recommend definite action, and whether the Federal Government should pay for the clerical work to get up these reports. It may not be practicable to decide upon the number of diseases to be reported on; but it might be well to handle this subject as we have the previous one, and request that the three members of the committee who are present recommend tentatively to the conference those diseases which should be notified. Pennsylvania requires reporting of 31 diseases, so it would be manifestly unnecessary to ask Pennsylvania to add to her list; other States require only two or three. If we could decide upon a certain minimum number of diseases, might it not be possible during the coming year to get more complete reports from certain States?

Dr. Bracken moved that the report of the committee be received. Motion seconded by Dr. Parkinson. Carried.

Dr. FULTON. When I was doing State work I realized the difficulty of getting prompt and reliable morbidity reports from the local health officers. There was, however, very little lack of promptness in reporting smallpox. We in the State board of health were

generally delinquent about accounting to the United States Public Health and Marine-Hospital Service for our smallpox. As an executive officer, I was sensible of this delinquency, and regretted it. The negligence was not willful. It was practically unavoidable. We needed a regular employee specially and rather exclusively charged with the epidemic memoranda. Without such a person, we were wholly occupied with field work and with the transmission of information within the State itself. With the best intentions a regular correspondence with the United States Public Health Service could not be undertaken. There was rarely any smallpox to report, but we were never free from outbreaks of the common infections. The United States Public Health and Marine-Hospital Service does not publish weekly reports of measles, diphtheria, scarlet fever, and typhoid. If we had felt a necessity for transmitting each month or each week an account of the infections actually present, we might have succeeded in making that task a fixture for a clerk, and so habitually corresponded with the United States Public Health Service. But the occasions when we had smallpox were very few and transient, so that no one habitually thought of sending information to the Public Health Bureau in Washington.

I believe that the committee on morbidity reports should be continued, and I suggest that the common infections ought to be accounted for regularly, both because that information is valuable on its own account, and because their notification to the bureau will establish regularity in accounting for the unusual infections. In any event, the States will come into line one at a time and at considerable intervals.

**Dr. CRUMBINE.** After a few preliminary remarks I desire to make a motion. I think that this conference should take definite action on this report if they expect to bring about a better condition of affairs in this country. We should be able to tell just exactly what is going on in disease conditions in the States. Two weeks ago there appeared in the Kansas City Star an editorial upon the last issue of the Public Health Reports, giving a record of the smallpox cases for 1909, and the Star brought attention to the fact that Kansas had one-eleventh of the total number of smallpox cases in the United States and remarked "what was the matter with Dr. Crumbine and the State board of health," and I assure you that there was something doing in the newspapers all over the State, as the editorial was extensively copied. I called a reporter of the Star and showed him the Public Health Reports and convinced him that there were a good many more cases in Missouri than in Kansas because of their larger population, but their reports are not as complete as those of Kansas, one city only reporting 211 cases against our 2,000 cases for the entire State. These reports unless uniform

are not satisfactory and may be very misleading, and I believe that when these reports are made there should be a definite statement made by the Public Health Reports stating why certain States apparently have greater numbers of smallpox cases than other States.

I move that the Chair appoint a committee to bring in a resolution based on the report read by Dr. Richardson, taking definite action with the object of stimulating health officers, Federal, State, and local boards, to obtain and publish more accurate reports on communicable diseases, particularly smallpox.

Motion seconded by Dr. Parkinson. Carried.

The Chair appointed the following to serve on the committee; Dr. M. W. Richardson, Dr. S. J. Crumbine, Dr. William F. Snow.

Dr. KERR. It will be gratifying to the Surgeon General and to Dr. Trask to have a resolution of this character. We need more complete reports, and it is impossible for the Government to secure them without the aid of the States and local communities. If there is anything additional we can do we want to do it, and if we have the advice of this conference that some additional law or appropriations are necessary, it will be easier to obtain it.

Dr. SWARTS. I think we ought to make definite what diseases shall be reported and the minimum amount of information to be given.

#### ADMINISTRATIVE MEASURES NECESSARY DURING OUTBREAKS OF ACUTE ANTERIOR POLIOMYELITIS.

Dr. KERR. In outbreaks of poliomyelitis administrative measures are necessary, and the object of bringing this subject before the conference at this time is to take certain action with the view of getting uniform reports from different parts of the country. Poliomyelitis has been studied in Iowa, New York, and Virginia by officers of the service. Compilations of the data collected in these States have been made and published and are of considerable value, but a disease of the character of poliomyelitis must be studied in a broad way with a view of determining how it is transmitted, and as a result of Dr. Frost's work he feels that if there could be brought about the adoption of a uniform blank to be used by all the States it would be a very desirable thing. Dr. Frost has prepared a blank, based on the blank forms used in other States and upon his experience in collecting such data. I have the form here, and, if it is the sense of the conference, we would like to have action taken in this matter in order that the Surgeon General can advise a uniform blank to be used by the different States. Another subject in connection with poliomyelitis is the period of quarantine, and while the Public Health and Marine-Hospital Service has had no occasion to segregate these cases, still we are asked what period of quarantine shall be ob-

served. A committee of the American Pediatric Society has recommended four weeks. Some of the States require from three to four weeks, some 14 days, and others various periods. I would be glad if the conference could take action on the adoption of a blank form and on the period of segregation that should be observed. Action on the latter question would necessarily be tentative and might be changed in the Conference of State and Provincial Authorities. We want some definite basis as to the length of quarantine that should be observed in view of a probable recurrence of the disease. A number of the members have seen the blank form prepared by Dr. Frost, but perhaps it might be a good plan to read it so that if there are any other points that should be added or any questions in it that the conference thinks hardly worth while to ask physicians to report upon, the blank form can be amended. We will probably have occasion to use this blank form during the summer, and so would like to have the State health authorities decide upon a blank that they, too, would use.

**Dr. CRUMBINE.** Would it not be well to have this blank used in duplicate so that one could be kept and one sent to the department?

**Dr. KERR.** I rather think that would be a good plan. I do not think that it would take more than eight or ten thousand for the entire country.

**Dr. SWARTS.** I move that the Public Health and Marine-Hospital Service be recommended by this conference to furnish blanks for the collection of data on poliomyelitis.

Motion seconded by Dr. W. F. Snow. Carried.

**Dr. Parkinson** moved that a committee of three be appointed by the Chair to determine upon the blank form to be adopted, said committee to report at the evening session, and that copies of the form suggested be put in the hands of all members of the conference before the evening session.

Motion seconded by Dr. M. W. Richardson. Carried.

The Chair appointed the following committee: Dr. M. W. Richardson, Dr. E. E. Heg, and Dr. G. T. Swarts.

#### THE ADVISABILITY OF CALLING A SPECIAL CONFERENCE ON RAILWAY SANITATION.

**Dr. KERR.** We have time to take up another subject before adjournment for the trip to the quarantine station on Angel Island. This would be the advisability of calling a special conference on railway sanitation. This subject has been discussed for years and it comes up practically every year, although we must recognize that sanitary conditions on railways, so far as passengers are concerned, are just about as good as the people demand. The railroads have really done more than the average traveler expects. There are certain questions,

however, that should be discussed and taken up probably in an informal way with the representatives of the railroads, and it has been suggested by one or two health officers that it might be advisable to have a joint conference of State health officers and representatives of the railroads. It has been suggested by a certain health officer in the Mississippi Valley that such a conference be called. It appears to me that it would be a good plan to have such a conference, especially in view of the coming International Congress on Hygiene and Demography to be held in Washington. The time and place of this conference will have to be considered and any action to be taken might well be considered by a committee. The subject is only brought to the attention of the conference with the object of discussing it very briefly and, then, if advisable, to name a committee which would consider the advisability of calling the conference.

Dr. PROBST. A few months ago I was requested to take up by correspondence the matter of calling a conference with the view of securing uniform regulations to govern the spitting on trains and one or two other points. I did this. About the time that we were proposing to have it we received a letter from Dr. Wertenbaker suggesting that not only the Central States but all the States be included in this conference, and so we decided not to hold the proposed conference in view of the fact that a larger conference might be called, as suggested by our chairman to-day. I believe that it would be advisable to have a special conference with the railway authorities in regard to railway sanitation.

Dr. BRACKEN. When Dr. Probst wrote me of the proposed conference I was much in favor of it, thinking it would be the means of getting things started in the right direction. I would indeed be glad to see a conference called for the purpose of discussing at length the subject of railway sanitation. A few years ago I tried to get in touch with railway organizations that would take up the question of transportation of the living, but I could not find any such organization that would take any interest in the matter. A railway surgeon read a paper on railway sanitation before the National Association of Railway Surgeons at its 1910 meeting, and among other things in this paper was the statement that railway surgeons were, as a rule, only interested in surgery. Several years ago I tried to get the officers of a certain railway interested in railway sanitation, but I ran against the chief surgeon of this company, who queered the whole thing. As a rule the railway surgeon does not take any interest in railway sanitation. An exception to this statement is to be found in the chief surgeon of the Rock Island system, Dr. S. C. Plummer. Last year a move was made by that road to try and learn something about the sanitary conditions of its stations and cleaning yards. Two men were appointed who went over the entire system, and their reports

are on file. I think the railway surgeons are to meet in October, and it is a question whether this conference should be held before or after their meeting. A few years ago in our own State I called the representatives of the various railways together for the purpose of discussing sanitary problems. As a result, the Minnesota State Board of Health passed certain regulations, which the railroads were ready to enforce. But the Minnesota State Legislature has never seen fit to give these regulations legal standing.

Dr. REGENSBURGER. One of the first recommendations that our board made for the betterment of these conditions was that cuspidors be put upon the ferryboats; it took us probably two years before we succeeded in getting the railroad companies to put these cuspidors upon the boats, and in going across to-day you will find, if you take the trouble to notice, that there is but one cuspidor in each section. It is obvious that these are not of much account, as the Oakland boats carry from 20,000 to 30,000 people a day, and these people spit all over the place. The cuspidor is too small and there are not enough of them. Another thing we have recommended is the abolishing of drinking cups on the railroads, but you will find that the cups are there, and on the ferryboats, just the same. Of course, as you know, the railroad companies of California were in politics at one time, but now matters are changed and we may be able to accomplish something.

Dr. PARKINSON. I have found that one of the objections raised by railroad representatives was that regulations of this kind might interfere with interstate traffic. Our board wanted notices prohibiting expectoration placed in the cars, but the objection was raised that this would interfere with interstate commerce and that the railroads could not do it. The best way to do things is to find out how to do them and how not to do them, and I think that this conference should take this matter up.

Dr. TUTTLE. Every railroad going through Montana has signs prohibiting expectoration in the cars. It seemed to me that in order to better conditions it might be well to notify the members of the railroad commissions to attend a conference. A meeting was called, I prepared rules, the members went over them, found them impracticable in some points and on other points they went me one better and made the rules stronger. I found the heads of the railroads were willing to adopt these regulations. We had trouble in enforcing these laws on account of the porters, who found it too troublesome to sweep with sawdust. Just before I left Montana I had two porters reported for this; they lost their jobs and had to pay the fine, and this will be apt to make the others pay more attention to the rules.

**Dr. HYDE.** I am heartily in favor of this discussion on railroad sanitation, and believe that if we ask reasonable reforms of the railroad companies that they will be willing to carry them out for the benefit of the traveling public. Last October we adopted resolutions advising the abolishment of public drinking cups, and tried to have the same enacted into law, but the last legislature thought differently. However, the Pullman people and the railroad companies generally have abolished the public drinking cup on their cars. I feel sure that whatever we ask the railroad companies to do in reason will meet with their hearty accord.

**Dr. WHITE.** I think this conference is overlooking the biggest problem, and that is the open toilet. We find the largest percentage of typhoid cases among section hands, and I think we should devise some way of doing away with the open toilet on all the trains, and I fully believe that this can be done.

**Dr. HEG.** I am very much in favor of a special conference to discuss nothing but railway sanitation, but the discussion should extend further than merely the sanitation of the coaches. The sanitation of the roadbeds should be considered, the drinking water, and the possible way in which disease is spread by the railroads.

**Dr. Bracken** moved that the Surgeon General be requested to call a special conference to discuss railroad sanitation.

Motion seconded by **Dr. G. T. Swarts.** Carried.

**Dr. CRUMBINE.** I think that the matter of the foods transported by the railroads should receive attention at such a conference. At this time of the year, especially in the Central States, the hottest place you can find is on the railway platform, and that is where the cream, milk, and other foods are kept awaiting transportation or removal, and if we could succeed in getting the railway commission to issue an order requiring all of these things to be properly cared for in the shade we would be doing something really valuable. I would suggest that this conference be called at the center of the United States, which is Kansas City.

**Dr. KERR.** In a special conference on railway sanitation the first thing to do would be to get acquainted with the railroad officials and to see what is being done. The railroads are doing a good deal along certain lines. The Pennsylvania Railroad has done a great deal in caring for their employees. I called at the superintendent's office in Philadelphia and was surprised to learn of the care they had taken to install safety devices and rest stations for their employees. I believe that the Surgeon General would like to have the advice of a committee with respect to the time of meeting and the subjects that should be taken up. It seems to me that it would be a good plan to appoint a committee of four or five that would attend to the corre-

spondence and assume part of the responsibility of holding the conference.

Dr. BRACKEN. I think it would be a good plan to appoint such a committee. It would invite the various States to take part in asking for this conference. As I understand it, such a conference can not be called unless a request is made from five or more States.

Dr. PROBST. I move that a committee be appointed by the Chair, to formulate a plan for a national conference on railway sanitation.

Motion seconded by Dr. H. M. Bracken. Carried.

The conference then took a recess to enable the delegates and guests to make a visit of inspection to the Angel Island Quarantine Station, the immigration hospital, and the Federal plague laboratory. These inspections occupied the entire afternoon.

#### EVENING SESSION.

The conference was called to order at 8.30 p. m. by Dr. J. W. Kerr, and the special committee appointed at the morning session to consider the report of committee on the disposal of the dead was called upon.

Dr. BRACKEN. Your committee has taken up the report and has the following resolutions to present; at the committee meeting this evening there were present Drs. Probst, Kerr, Heg, and Bracken.

*Resolved*, That quarantine officials be given the same recognition as State officials of health in passing upon the transportation permits for dead bodies sent into the United States from other countries, and that the restrictions as to the shipment of dead bodies from other countries be also applied to Alaska and other United States possessions.

*Resolved*, That the suggestions relative to the method of undertaking bodies and the amount and standard of the embalming fluid used be made the basis of further study and investigation.

Dr. PROBST. I move that this report be adopted.

Motion seconded by Dr. Converse.

Dr. PROBST. Although I was on that committee, I would like to ask Dr. Bracken if it would not be well to define "quarantine officials" more exactly.

Dr. BRACKEN. I meant it to apply to United States public health officials, but Dr. Kerr thought it ought to be extended, so we made it general that way on purpose.

Dr. KERR. It can be limited to Federal quarantine officials.

Dr. BRACKEN. I amend the motion that the report shall read "United States quarantine officials."

Amendment accepted. Motion carried.



## ANTIPLAGUE OPERATIONS ON THE PACIFIC COAST.

Dr. KERR. There remains on the program to be discussed the subject of "Antiplague measures on the Pacific coast." This subject has been thus far deferred to afford the members of the conference an opportunity to visit the various stations of the service where a great deal of antiplague work has been carried on. Since the antiplague measures have been largely directed by Surg. Blue, I shall ask him to open the discussion.

A RÉSUMÉ OF ANTIPLAGUE OPERATIONS IN CALIFORNIA, FROM SEPTEMBER, 1907, TO JUNE, 1911.

[By Surg. RUPERT BLUE, Public Health and Marine-Hospital Service.]

The 1907 outbreak began in August and lasted until January, 1908. The epizootic among the rats, however, was not suppressed in San Francisco until the following October. From August 14 to January 30, there occurred in the city of San Francisco 159 cases, with 77 deaths. In Oakland, during the same period, there were 12 cases, with 7 deaths. In addition to the cases above mentioned, several were reported in the transbay towns, and in the summer and fall of 1908 2 cases were discovered in Contra Costa County at a point remote from any possible connection with San Francisco or Oakland. Human plague has been found in the past two years in Alameda, San Benito, and Santa Clara Counties. In each rural case there existed a sufficiently intimate association with ground squirrels to warrant the assumption that the squirrel was the source of infection.

In September, 1907, on the request of the mayor, the Public Health and Marine-Hospital Service assumed the direction of the antiplague operations in San Francisco, and after the disease had been eradicated in 1908, the Surgeon General authorized an investigation of the conditions in Contra Costa County. The work, however, was not abandoned in San Francisco. It has been continued on a somewhat smaller scale up to the present time.

The measures which proved of value in the San Francisco and Oakland campaign may be briefly summarized, as follows: Systematic extermination of rats by means of traps and poisons, supplemented by a simultaneous attack on their food supply and habitations; rat-proofing of buildings; isolation of infected persons and the disinfection of infected houses. It may be pertinent to state here that the proper collection and disposal of garbage and the insulation of human habitations against rats are prophylactic measures that should be generally adopted in this country.

A partial summary of operations for San Francisco from the beginning of the epidemic up to June, 1911, will give an idea of the magnitude of the campaign. At one time there were more than 1,200 employees on the payroll. These were employed in the spring and summer of 1908 in the wrecking of insanitary buildings, destroying rat-harboring places, trapping, and poisoning, and in the general work of "cleaning up." The force consisted of medical officers, inspectors, assistant inspectors, foremen, laborers, and adequate clerical help in the various headquarters and substations of the special plague service. Bacteriological laboratories were maintained in San Francisco and Oakland in which rats and pathological specimens were examined for evidence of plague infection. It may be of interest to note that diagnoses of plague were confirmed in every instance by all known methods, including animal inoculations

and cultural tests, and that Federal, State, and municipal experts were required to pass on each human case before an official report was rendered.

The following statement shows some of the more important operations of the special plague service:

Buildings and premises inspected (including reinspections).....	1, 051, 368
Buildings demolished .....	3, 179
Buildings disinfected .....	14, 126
Buildings made rat proof (not including stables).....	13, 778
Stables made rat proof (concreted).....	3, 438
Cellars made rat proof.....	12, 279
Yards made rat proof.....	10, 699
Chicken yards concreted.....	1, 591
Square feet of concrete laid.....	18, 593, 637
Sick inspected .....	500
Plague cases.....	160
Dead inspected .....	5, 711
Necropsies made .....	300
Plague cases found, at necropsy.....	9
Poisons placed .....	13, 237, 964
Rats collected .....	692, 533
Garbage cans installed.....	61, 858
The work of the plague laboratories:	
Rats examined .....	471, 469
Found infected .....	436
Squirrels examined .....	243, 048
Found infected .....	447
Other rodents examined.....	4, 710
Found infected (wood rat).....	1
Largest number of rodents examined in one day (May 16, 1911)	1, 339

In addition, a great deal of valuable experimental work has been conducted by Passed Asst. Surg. G. W. McCoy, the bacteriologist in charge, which tends to clear up the remaining problems in relation to the transmission of plague.

Opportunity for the study of the diseases of rodents, bacterial and organic, and the best methods of exterminating the species, was afforded. The organic diseases were investigated for the first time and much interesting data collected. A new bacterial disease of squirrels (*Citellus becheyi*) has been observed in which the lesions are almost indistinguishable from those of plague. Filariasis was also found to be present in the California ground squirrel.

The entomology of plague with special reference to the Siphonaptera of San Francisco and vicinity has received considerable attention in both laboratory and field. As a result, much valuable information on the bionomics of fleas and other ectoparasites of California rodents has been collected and published for the benefit of those engaged in similar work.

#### POST-EPIDEMIC MEASURES IN SAN FRANCISCO AND OAKLAND.

Of great importance in this connection is to know when to discontinue the eradicated work. It has been learned in the school of experience that the disappearance of human cases is not a safe guide, nor is the failure to find infected rats an infallible indication. In order to be on the safe side we adopted the rule, and laid down the principle, that certain procedures should be continued almost indefinitely after the last infected rat has been found. This work should include such measures as will reduce the rat population and

maintain it at the lowest possible mark throughout the year. The importance, therefore, of enforcing the special garbage regulations, and the building ordinances as regards impervious material on ground surfaces and side-walls, can not be too strongly emphasized.

We have at present in San Francisco, Oakland, and Berkeley for this purpose a force of 50 men, consisting of 2 inspectors, 6 foremen, and 42 laborers. The San Francisco Board of Health furnishes 5 additional inspectors, who serve under the direction of this service. The satisfactory work of this small force is represented on the appended chart, which shows the rat catch by months in San Francisco from September, 1907, to June, 1911. The top of the curve, the maximum catch, was reached in the spring of 1908. Since that time, although more rat catchers were employed, and a larger number of traps set daily, the catch diminished until a fixed monthly rate was established. In view of this showing, it is not too much to claim that a rat population can be lowered and kept down by the application of appropriate means. It is to be noted on the chart that the highest average was 42,000 for the month of March, in 1908; the lowest was 4,300 for April, 1911. The number of traps in daily use at present is 7,500.

A systematic collection of rats from all sections of the city, in addition to diminishing their numbers, will enable us to detect an epizootic in time to adopt preventive measures before the occurrence of human cases. This is one of the chief aims of the present system.

#### PLAGUE IN RURAL CALIFORNIA.

In 1908, as above stated, two cases of human plague occurred in Contra Costa County. The investigations which followed failed to connect either with a previous case, but showed an intimate association with a rural rodent—the California ground squirrel. The finding of these cases was not an accident, but was the result of a carefully laid plan to ascertain whether or not infection had been conveyed to the rodents of the country districts. The condition had been suspected as early as 1903 and efforts were made then, and again in 1906, to collect sick and dead squirrels for examination, but without success.

In August, 1908, immediately following the above occurrence, an investigation was ordered, and a force of squirrel hunters was sent into the country. Between August 1 and October 15, 450 squirrels and 50 or more rats were collected in the northern part of the county. Four of the ground squirrels proved to be plague infected. In the following spring and summer (1909) an organized campaign on a larger scale was inaugurated for the purpose of learning to what extent the infection had spread. Scouting parties were sent into Alameda, San Joaquin, Stanislaus, and Merced Counties and specimens obtained for examination. In November, 1909, infection among the ground squirrels had been found so widespread in those counties that it became necessary to advance the line of investigation to the extreme limits of the State. Since that date the inquiry has covered 44 counties, parts of Arizona, Nevada, and Oregon, and the infected area accurately defined.

From the inception of the work up to June 1, 1911, there have been received at the laboratory in San Francisco 243,048 ground squirrels, 447 of which proved to be infected. Specimens of the other rodent families, such as gophers, rabbits, weasels, and brush rats, to the number of 4,710, were received during the same period. One of these, a brush rat (*neotoma*), showed the gross and microscopic lesions of plague. The infected animals were obtained in 10 counties, namely, Contra Costa, Alameda, San Joaquin, Stanislaus, Merced, San Benito, Santa Clara, Santa Cruz, Monterey, and San Luis Obispo. San Fran-

San Francisco and Los Angeles Counties are omitted because no infection has been found in them in the past two years.

It will be seen that the area affected lies in the central and coast regions of the State, extending from Suisun Bay on the north to San Luis Obispo County on the south. For a while it was thought that the San Joaquin River formed its eastern boundary, but in December last infected squirrels were shot near the town of Ripon, San Joaquin County, some 15 or 20 miles east of the river. It is to be observed that, in this instance, the river did not check the advance of the epizootic. Invasion of the northern countries, however, seems to have been prevented by the bay and marsh lands at the conference of the Sacramento and San Joaquin Rivers.

There has been, apparently, a rapid distribution in the south through Santa Clara, Merced, San Benito, and Monterey Counties. This may be attributed, for the most part, to the unbroken continuity of rodent range found therein, and to the fact that squirrels are more numerous in this section than elsewhere in the State. These are the natural conditions favoring the spread of infection. The progress of the epizootic, I regret to state, has been aided by farmers in some cases. A rancher who lives in Santa Clara County, having heard of the fatal disease in Contra Costa, imported sick squirrels and liberated them on his lands. The effect was immediate and satisfactory, the squirrels being eradicated for miles around. This occurred some years ago, however, and the animals are now as numerous as ever.

From the foregoing statement, it will be seen that an extensive plague focus has been established in the central and coast counties of California, and that, in this instance, the ground squirrel (*Citellus beecheyi*) is the alternative host of the disease.

#### MEASURES FOR THE CONTROL OF RURAL PLAGUE.

The threatening possibilities of the situation have been fully appreciated, and comprehensive measures adopted to safeguard the public health. The Surgeon General has enlarged and extended the work as the investigations disclose new conditions that require either increased appropriations or the detail of additional officers.

The general plan of operations includes eradicated work in conjunction with the State and county officials, the maintenance of rodent free zones around the cities, and the continuance of the investigation to determine the location and extent of plague epizootics in California and near-by States. The joint Federal and county service is conducted with a view to enforcing the State law of March 13, 1909, entitled "An act for the extermination of rodents." Any violation of the provisions of the statute is deemed a misdemeanor, and is punishable by both criminal and civil action.

The boards of supervisors of 14 counties have agreed to enforce the law and have appointed inspectors to serve formal notice on all property owners and tenants of infested lands that a full compliance will be required. Federal inspectors have been detailed to supervise this work and to give expert advice on the best and most inexpensive methods of exterminating squirrels. Farmers, ranchers, and orchardists in these counties are complying in a most commendable manner, and great destruction is being accomplished.

One of the main objects of the campaign is to exclude infection from the centers of population. This is accomplished by preventing contact and the interchange of ectoparasites (fleas) between rural and urban rodents by (1) prohibiting the marketing of squirrels, and (2) the maintenance of rodent free zones around the cities. Broad areas, in which squirrels have been de-

stroyed, are at present maintained around the cities of San Francisco, Oakland, Alameda, Berkeley, and Point Richmond.

Another very important consideration is the prevention of a further spread among rural rodents. As a measure in the protection of the Eastern States and in the interests of the general commercial welfare, it is probably the most important feature of all. Among the cardinal indications suggested under this head are (1) destruction of known foci of infection, and (2) general rodent extermination. In the prosecution of this plan we have recently organized a number of field companies and have dispatched them to points of strategic importance in the infected area.

Each company consists of six men, and is supplied with a covered wagon, tents, kitchen utensils, weapons, and the necessary paraphernalia for a long stay in the field. It is our purpose to combat the natural conditions favoring the spread of infection. That is, to break the continuity of range by creating a free zone in front of the epizootic. There are two of these strategic points selected, namely: Ripon, in San Joaquin County, and San Miguel, in San Luis Obispo County. Other points will be sought and provided for in due time.

General rodent extermination has been taken up by the county officials, under the supervision of this service, and will be enforced as a continuous prophylactic measure for many years to come.

#### PLAGUE SUPPRESSIVE MEASURES—SYSTEMATIC RAT DESTRUCTION IN A LARGE COMMUNITY.

[By G. M. CONVERSE, Acting Assistant Surgeon, United States Public Health and Marine-Hospital Service.]

Anti plague work in a city may be divided into three periods:

First. Period of discovery of plague infection.

Second. Period of organization and active anti plague measures until disappearance of infection.

Third. Postepidemic period.

To these should be added, to be logical and in conformity with the principles or true preventive medicine, a preepidemic, or, more correctly speaking, a pre-epizootic period; that is to say, that in such communities as lie in the route of travel by land or sea with localities known to harbor plague infection the same measures should be adopted as are considered necessary during the post-epidemic period. Such a timely intervention would save life, money, and avoid interference with the commerce of the community.

I shall confine my remarks to that phase of the work having to do with rat destruction—demurization, as it has been called, from *Mus*, a rat.

Here it may be well to remark that wherever wood construction is cheaper than brick or stone, as on the Pacific slope, there rats will find particularly favorable conditions for multiplying; if, in addition, the sanitary policing is lax, so that refuse of all kinds is easily accessible, then you have conditions that are perfect for harboring and feeding an innumerable number of these animals. These conditions already existed in San Francisco previous to the fire, and the combination of conditions produced by that catastrophe were such as to particularly favor the multiplying and harboring of rats throughout the city. A gentleman walking with a friend through a section of the burnt district shortly before the commencement of this campaign stated that in walking the distance of one block he counted over 100 rats scampering about.

Plague infection either carried over from the Chinatown epidemic of 1907 or introduced from some of the infected bay counties found a continuous chain of the rodents for spreading from one end of the city to the other.

In order to effectively destroy rats in a large community it is necessary: (1) to trap or poison; (2) to shut off the food supply; (3) to destroy and remove their harboring and breeding places.

(1) *Trapping and poisoning.*—There are employed in operations of trapping and poisoning 32 laborers. These are divided into four squads, each squad in charge of a foreman, and each having its own quarters in a different section of the city. These trappers attend to nearly 8,000 traps, exactly 7,613, of which 6,454 are so-called snap traps and 1,159 cage traps. As two of the laborers have no traps there is an average of 266 for each of the 30 trappers. The traps are scattered over the entire city, the exact distribution being regulated by the character of the premises in the varying sections. The city is divided into a number of exactly defined trapping sections, each trapper being allotted two of these sections; he attends the traps of one section on one day and the traps of the other section the following day, etc. This trapping is controlled by the foreman, who has full charge of the men under him. He is responsible to the officer in charge for their discipline, for the condition of their traps, and for results obtained.

The result of these systematic and persistent trapping operations, taken in conjunction with other work to be described, is a steadily declining rat catch. This is best shown by a graphic tracing of the same, month by month, since the beginning of the work. Thus, during the month of March, 1908, with a large force of trappers, using about 6,000 traps, 43,000 rats were trapped; during the same month of March, 1911, 4,600 rats were trapped with 8,000 traps in the field. These are due mostly to other measures than trapping, for trapping alone would not have reduced these numbers to this extent. For instance, certain premises, which for a number of reasons it has not been possible to place in a rat-proof condition, show a constant and almost undiminishing rat catch month by month; such are several premises with wooden floors close to the ground and containing an abundance of foodstuffs, the owners of which procured an injunction restraining the health authorities from compelling rat-proofing work; such, also, two large grain warehouses, which by the unusual physical conditions of the land on which they are built have made efficient rat proofing impracticable.

An important feature of trapping not to be overlooked is the trapping of vessels and of the water front; thus in a period of six months just elapsed the records show a catch of something like 6,000 rats from these sources alone.

The traps are baited with bacon, cheese, bread, or any other foodstuffs that the trapper finds acceptable to the rats. During one year, from April 1, 1910, to April 1, 1911, there were used 1,263 pounds of cheese, 3,565 pounds of bacon, and 6,602 loaves of bread. This amount of bait furnished 1 ounce of bacon and cheese per snap trap per month, 8 ounces of bread per cage trap per month. Numerous other systems of catching rats have been tried, such as barrels, etc., but they are not practicable for use on a large scale.

In addition to trapping, poisoning is essential particularly in certain localities. Various poisons have been used, but that which has given the most satisfactory and uniform result is a proprietary preparation containing phosphorus. It is spread on bread and the bread cut into cubes and distributed in this form. From 6,000 to 8,000 pieces of poisoned bread are spread daily, the poisoning being conducted under the immediate supervision of the foreman. At the present time this poison is distributed only in such portions of the city as will entail absolutely no risk to human life; for example, the entire water front, butcher-town, freight depots, etc. Although not many rats are recovered as a result of systematic poisoning, its good effect has been well proven. In the early part of the work thousands upon thousands of dead rats were seen floating out of

the sewers into the bay; during a considerable period of time the trappers in charge of the slaughterhouse section used to trap from 100 to 200 rats daily. Heavy and systematic and repeated poisoning has reduced this number until now only 5 or 10 rats are trapped there a day, inspection of the territory showing that this is not due to inefficiency on the part of the trapper, but to the absence of rats.

(2) *Shutting off the rats' food supply.*—This includes the providing of proper receptacles for food refuse throughout the city and constant inspection to see that these are renewed, that no refuse is thrown about, etc. Sixty-two thousand garbage cans have been procured through the efforts of the inspectors in addition to those already in use.

(3) *The destruction and removal of harboring and breeding places.*—During the earlier part of the campaign, when there was a sufficient number of officers and inspectors to make systematic inspection and investigation of all premises in the city, rat proofing could be accomplished in that way. As the exigencies of the work diminished and a consequent material reduction in the force was made (at the present time there are but two inspectors for the entire city), it became evident that some system by which rat-infested localities could be determined would have to be employed. This consists of a map on which the location of rats trapped is shown by means of colored pins; this map, taken in conjunction with the record books, makes it possible to see at a glance the localities in the city that are particularly infested. In this manner it was found that the section of the city inhabited by the Japanese was heavily infested, the trappers from this section bringing in from 60 to 75 rats each day. A systematic inspection of this restricted section showed the presence of wooden floors in stores and dwellings, wooden floors covering yards, the presence of large amounts of foodstuffs, and a congested population of Japanese. The owner of each parcel of this property was found, the necessity of removing all these wooden floors explained to him, and specific directions by letter were given him directing the nature of the concrete work to be done. The ultimate result was the concreting of almost the entire surface of the Japanese district and the reduction of the rat catch from 60 to 75 per day to 5 or 10 per day, scattered here and there throughout the district. Thus, also, the map showed a considerable rat catch in that portion of the city built up with steel, concrete, and brick buildings. On consulting the records it was found that in a period of five months 5,000 rats were trapped in 60 supposedly rat-proof buildings. Investigation showed the reasons for this infestation to lie in the fact that rats enter these buildings through openings left in the basements, walls, alongside of pipes, wires, etc. The owner of property must be found and notified; he is then furnished with specific instructions as to the necessary work to be done, said work to be reinspected after completion. To date 180 such buildings have been thus treated. Simple as this phase of the work appears, its real extent is shown by the fact that in one building, in order to do away with rat infestation, it was necessary to seal with concrete 690 openings around pipes, 137 other openings, to screen 57 ventilators on the roof and 40 ventilators in the basements, together with screening some 30 unused chimney flues. These figures happen to be available from the fact that the contractor doing the work had to account for the same.

The result of this portion of the work begins to be available after a sufficient period of time has elapsed since the completion of the work. Thus in 30 such buildings showing a rat catch of 1,650 rats for a period of three months prior to rat proofing, the same 30 buildings have furnished but 624 rats for the three months succeeding the completion of the work.

There are in the city of San Francisco 4,216 stables, and the number is being added to each week by permits granted by the board of supervisors; 3,337 of these stables have been rat proofed by means of concrete floors, etc., most of them during the actual epidemic work. A considerable number could not thus be treated at that time owing to a variety of circumstances, among them being short leases, lack of funds, etc., and these are being taken up as fast as practicable. Official notification of new permits granted for the erection of stables is furnished this office and inspections are made to see that they comply fully with the rat-proofing laws provided for the same. While the rebuilding of stables in such a manner as to make them rat proof has been the chief consideration, the question of the breeding of flies in the manure has not been lost sight of, and as much as possible the manure bins have been made fly proof as well as rat proof.

Dr. SNOW. I have brought you some newspaper clippings which I think you will find of interest. I thought that Dr. Blue in his modesty would not say much about the success which he has had in getting the people to stand by him in the work that he has done. These clippings are the best proof of his tact and energy in conducting the campaign. I presume that you all remember the spring of 1903 when California was having a rather hard time from the citizen's point of view, and most of you met in Washington to decide what you would do to California if the citizens of the State did not wake up and realize the dangers of the plague to both themselves and the Government. At that time Dr. Foster and others were appointed a State board of health and given authority from the new governor to do whatever was necessary in ridding the State of plague. Dr. Foster went to Washington, stated the situation, and made certain promises. His report, which he presented to the board of health upon his return, is of considerable interest. In July, 1903, California agreed to cooperate in every way possible in this problem and I believe that the citizens of California have made good. From that time forward there have always been some who persist in saying that plague did not exist in California; that plague, like smallpox, is a disease of filth; and that in this advanced age of sanitation and with the climate of California this disease could never get a strong foothold, even if it did exist here. But such ideas are not representative of general public opinion.

When the later plague outbreak did start here the citizens felt most fortunate that the Federal service had men in Washington who knew in advance what the situation was. Especially did they appreciate having Dr. Blue returned to them for command of the local situation. Dr. Blue was fortunate in having Dr. McCoy and Dr. Rucker as assistants. Dr. McCoy has done and is still doing some remarkable scientific pioneer work on this problem. Dr. Rucker carried on the field work, of which you will see something to-morrow, and you can not realize before you see it what a difficult problem he had before him.



To keep the public interested in this work has been a problem. Just now we are trying to get the citizens in the rural districts to lend their assistance, and it takes a great deal of tact and personal effort to accomplish anything in this line. The State board can do little by itself because of the lack of funds. It seems to me that a problem like this one of plague is altogether too big for a State to handle and is necessarily a national problem in its importance. It becomes a question of just how it shall be handled, and it is a matter of cooperation of State and Nation. In this State it has seemed to work itself out very satisfactorily in a cooperative way. The city of San Francisco requested the Federal Government to send representatives here to assume the charge of this campaign. When it became a rural problem the State board of health made the request that it be put under the supervision of the Federal Government. The question of expense is one of importance that has not been mentioned. The United States Government is spending, and has been spending, between \$12,000 and \$15,000 a month in their part of the work. Just now we have the counties contributing something like \$2,000 per month—possibly more than that. The State has had rather a hard time, so far as the finances are concerned, on account of the changing of the system of collecting taxes, and there is but a small amount of money left in the contagious-disease fund for carrying on this work at the present time. The State board of health faces an uncomfortable problem if any unforeseen situation should develop requiring a sudden increase in the State expenditure, but I have no doubt that if such a thing should transpire that some way would develop for raising money.

Dr. PARKINSON. It might be well to put on record at this time that when Dr. Kellogg first reported that he had demonstrated the existence of plague here, I published the case, and there was a storm of disapproval from the San Francisco newspapers. A fight was kept up in the campaign against plague, and no one who was not on the ground at the time would realize the bitterness of feeling on this question. The Medical Times published case after case, with all the facts pertaining to them, and the Sacramento Bee did the same thing. Those opposed to giving the facts to the public were a small coterie of men connected with transportation companies of the State and political appointees. The medical profession was loyal to the truth, and the San Francisco County Medical Society and the State Medical Society passed resolutions stating that plague existed in California, and calling upon the State board of health to do its duty and tell the truth. Precisely the same men who opposed publicity of the facts were the ones who opposed the resolutions in each society—I know, because I wrote the resolutions and put them

through. The Southern Pacific Co. kept men on the trains to interview men attending State meetings to urge them to suppress the fact that plague existed, saying we would be ruined if they were known, absolutely ignoring the fact that the Marine-Hospital Service was publishing this material and sending it all over the world. Nevertheless the San Francisco newspapers persisted in denying the existence of plague. This lasted until Gov. Pardee came into office, when he sent for me (I was on the Sacramento Bee) and he said that he wanted to know what it was that the paper wanted, and I told him all the paper wanted was that the truth be told. He said if we thought he would shoulder that responsibility for the administration we were mistaken, because he would not do it. Finally he asked that if we stopped what would we require, and I said we required only that the truth of the situation be told. After that it came out in plain English, and we stopped pitching into the governor of the State. A representative of transportation then went to Washington to suppress this thing, and when he found that that was impossible he turned around and posed as the savior of California, and came back and made a report to that effect. The lying and vilification rested with a small coterie of men. In October, 1907, Dr. Blue said that he was refused admission to six houses in San Francisco, and then it seemed about time to do something. I asked the council of the State society to take charge of this thing. Dr. Evans was president of the society and I was chairman of the committee; a special meeting was called, and it was decided to commence a campaign of education. The committee spent a whole day and evening selecting the men who were to take charge of this work. What we wanted were men who were not afraid of the newspapers and who would stand up and tell the truth. Six hundred invitations were sent out for a meeting and there were 60 present. Two good men were present, and they promised the profession an audience if they had a meeting room, and two weeks later a most successful meeting was held in the Merchants' Exchange Building. After that I went home. Most of the trouble was solely due to a noisy coterie, but the great body of the people was honest and sincere, but they did not have the newspapers.

Dr. HEG. As representative of one other section of the United States that has been afflicted with plague I shall discuss the question. I wish to state first that I think that the invasion of plague which we had in Seattle was one of the best things that ever happened to the city of Seattle or the State of Washington—it brought our sanitary conditions to a much higher standard. In the city of Seattle in 1907 three cases of plague were discovered. There were four or five others that were suspicious of plague, but the diagnosis was never confirmed. Prior to that time the city was spending about \$10,000

or \$12,000 a year in the routine way, supporting a board of health, and it was doing nothing but reporting a few cases of diphtheria and smallpox and a birth and a death or two and some things like that. Immediately after the Public Health and Marine-Hospital Service took charge of things more was spent in one month than had been spent in a whole year. We are now spending from \$150,000 to \$200,000 a year and are doing excellent work and there is a prospect next year of spending probably double what was spent this year. The death rate has dropped, but that is not all. The death rate from typhoid fever and diarrheal diseases was cut more than half. When we found that there was plague in Seattle we took our lessons from San Francisco, and we did not hesitate to come out squarely with the first case. The newspapers stood with us. We did not have a ring of transportation officials that had control of everything in the State. We came out strongly and stated that we had plague and that we were spending money to suppress it. But to keep on getting the money for this purpose we find to be a rather hard job. We can get money for almost anything but we can not get much money for plague now, but, as Dr. Blue stated, antiplague measures must be kept up practically indefinitely. The last plague rat that we found was in April, 1910, and prior to that time 18 months elapsed, during which we had not found a plague rat, and then only 1 was found, although the district was carefully trapped and isolated. This shows that, although trapping is carried on systematically, you will run for a long period and then pick up a plague rat. I have studied the migration of rats in our State; in 1908 I had the State well canvassed for rats and I found, while one-third of the human population was west and the other two-thirds of the population was east of a range of mountains, that east of the mountains there were practically no rats, while they were abundant in all places west of the mountains. Later, on the east side, along the lines of railroads, in a few places, rats were to be found. Now rats are not found off the railroads on the east side of the mountains, but only along the lines of travel. They have traveled from one part of the State to the other and I think if they could travel 300 miles across our State that they certainly can travel a great deal farther. If a rat can travel from Seattle to Spokane, I do not see any reason why he can not travel from Seattle to St. Paul. How this infection of ground squirrels is going to affect our State I do not know. I hope you will keep them all here as we do not want them. From the very beginning to the present time the antiplague measures in Washington have been under the supervision of the Public, Health and Marine-Hospital Service.

Dr. PROBST. I move that this conference express its commendation of what has been done and is being done for the protection of the United States by the Federal, State, city, and county officials, and express full confidence in the measures now being taken here to protect against plague.

Motion seconded by Dr. Crumbine. Carried.

#### A REGISTRATION AREA FOR SICKNESS REPORTS SUGGESTED.

Dr. RICHARDSON. The committee on reporting on morbidity statistics has not been able to get together and I would suggest that the matter be continued and a report be made at the next conference.

Dr. KERR. I think it might be well to accept the suggestions of the committee and keep the question in our minds by correspondence and make it the subject of discussion at the next conference, as it is one of the most important subjects that can be taken up between the States and the service.

Dr. SNOW. This question of making progress by the reporting of morbidity statistics is one of the most important subjects that has or can come before us at this stage of our development of public-health work. I feel that something more active should be done than just casual correspondence. The Federal service has done a tremendous amount of work getting together for comparative study the data from various States on their laws relating to morbidity statistics. I hope that something very active will come from the committee's suggestion that this matter be taken up by letter. I believe that a registration area should be established.

Dr. CRUMBINE. I move that it is the consensus of opinion of this conference that the Surgeon General be asked to constitute a registration area for morbidity statistics.

Motion seconded by Dr. W. F. Snow. Carried.

Dr. KERR. It is the desire of the Surgeon General to get more complete statistics. The reason this subject was brought before the conference this year was to make a start and to get men engaged in the compilation of statistics, but it must be borne in mind that it is much more difficult to establish a registration area for notifiable diseases than for mortality statistics. I think that perhaps much time will be lost if this subject is considered only through correspondence. I am anxious that some action should be taken.

#### PROPOSED METHOD OF COLLECTING DATA REGARDING POLIOMYELITIS.

Dr. KERR. We will now take up the subject of the adoption of a uniform blank for the collection of data regarding poliomyelitis. I will now call upon Dr. Richardson, chairman of the committee, to make his report.

Dr. RICHARDSON. The committee has gone over this blank, copies of which you have all seen, and in general it is an excellent one. There are three changes which the committee would like to have made in this blank, and if these changes are approved by the conference the committee will approve of the blank as submitted. The following are the three proposed changes:

(1) In case patient lives in the country, that the approximate distance of patient from the center of town be stated.

(2) That the occupations of the parents and other adults in the family be stated.

(3) The kind of treatment and its probable value be stated.

Dr. HEG. I move that this blank with the suggestions made by the committee be approved.

Motion seconded by Dr. Parkinson. Carried.

Dr. KERR. By correspondence we will apprise the other State boards of the action taken and get them to take up the matter. After I return to Washington I will take up the possibility of getting the blanks published, of which the following is a corrected copy:

Indicate by check whether { Paralyzed case——  
or  
Abortive case——

*Case report of acute anterior poliomyelitis.*

Patient's name, -----; age, -----; sex, -----  
Nationality of father, -----; of mother, -----  
Occupation of father, -----, of mother, -----  
Residence (post office), -----; county, -----  
Did patient live in city? -----; village? -----; country? -----  
If in country, state distance from center of nearest town or village, -----  
Status of family: Well-to-do? -----; moderate? -----; poor? -----  
Sewage disposal: Flush closet? -----; cesspool? -----; privy? -----  
General sanitary conditions: Excellent? -----; good? -----; fair? -----; bad? -----  
Previous general health of patient: Excellent? -----; good? -----; poor? -----  
Had patient suffered from any illness, indisposition, or accident within a month prior to this attack? -----; nature of illness or accident? -----  
-----  
-----

OTHER MEMBERS OF FAMILY (INCLUDING GUESTS, BOARDERS, AND SERVANTS).

Children: Males (age of each) -----  
Females (age of each) -----

Adults: Males, number -----; females, number -----

Were there any other cases of sickness in the family within one month before or after this attack? ----- Give name, age, sex, date, and nature of each case -----  
-----  
-----

## SYMPTOMS OF ACUTE STAGE.

Fever: High? -----; moderate? -----; slight? -----; none? -----  
 Headache? -----; severe? -----; moderate? -----; slight? -----; none? -----  
 Constipation? ----- Diarrhea? ----- Vomiting? ----- Sore throat? -----  
 Pain? ----- Distribution? -----  
 Tenderness? ----- Distribution? -----  
 Retraction of head? ----- Restlessness? ----- Drowsiness? -----  
 Date of onset of acute symptoms? -----  
 Date of onset of paralysis? -----  
 Distribution of paralysis at its worst -----

-----  
 What treatment was employed, and with what apparent results? -----

(a) In acute stage -----

(b) Subsequent to acute stage -----  
 -----

## OUTCOME OF CASE TO DATE.

Recovery? (complete disappearance of paralysis) -----  
 Improvement? ----- Extent of paralysis remaining -----

Death? ----- Date? -----

## CONTACT WITH PREVIOUS CASES.

Had patient been associated with any previous case? ----- If so, state whether paralyzed or abortive case? ----- Give name, address, and date -----

Had any member of the patient's family been associated with any previous case? ----- If so, state whether paralyzed or abortive ----- Give name, address, and date -----

Did patient attend school? ----- Where? ----- Grade? -----

What were the weather conditions immediately preceding this attack—  
 Hot? ----- Mild? ----- Cold? ----- Wet? ----- Dry? -----  
 Dusty? ----- Unusual in any respect? -----

Have any infective diseases, respiratory or digestive troubles been unusually prevalent in the community? -----

What animals or fowls are kept on the premises? -----

Has there been any paralysis of animals in the vicinity? -----

What preventive measures were carried out? -----

REMARKS. Please state any other facts of interest concerning the case -----

Date of filling out report ----- Signed ----- M. D.

Dr. KERR. As I have not yet appointed the committee on railroad sanitation I now appoint the following: Drs. C. O. Probst, H. M. Bracken, J. A. Egan, T. D. Tuttle, and M. L. Price. The hour is growing late and we must not forget that after this meeting we have an engagement with Dr. Regensburger to visit the municipal clinic.

I desire to express the pleasure it has given me to meet the conference in San Francisco. On behalf of the service and the Surgeon General I desire to thank those who have been in attendance.

**Dr. SWARTS.** I move that a vote of thanks be extended to the hosts that have received the conference during this meeting and to express the appreciation for the kind hospitality extended to us by the State Board of Health of California.

Motion seconded by Dr. C. O. Probst. Carried.

**Dr. KERR.** Again I desire to express the appreciation of the Surgeon General and the service for the attendance of the members at this conference, which I now declare adjourned.

Conference adjourned.

## APPENDIX.

### STATE AND TERRITORIAL HEALTH AUTHORITIES IN THE UNITED STATES.

[Corrected September 15, 1911.]

#### ALABAMA:

*The State board of censors, acting as a State board of medical examiners and as a State committee of public health—*

- Dr. W. H. Sanders, chairman, Montgomery.
- Dr. D. F. Talley, Birmingham.
- Dr. L. W. Johnston, Tuskegee.
- Dr. M. B. Cameron, Eutaw.
- Dr. Glenn Andrews, Montgomery.
- Dr. S. G. Gay, Selma.
- Dr. I. L. Watkins, Montgomery.
- Dr. S. W. Welch, Talladega.
- Dr. T. L. Robertson, Birmingham.
- Dr. V. P. Gaines, Mobile.

W. H. Sanders, M. D., State health officer, Montgomery.

P. B. Moss, M. D., State bacteriologist and pathologist, Montgomery.

G. W. Williamson, M. D., registrar of vital and mortuary statistics, Montgomery.

#### ALASKA:

(Alaska has no District board of health.)

#### ARIZONA:

*Territorial board of health—*

- Gov. Richard E. Sloan, president, Phoenix.
- Attorney General J. B. Wright, Tucson.
- Edward S. Godfrey, jr., M. D., secretary and superintendent of public health, Phoenix.

#### ARKANSAS:

*State board of health—*

- J. P. Runyan, M. D., president, Little Rock.
- J. P. Sheppard, M. D., secretary, Little Rock.
- John R. Dibrell, M. D., Little Rock.
- R. S. Hilton, M. D., El Dorado.
- B. L. Harrison, M. D., Jonesboro.
- E. H. Abingdon, M. D., Beebee.

#### CALIFORNIA:

*State board of health—*

- Martin Regensburger, M. D., president, San Francisco.
- W. Le Moyne Wills, M. D., vice president, Los Angeles.
- Wallace A. Briggs, M. D., Sacramento.
- F. K. Ainsworth, M. D., San Francisco.
- O. Stansbury, M. D., Chico.
- Wm. F. Snow, M. D., secretary, Sacramento.
- James H. Parkinson, M. D., Sacramento.



**COLORADO:***State board of health—*

Sherman Williams, M. D., president.  
 Jacob Campbell, M. D., Boulder, vice president.  
 Paul S. Hunter, M. D., Denver, secretary and executive officer.  
 Crum Epler, M. D., Pueblo, treasurer.  
 S. R. McKelevy, Denver, medical inspector.  
 B. F. Wooding, M. D., Denver, inspector lying-in hospitals.  
 James Rae Arnell, M. D., Denver.  
 Charles Morrison, M. D., Colorado City.  
 Arnold Stedman, M. D., Denver.

**CONNECTICUT:***State board of health—*

Edward K. Root, M. D., president, Hartford.  
 Joseph H. Townsend, M. D., secretary; office at Hartford.  
 T. H. McKenzie, C. E., Southington.  
 Lewis Sperry, Esq., South Windsor.  
 Albert W. Phillips, M. D., Derby.  
 Arthur J. Wolff, M. D., Hartford.  
 Louis J. Pons, M. D., Roxbury.

**DELAWARE:***State board of health—*

William P. Orr, M. D., president, Lewes.  
 J. W. Clifton, M. D., Smyrna.  
 W. F. Haines, M. D., Seaford.  
 J. A. Draper, M. D., Wilmington.  
 E. R. Steele, M. D., Dover.  
 C. A. Ritchie, M. D., Middletown.  
 A. E. Frantz, M. D., secretary and executive officer, Wilmington.

**DISTRICT OF COLUMBIA:**

William C. Woodward, M. D., health officer, Washington.

**FLORIDA:***State board of health—*

E. M. Hendry, president, Tampa.  
 H. L. Simpson, M. D., Pensacola.  
 John G. Christopher, Jacksonville.  
 Joseph Y. Porter, M. D., State health officer and secretary State board of health, Jacksonville and Key West.

**GEORGIA:***State board of health—*

W. F. Westmoreland, M. D., president, Atlanta.  
 Charles Hicks, M. D., vice president, Mount Vernon.  
 H. F. Harris, M. D., secretary and director of laboratories, Atlanta.  
 W. W. Owens, M. D., Savannah.  
 A. P. Taylor, M. D., Thomasville.  
 M. S. Brown, M. D., Fort Valley.  
 James H. McDuffie, M. D., Columbus.  
 Howard J. Williams, M. D., Macon.  
 R. M. Harbin, M. D., Rome.  
 Samuel C. Benedict, M. D., Athens.  
 Gles Hathcock, M. D., Belton.  
 W. H. Doughty, M. D., Augusta.

**HAWAII:***Territorial board of health—*

J. S. B. Pratt, M. D., president.  
 Alexander Lindsay, jr.  
 F. C. Smith.  
 A. R. Keller.  
 D. Kalauokalani, sr.  
 Jas. F. Morgan.  
 W. C. Hobdy, M. D.  
 K. B. Porter, secretary, Honolulu.

**IDAHO:***State board of health—*

Geo. E. Hyde, M. D., president, Rexburg.  
 Ralph Falk, M. D., secretary, Boise.  
 W. R. Hamilton, M. D., Weiser.  
 Attorney General D. C. McDougal.  
 C. D. Mason, State chemist, Boise.  
 J. H. Wallis, dairy, food, and sanitary inspector, Boise.  
 A. E. Robinson, State engineer.  
 C. B. McGlumphy, bacteriologist.

**ILLINOIS:***State board of health—*

George W. Webster, M. D., president, Chicago.  
 Charles J. Boswell, M. D., Mounds.  
 R. E. Niedringhaus, M. D., Granite City.  
 Walter R. Schussler, M. D., Orland.  
 P. H. Wessel, M. D., Moline.  
 Henry Richings, M. D., Rockford.  
 James A. Egan, M. D., secretary and executive officer, Springfield.

**INDIANA:***State board of health—*

Fred. A. Tucker, M. D., president, Noblesville.  
 T. Henry Davis, M. D., vice president, Richmond.  
 James S. Boyers, M. D., Decatur.  
 John R. Hicks, M. D., Covington.  
 J. N. Hurty, M. D., Ph. D., secretary, Indianapolis.

**IOWA:***State board of health—*

Attorney General George Cosson, Des Moines.  
 J. I. Gibson, State veterinarian, Des Moines.  
 Lafayette Higgins, C. E., Des Moines.  
 A. C. Moerke, M. D., Burlington.  
 B. L. Eiker, M. D., president, Leon.  
 Albert de Bey, M. D., Orange City.  
 T. U. McManus, M. D., Waterloo.  
 E. E. Richardson, M. D., Webster City.  
 G. A. Smith, M. D., Clinton.  
 G. A. Huntoon, M. D., Des Moines.  
 Gullford H. Sumner, M. D., secretary, Des Moines.  
 Henry Albert, M. D., director bacteriological laboratory, Iowa City.  
 Prof. C. N. Kinney, chemist, Des Moines.

**KANSAS:***State board of health—*

- B. J. Alexander, M. D., president, **Hiawatha**.  
 C. D. Welch, vice president, attorney, **Coffeyville**.  
 Clay E. Coburn, M. D., **Kansas City**.  
 C. H. Lerrigo, M. D., **Topeka**.  
 V. C. Eddy, M. D., **Colby**.  
 M. F. Jarrett, M. D., **Fort Scott**.  
 C. W. Reynolds, M. D., **Holton**.  
 O. D. Walker, M. D., **Salina**.  
 H. L. Aldrich, M. D., **Caney**.  
 W. O. Thompson, M. D., **Dodge City**.  
 S. J. Crumblin, M. D., secretary, **Topeka**.

*Members of the advisory board.*

- F. O. Marvin, A. M., Mem. Am. Soc. C. E., sanitary adviser, **Lawrence**.  
 William C. Hoad, B. S., Asso. Mem. Am. Soc. C. E., sanitary and civil engineer, **Lawrence**.  
 E. H. S. Bailey, Ph. D., chemist, **State University, Lawrence**, food analyst for board.  
 J. T. Willard, M. S., **Agricultural College, Manhattan**, food analyst for the board.  
 L. E. Sayre, Ph. M., **State University, Lawrence**, director of drug analysis.  
 R. S. Magee, M. D., pathologist, **Topeka**.  
 Sara E. Greenfield, M. D., bacteriologist, **Topeka**.  
 W. J. V. Deacon, registrar, **Topeka**.

**KENTUCKY:***State board of health—*

- Joseph M. Mathews, M. D., president, **Louisville**.  
 H. S. Keller, M. D., **Frankfort**.  
 John G. South, M. D., **Frankfort**.  
 William A. Quinn, M. D., **Henderson**.  
 C. Z. Aud, M. D., **Cecilian**.  
 O. C. Robertson, M. D., **Cynthiana**.  
 J. C. Mitchell, M. D., **Louisville**.  
 J. N. McCormack, M. D., secretary, **Bowling Green**.

**LOUISIANA:***State board of health—*

- Oscar Dowling, M. D., president, **Caddo Parish**.  
 Beverly W. Smith, M. D., vice president, **St. Mary Parish**.  
 T. T. Tarlton, M. D., **St. Landry Parish**.  
 Herman Oechsner, M. D., **Orleans Parish**.  
 G. W. Gaines, M. D., **Madison Parish**.  
 B. A. Ledbetter, M. D., **Orleans Parish**.  
 Thomas A. Roy, M. D., **Avoyelles Parish**.  
 E. S. Kelly, M. D., secretary, **Orleans Parish**.  
 Sidney D. Porter, M. D., medical inspector, **Avoyelles Parish**.  
 George B. Taylor, analyst, **Orleans Parish**.  
 P. E. Archinard, M. D., bacteriologist, **Orleans Parish**.

**MAINE:***State board of health—*

- Charles D. Smith, M. D., president, **Portland**.  
 G. M. Woodcock, M. D., **Bangor**.

**MAINE—Continued.***State board of health—Continued.*

Richard H. Stubbs, M. D., Augusta.  
 Marshall P. Cram, Ph. D., Brunswick.  
 W. L. Haskell, M. D., Lewiston.  
 Eugene W. Goss, Auburn.  
 A. G. Young, M. D., secretary, Augusta.

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William H. Welch, M. D., president, Baltimore.  
 Marshall Langton Price, M. D., secretary, Baltimore.  
 Howard Bratton, M. D., Elkton.  
 James Bosley, M. D., commissioner of health of Baltimore City (ex officio), Baltimore.  
 Douglas H. Thomas, jr., Baltimore.  
 Attorney General Isaac Lobe Straus (ex officio), Baltimore.  
 Louis A. Griffith, M. D., Upper Marlboro.

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 C. E. McGillicuddy, Esq., Worcester.  
 Clement F. Coogan, Pittsfield.  
 Robert W. Lovett, M. D., Boston.  
 Mark W. Richardson, M. D., secretary, Boston.  
 William C. Hanson, M. D., assistant to the secretary, Boston.

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 Aaron R. Wheeler, M. D., vice president, St. Louis.  
 R. L. Dixon, M. D., secretary, Lansing.  
 Charles M. Ranger, A. B., Battle Creek.  
 John H. Kellogg, M. D., Battle Creek.  
 Thomas M. Koon, M. D., Grand Rapids.  
 Edward L. Abrams, M. D., Hancock.

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 B. J. Merrill, M. D., vice president, Stillwater.  
 H. M. Bracken, M. D., secretary and executive officer, St. Paul.  
 O. T. Sherping, M. D., Fergus Falls.  
 C. W. More, M. D., Eveleth.  
 C. Graham, M. D., Rochester.  
 F. F. Westbrook, M. D., Minneapolis.  
 R. O. Earl, M. D., St. Paul.  
 W. C. Chambers, M. D., Blue Earth.

*Laboratory division—*

R. H. Mullin, M. D., director.

*Epidemiological division—*

H. W. Hill, M. D., director.

*Engineering division—*

Frederic Bass, director.

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 B. A. Shepherd, M. D., Lexington.  
 D. J. Williams, M. D., Ellisville.  
 S. H. McLean, M. D., secretary, Jackson.  
 John Darrington, M. D., Yazoo City.  
 T. E. Ross, M. D., Hattiesburg.  
 G. S. Bryan, M. D., Amory.  
 L. D. Dickerson, M. D., McComb City.  
 W. L. Little, M. D., Wesson.  
 E. A. Cheek, M. D., Arcola.  
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 Frank B. Hiller, M. D., secretary, Jefferson City.  
 M. P. Overholser, M. D., Harrisonville.  
 Ira W. Upshaw, M. D., 5015 Shaw Avenue, St. Louis.  
 L. E. Bunte, M. D., 3203 Sullivan Avenue, St. Louis.  
 G. B. Schulz, M. D., Cape Girardeau.

**MONTANA :***State board of health—*

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 Attorney General Albert J. Galen, Helena.  
 William Treacy, M. D., president, Helena.  
 Thomas D. Tuttle, M. D., secretary, Helena.  
 M. E. Knowles, D. V. S., State veterinarian, Helena.  
 C. T. Pigot, M. D., Roundup.  
 D. J. Donohue, M. D., Glendive.

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 H. B. Cummins, M. D., vice president, Seward.  
 Porter F. Dodson, M. D., treasurer, Wilber.  
 E. Arthur Carr, M. D., secretary, Lincoln.  
 W. H. Wilson, M. D., State health inspector, Lincoln.

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 O. P. Johnstone, M. D., Reno.  
 S. L. Lee, M. D., secretary, Carson City.

**NEW HAMPSHIRE :***State board of health—*

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 Attorney General E. B. Eastman, Exeter.  
 G. P. Conn, M. D., president, Concord.  
 Charles S. Collins, M. D., Nashua.  
 Robert Fletcher, C. E., Hanover.  
 Irving A. Watson, M. D., secretary, statehouse, Concord.

## NEW HAMPSHIRE—Continued.

*Laboratory of hygiene—*

- Irving A. Watson, M. D., director, Concord.  
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 Waldo L. Adams, B. S., assistant chemist, Concord.  
 H. N. Kingsford, M. D., bacteriologist in charge, Hanover and Concord.  
 Charles Duncan, M. D., bacteriologist, Concord.  
 George S. Graham, M. D., assistant bacteriologist, Hanover.  
 W. S. Purrington, B. S., inspector, Concord.

## NEW JERSEY:

*State board of health—*

- John H. Capstick, president, Boonton.  
 Bruce S. Keator, M. D., secretary, Asbury Park.  
 George P. Alcott, East Orange.  
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 Herbert W. Johnson, Haddonfield.  
 Richard C. Newton, M. D., Montclair.

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 W. E. Kaser, M. D., vice president, Las Vegas.  
 J. A. Massie, M. B., secretary, Santa Fe.  
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 F. F. Doepp, M. D., Carlsbad.  
 J. G. Moir, M. D., Deming.  
 Robert Smart, M. D., Albuquerque.

## NEW YORK:

*State department of health—*

## Division of administration—

- Eugene H. Porter, A. M., M. D., commissioner.  
 William A. Howe, M. D., deputy commissioner.  
 Alec H. Seymour, secretary.

## Division of sanitary engineering—

- Theodore Horton, C. E., chief engineer.  
 H. B. Cleveland, C. E., principal assistant engineer.  
 H. N. Ogden, C. E., special assistant engineer.  
 C. A. Holmquist, C. E., assistant sanitary engineer.  
 A. O. True, inspecting engineer.

## Division of laboratory work—

- William S. Magill, M. D., director State antitoxin and hygienic laboratories.  
 Thomas Ordway, M. D., director Bender Laboratory.  
 H. R. Gaylord, M. D., director Cancer Laboratory.  
 L. M. Wachter, chief sanitary chemist.  
 W. A. Bing, assistant bacteriologist.

## Division of vital statistics—

- F. D. Beagle, director.

## Division of communicable diseases—

- William B. May, M. D., director.

## Division of publicity and education—

- Hills Cole, M. D., director.

**NEW YORK—Continued.***State department of health—Continued.**Consulting staff—*

Herbert D. Schenck, M. D., ophthalmologist.  
 Frederic C. Curtis, M. D., dermatologist.  
 Harlan P. Cole, M. D., orthopedist.  
 Walter F. Willcox, Ph. D., statistician.  
 John B. Garrison, M. D., laryngologist.

*Tuberculosis advisory board—*

Edward R. Baldwin, M. D., Saranac Lake.  
 Thomas Darlington, M. D., New York City.  
 Livingston Farrand, M. D., New York City.  
 Homer Folks, Esq., New York City.  
 Alfred Meyer, M. D., New York City.  
 Veranus A. Moore, M. D., Ithaca.  
 John H. Pryor, M. D., Buffalo.  
 William H. Watson, M. D., Utica.  
 John L. Heffron, M. D., Syracuse.

**NORTH CAROLINA :***State board of health—*

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 Richard H. Lewis, M. D., Raleigh.  
 Edward C. Register, M. D., Charlotte.  
 J. E. Ashcraft, M. D., Monroe.  
 David T. Tayloe, M. D., Washington.  
 J. L. Ludlow, C. E., Winston-Salem.  
 W. O. Spencer, M. D., Winston-Salem.  
 Thomas E. Anderson, M. D., Statesville.  
 Charles O'H. Laughinghouse, Greenville.  
 W. S. Rankin, M. D., secretary and treasurer, Raleigh.  
 Warren H. Booker, C. E., assistant to the secretary, Raleigh.

**NORTH DAKOTA :***State board of health—*

Attorney General Andrew Miller, president, Bismarck.  
 C. E. Bennett, M. D., vice president, Aneta.  
 J. Grassick, M. D., secretary, Grand Forks.

**OHIO :***State board of health—*

William T. Miller, M. D., president, Cleveland.  
 Frank Warner, M. D., vice president, Columbus.  
 Oscar Hasencamp, M. D., Toledo.  
 Josiah Hartzell, Ph. D., Canton.  
 R. H. Grube, M. D., Xenia.  
 John W. Hill, C. E., Cincinnati.  
 H. T. Sutton, M. D., Zanesville.  
 C. O. Probst, M. D., secretary and executive officer.

**OKLAHOMA :***State public health department—*

J. C. Mahr, M. D., State commissioner of health, Oklahoma City.  
 Prof. Edwin DeBarr, chemist, director public health laboratories.  
 Dr. Gayfree Ellison, bacteriologist.  
 R. H. Riley, chief clerk.  
 H. W. Russell, statistical clerk.

## OKLAHOMA—Continued.

*State public health department—Continued.*

- U. S. Russell, assistant pure food and drug commissioner.
- A. J. Emery, sanitary inspector.
- L. D. Allen, sanitary inspector.
- H. O. Tener, pure food inspector.
- W. G. Short, drug inspector.
- Caswell Bennett, pure food inspector.

## OREGON :

*State board of health—*

- Andrew C. Smith, M. D., president, Portland.
- C. J. Smith, M. D., vice president, Pendleton.
- Alfred Kinney, M. D., Astoria.
- E. A. Pierce, M. D., Portland.
- W. B. Morse, M. D., Salem.
- E. B. Pickel, M. D., Medford.
- Calvin S. White, M. D., secretary and State health officer, Portland.
- Emile F. Pernot, M. S., State bacteriologist, Portland.
- W. H. Lytle, State veterinarian, Pendleton.

## PENNSYLVANIA :

*State department of health—*

- Samuel G. Dixon, M. D., LL. D., commissioner of health, Harrisburg.
- Benjamin Lee, M. D., assistant to commissioner, Harrisburg.
- Wilbur Morse, secretary, Harrisburg.
- B. Franklin Royer, M. D., chief medical inspector, Harrisburg.
- Charles J. Hunt, M. D., associate chief medical inspector, Harrisburg.
- Wilmer R. Batt, M. D., registrar of vital statistics, Harrisburg.
- Fred C. Johnson, M. D., medical director, Pennsylvania South Mountain Sanatorium for Tuberculosis, Mont Alto.
- Thos. H. A. Stites, M. D., medical inspector of dispensaries, Harrisburg.
- John A. Bouse, M. D., special medical inspector on organization of local boards of health, Harrisburg.
- F. Herbert Snow, chief engineer, Harrisburg.
- Henry W. Peirson, chief of the division of distribution of biological products, Harrisburg.
- Herbert Fox, M. D., chief of the department of health laboratories, University of Pennsylvania, Philadelphia.

*Advisory board—*

- Adolph Koenig, M. D., Pittsburgh.
- Lee Masterson, C. E., Johnstown.
- Charles B. Penrose, M. D., Philadelphia.
- B. H. Warren, M. D., West Chester.
- George W. Guthrie, M. D., Wilkes-Barre.

## PORTO RICO :

Dr. E. Lippitt, director of sanitation.

(By a law passed in 1911 the sanitary service of Porto Rico was reorganized. It has been impossible to this date to secure a complete list of members of the board of health.)

## RHODE ISLAND :

*State board of health—*

- Alexander B. Briggs, M. D., president, Ashaway.
- Samuel M. Gray, C. E., Providence.
- Rev. George L. Locke, Bristol.



## RHODE ISLAND—Continued.

*State board of health*—Continued.

Rufus E. Darrah, M. D., Newport.  
 Gardner T. Swarts, M. D., secretary, Providence.  
 James O'Hare, Ph. C., Providence.  
 John H. Bennett, M. D., Pawtucket.  
 R. Morton Smith, M. D., Riverpoint.

## SOUTH CAROLINA:

*State board of health*—

Robert Wilson, jr., M. D., chairman, Charleston.  
 H. T. Hall, M. D., Aiken.  
 C. C. Gambrell, M. D., Abbeville.  
 E. A. Hines, M. D., Seneca.  
 W. J. Burdell, M. D., Lugoff.  
 William Egleston, M. D., Hartsville.  
 W. M. Lester, M. D., Columbia.  
 Comptroller General A. W. Jones, Columbia.  
 Attorney General J. Fraser Lyon, Columbia.  
 Dr. W. W. Dodson, pharmaceutical member, Laurens.  
 James A. Hayne, M. D., secretary and state health officer, Columbia.

## SOUTH DAKOTA:

*State board of health*—

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 W. L. Vercoe, M. D., vice president, Lead.  
 O. N. Hoyt, M. D., superintendent and secretary, Pierre.  
 R. T. Dott, M. D., Salem.  
 P. B. Jenkins, M. D., Waubay.

## TENNESSEE:

*State board of health*—

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 Louis Leroy, M. D., vice president, Memphis.  
 R. E. Fort, M. D., Nashville.  
 Hon. John Thompson, Nashville.  
 J. A. Albright, secretary and executive officer, Nashville.  
 John S. Hamel, assistant to the secretary, Nashville.  
 Olin West, M. D., assistant secretary for the eradication of hookworm disease.  
 William Litterer, M. D., State bacteriologist, Nashville.  
 Lucius P. Brown, pure food and drugs inspector, Nashville.

## TEXAS:

*State board of health*—

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 B. F. Calhoun, M. D., Beaumont.  
 Hugh McLaurin, M. D., Dallas.  
 K. H. Beall, M. D., Fort Worth.  
 B. M. Worsham, M. D., El Paso.  
 A. W. Fly, M. D., Galveston.  
 S. M. Lister, M. D., Houston.  
 R. P. Babcock, secretary, Austin.

## UTAH:

*State board of health*—

F. S. Bascom, M. D., president, Salt Lake City.  
 W. R. Calderwood, M. D., Salt Lake City.  
 D. O. Miner, M. D., Nephi.

## UTAH—Continued.

*State board of health—Continued.*

- Fred Stauffer, M. D., Salt Lake City.  
 A. F. Doremus, C. E., Salt Lake City.  
 T. B. Beatty, M. D., secretary, Salt Lake City.  
 H. K. Merrill, M. D., Logan.

## VERMONT:

*State board of health—*

- C. S. Caverly, M. D., president, Rutland.  
 H. D. Holton, M. D., secretary, Brattleboro.  
 F. Thomas Kidder, M. D., treasurer, Woodstock.

## VIRGINIA:

*State department of health—*

(Office and laboratories, 1110 Capitol Street, Richmond.)

- Ennon G. Williams, M. D., health commissioner.  
 Allen W. Freeman, M. D., assistant commissioner.  
 Meade Ferguson, Ph. D., bacteriologist.  
 Richard Messer, C. E., sanitary engineer.  
 Roy K. Flannagan, M. D., director of inspections.

*Board of health—*

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 W. M. Smith, M. D., secretary.  
 S. W. Hobson, first congressional district, Newport News.  
 L. T. Royster, M. D., second congressional district, Norfolk.  
 J. B. Fisher, M. D., third congressional district, Midlothian.  
 O. C. Wright, M. D., fourth congressional district, Jarratts.  
 Lewis E. Harvie, M. D., fifth congressional district, Danville.  
 R. W. Martin, M. D., sixth congressional district, Lynchburg.  
 T. C. Firebaugh, M. D., seventh congressional district, Harrisonburg.  
 W. M. Smith, M. D., eighth congressional district, Alexandria.  
 J. H. Dunkley, M. D., ninth congressional district, Saltville.  
 Reid White, M. D., tenth congressional district, Lexington.  
 George Ben Johnston, M. D., city of Richmond.  
 Stuart McGuire, M. D., city of Richmond.

## WASHINGTON:

*State board of health—*

- Edwin L. Kimball, M. D., president, Spokane.  
 Wilson Johnston, M. D., Spokane.  
 Elmer E. Heg, M. D., secretary and State commissioner of health,  
 Seattle.  
 James R. Yocom, M. D., Tacoma.  
 S. B. Nelson, D. V. S., Spokane.  
 P. Frank, M. D., North Yakima.  
 Eugene R. Kelley, assistant State commissioner of health.  
 Edward P. Flick, State bacteriologist.  
 Myrtle V. Goodman, assistant State registrar.

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*State board of health—*

- C. W. Halterman, M. D., Clarksburg.  
 C. A. Wingerter, M. D., Wheeling.  
 L. S. Brock, M. D., Morgantown.  
 W. W. Golden, M. D., Elkins.  
 M. V. Godbey, M. D., Charleston.  
 J. E. Robins, M. D., Charleston.

**WEST VIRGINIA—Continued.***State board of health—Continued.*

A. N. Frame, M. D., Parkersburg.

H. M. Rymer, M. D., Harrisville.

R. E. Vickers, M. D., president, Huntington.

H. A. Barbee, M. D., secretary and executive officer, Point Pleasant.

**WISCONSIN:***State board of health—*

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C. H. Sutherland, M. D., Janesville.

E. S. Hayes, M. D., Eau Clair.

L. E. Spencer, M. D., Wausau.

Hasso A. Mellike, M. D., Clintonville.

C. A. Harper, M. D., secretary and executive officer, Madison.

Lawrence P. Mayer, M. D., Hudson.

**WYOMING:***State board of health—*

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A. W. Barber, M. D., secretary and executive officer, Cheyenne.

D. E. Brown, M. D., Diamondville.



TREASURY DEPARTMENT  
Public Health and Marine-Hospital Service of the United States

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PUBLIC HEALTH BULLETIN No. 47

SEPTEMBER, 1911

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# STUDIES UPON LEPROSY

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XIV. THE ARTIFICIAL CULTIVATION OF THE BACILLUS  
OF LEPROSY

XV. ATTEMPTS AT SPECIFIC THERAPY IN LEPROSY

BY

DONALD H. CURRIE

PASSED ASSISTANT SURGEON AND DIRECTOR LEPROSY INVESTIGATION STATION

MOSES T. CLEGG

ASSISTANT DIRECTOR LEPROSY INVESTIGATION STATION

AND

HARRY T. HOLLMANN

ACTING ASSISTANT SURGEON LEPROSY INVESTIGATION STATION

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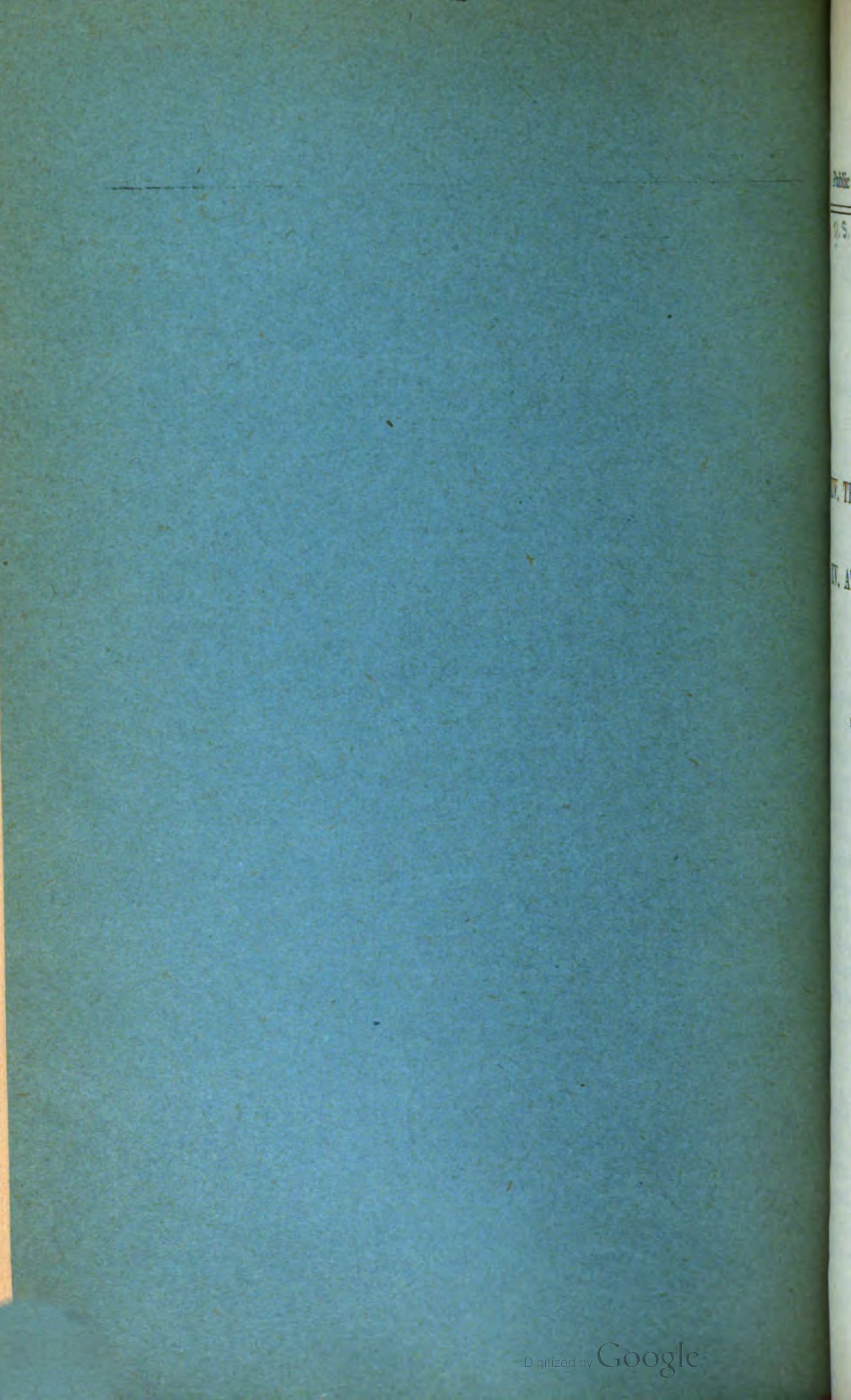
Investigations made in accordance with  
the Act of Congress approved  
March 3, 1905



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GOVERNMENT PRINTING OFFICE  
1912

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**TREASURY DEPARTMENT**

**Public Health and Marine-Hospital Service of the United States**

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*U. S. Public Health Service.*

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**AND**

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**ACTING ASSISTANT SURGEON LEPROSY INVESTIGATION STATION**

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**Investigations made in accordance with  
the Act of Congress approved  
March 3, 1905**



**WASHINGTON  
GOVERNMENT PRINTING OFFICE**

**1912**



# CULTIVATION OF THE BACILLUS OF LEPROSY.

---

By DONALD H. CURRIE,

*Passed Assistant Surgeon and Director Leprosy Investigation Station;*

MOSES T. CLEGG,

*Assistant Director Leprosy Investigation Station;*

and

H. T. HOLLMANN,

*Acting Assistant Surgeon Leprosy Investigation Station.*

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## INTRODUCTION.

The greatest obstacle that has been met with in the past investigations of leprosy has been our inability to artificially propagate the bacillus, either on culture media or in laboratory animals.

Without this knowledge studies in specific therapy were at least difficult, if not quite impossible; and studies in transmission were limited chiefly to clinical observations, or to the mere recording of the findings of lepra bacilli in certain tissues or discharges of lepers, or insects or objects that had come into contact with lepers. If the results which we record here are confirmed by others and become generally accepted, there should result a renewed interest in this disease in both leprous and nonleprous countries, and such interest may possibly result in the acquisition of knowledge that will be of use in the control of this disease.

## REVIEW OF LITERATURE.

Bacterial rods were first described as being present in a leproma by Hansen (1) in 1868 and 1873, and by Vandeycke Carter (1); these observations were soon afterwards confirmed by Klebs (1), Auspitz (1), Danielsen (1), and Neisser (1). From that time up to the present numerous attempts have been made, as the below-given literature will indicate, to cultivate this organism on artificial media; but up to 1909, when Clegg (52) was successful in repeatedly growing acid-fast bacilli, morphologically identical with the organism found in



leproma, in symbiosis with cholera and amœba, it is doubtful whether any success had been met with in the artificial cultivation of this organism, and certainly no one has been able to carry cultures on for several generations.

The following brief review of the literature on this subject is, however, of interest as showing the difficulties met with in the attempts to cultivate this organism and by showing the futility of attempting to grow this bacillus on ordinary media, and thus prepared the way for its final successful cultivation.

Neisser (2), 1886, attempted to cultivate the bacillus on gelatin-blood serum and cooked egg. He thought that slow multiplication occurred on these media, but his experiments were not productive of any practical results.

Bordoni-Uffreduzzi (3), 1887, first reviews the work of previous investigators in their attempts to cultivate the bacillus of leprosy, quoting Fraenkel as stating that heretofore no success had been met with in growing this bacillus on artificial media, and also stating that Fluegge (*Die Mikroorganismen, usw.*, 1886, 2. Aufl., p. 221), Hansen (*Virchow's Archive*, 1882, vol. 90, p. 542), Neisser (2), and Crookshank (*Manual pratique de bacteriologie, Trad. par Bergeaud, Brussels*, 1886) had been entirely unsuccessful in their attempts at growing this organism outside of the body.

Bordoni-Uffreduzzi then goes on to describe his own cultural attempts. He uses as media bouillon, gelatin, agar-agar, and coagulated blood serum, as well as spinal marrow, on peptone-glycerin serum; on the latter media he secured a growth of what he thought was the lepra bacillus.

The same author (4), 1887, describes the organism which he grew from leprous material on spinal marrow media, and his description seems to indicate that the bacterium is one of the nonacid-fast diphtheroid group.

The same author (5), 1888, replies to certain criticisms of Baumgarten regarding his organism, and attempts to uphold his claim of having cultivated the bacillus of leprosy.

Baumgarten (7), 1888, sums up, in a manner unfavorable to the claims of Bordoni-Uffreduzzi, the controversy over the bacillus grown by that investigator.

Beavan Rake (8), 1888, employed the serum of lepers either as a fluid or solidified with agar or gelatin. On these media he grew a number of organisms, but none of them were acid fast.

Gianturco (9), 1889, employed glycerin agar and cultivated what appeared to be a similar organism to that isolated by Bordoni-Uffreduzzi, and he believes his bacillus to be identical with Bordoni-Uffreduzzi's organism.

Bordoni-Uffreduzzi (10), 1889, agrees with Gianturco that they have isolated identical organisms.

Campana (11), 1889, describes 500 attempts which he made to grow the bacillus of leprosy on artificial media, all of which, however, resulted in failure, and from this experience he doubts the claim made by other investigators that this bacillus could be grown on certain artificial media.

Beavan Rake's (12), 1891, work is reviewed in an editorial of the *Lancet*, 1891, and the statement made that all of this investigator's attempts have proven negative.

Holst (13), 1891, believed that failure to cultivate the bacillus of leprosy was due to the organisms in old lepromata being dead. He therefore chose only new nodules in his work, thus hoping to secure live bacilli; his attempts at artificial cultivation were, however, entirely negative.

Campana (14), 1891, isolated an anaerobic, nonacid-fast bacillus from a leproma and believed this organism to be the bacillus of leprosy.

Kanthack and Barclay (15), 1891, employed bouillon and glycerin agar for media and were successful in growing an acid-fast organism from a leproma. This peculiarity of acid fastness appeared to be variable, however, as after growing for some time on artificial media it became almost nonacid fast, and still later regained its acid fastness. These investigators were at first inclined to consider this organism to be *B. lepræ*, but in a subsequent communication they withdrew this claim.

Campana (16), 1891, describes further culture peculiarities of the bacillus which he isolated.

Ducrey (17), 1892, isolated a bacillus, probably identical to Campana's bacillus, from a leproma, and found that, like Campana's organism, it was very little, if at all, acid fast.

At the "Leprosy Discussion" (18), 1892, the organism isolated by Campana was discussed.

Campana (19), 1892, again discusses the method he employed in the cultivation of an anaerobic nonacid-fast bacillus from a leproma.

Wolters (20), 1893, reviews some of the cultural attempts made to date and judges all previously reported successes to be either doubtful or negative. He himself thinks that he once secured, while working in Doutrelepont's clinic, a single *B. lepræ* colony on glycerin agar.

A commission composed of Beavan Rake, Buckmaster, and Thompson (21), 1893, report attempting to grow *B. lepræ* on various media, but that they only succeeded in growing a liquefying, nonacid-fast bacillus.

Campana (22), 1894, describes the morphology of the bacillus which he isolated (previously referred to). The media he employed was agar, mixed with bouillon, peptone, and glucose. The organism grows anaerobically and is neither alcohol nor acid fast.

Levy (24), 1898, succeeded in growing an organism on glycerin agar from the blood of a leper. This organism is nonacid fast, or very slightly acid fast. With this rather important exception, it resembled "the bacillus of bovine tuberculosis," or possibly a streptothrix.

The same author (25), 1898, again refers to the organism which he grew from a leper. He considers that it is a streptothrix and probably identical to Czaplewski's organism. He considers this organism of only academic interest, and not *B. lepræ*.

Czaplewski (26), 1898, grew from the nasal secretion of a leper an organism which he believes belongs to the "Sklerothrixgruppe." This organism retains its acid fastness in cultures. He denies the claim of Levy that this organism is identical with Levy's and therefore a streptothrix.

Spronck (28), 1898, succeeded in growing a bacillus from a leproma, using glycerin-potato as media. This organism, from his description, appears to be a member of the pseudo-diphtheria group.

Levy (29), 1899, again writes on the organism which he isolated from a leper, and still believes it to be a streptothrix. He mentions Babes, Spronck, and Czaplewski as having grown the same organism as himself, while, on the other hand, Bordoni-Uffreduzzi's, Gianturco's, and Campana's publications deal, in his opinion, with a different organism.

Teich (31), 1899, claims to have grown an acid-fast, pleomorphic organism from five cases of leprosy. He used potato agar as a media.

Bordoni-Uffreduzzi (32), 1899, reviews what he considers his successful attempt to grow the bacillus of leprosy, and states that Gianturco, Spronck, Czaplewski, and Barannikow all later grew the same organism, and all regarded it as an acid-fast bacillus.

Babes (33), 1899, refers to a previous article (*Zeitschrift fuer Hygiene*, 1889, February, p. 173) and to Czaplewski's description (*Centralblatt für Bakteriologie*, etc., *Originale*, No. 13, 1898), also to the work of Cornil and Babes in 1890. In his present article Babes gives a full description of an organism which he previously isolated, and which he believes belongs to the pseudo-diphtheria group. In his cultures he occasionally observed branching forms. He has succeeded in isolating this organism from the nodules of 12 lepers.

Barannikow (34), 1899, grew a bacillus from a leproma, which resembles the organism of Babes, Bordoni-Uffreduzzi, and others; that is to say is a member of the pseudo-diphtheria group.

Carrasquilla (34a), 1899, grew what he believed to be lepra bacilli on coagulated human serum. The organism was motile and aerobic.

Kedrowski (35), 1900, used placenta for media, and succeeded in growing four different varieties of streptothrix, all of which were more or less completely acid-fast.

Scholtz and Klingmüller (36), 1900, reported complete failure to grow the bacillus of leprosy, and express the opinion that no one else had succeeded up to that time.

Puschtiwoi (37), 1902, used potato as media, and by this means succeeded in isolating a bacillus from a leper. No description of this bacterium is given in the abstract of this article in "Lepra Bibliotheca Internationalis," and his original article is inaccessible to us.

Van Houtum (38 and 38a), 1902, attempted to cultivate the bacillus of leprosy on various media, and states that he found that by starting his cultures on fish bouillon, containing a small portion of beef bouillon, the organism multiplied. From the abstract (Lepra Bibliotheca Internationalis, vol. 5; the original article is inaccessible to us) it appears that he then transferred this bouillon culture to glycerin-glucose-agar slants, on which latter media the organism he was dealing with grew well. The bacillus he isolated was nonacid-fast and liquefied gelatin.

Kedrowski (39), 1902, has grown a number of branching forms of either streptothrix or other higher forms from leprous nodules. He employed as a media an extract of placenta which, after sterilization by filtration, was added to agar.

Barannikow (40), 1902, grew a nonacid-fast bacterium from a leproma and believed it to be *B. lepræ*.

Zenoni (41), 1902, claims to have cultivated a nonacid-fast bacillus from the skin lesions of a leper. This bacterium caused the death of white mice in from 2 to 13 days.

Levy (42), 1902, claims that after growing on garden beets for one generation his organism will grow on glycerin bouillon, and on this latter media it resembles the bacillus of diphtheria.

Gjubert (43), 1903, employed, as media, calf's brain emulsion in agar, and reports what he believed to be a successful attempt to cultivate *B. lepræ*.

Zenoni (45), 1904, states that the "best" artificial media for the cultivation of the lepra bacillus is the serum of lepers, inactivated at 55° C. By employing this media he succeeded in growing a nonacid-fast organism, apparently belonging to the pseudo-diphtheria group. He inoculated white rats with this organism and caused lesions which, in his opinion, resemble human lepromata.

Rost (46), 1904, prepared numerous salt-free media, and on these believes he succeeded in growing *B. lepræ*.

Rost (47), 1905, reiterates his claim that lepra bacilli will grow on salt-free media, the growth appearing in bouillon, freed from sodium chloride, from three to five days after inoculation with leprous material. He uses his cultures to obtain an extract for therapeutic purposes.

Editorial, *Lancet* (48), 1905, refers to Semple's work disproving Rost's claim to have grown the bacillus of leprosy.

Weil (49), 1906, employed several media, among which were glycerin-glucose agar, containing noncoagulated, human pleuritic serum; glucose peptone agar, containing noncoagulated, human pleuritic serum; live hen's egg, etc. On several of these media, but especially on the hen's egg, this investigator thought he was successful in securing a growth of the bacillus of leprosy for one generation. The growth was stated to begin on the fifth day, proceed up to the twenty-fifth day, after which no further development occurred. The colonies produced were of a light-yellowish color. Weil did not succeed in transferring these colonies beyond the first generation.

Campana (51), 1909, describes again the bacillus which he grew from a leper, under anaerobic conditions, on glucose media.

Clegg (52), 1909, grew amœba and *S. cholerae* in symbiosis on plain agar and weakly nutrient agar. The amœba which he employed were obtained from several sources (animals' intestinal tracts and pond water). To these two symbiants, when growing well together, leprous material was added. A few days after this addition morphological changes were seen to occur in the lepra bacilli, the long slim rods noted in tissues became beaded, and from the deeply stained portions of these beaded bacilli short, plump rods developed. By further multiplication chains longer than the original clumps, composed of many short bacilli, were noted in the culture media. After this morphological change had occurred, multiplication continued. At the end of a week or 10 days transfers were made to plain agar tubes, and this process of transfer continued until he secured multiplying subcultures 10 or more generations removed from the original inoculation. These later generation tubes contained many more acid-fast bacilli than the original tube, showing that multiplication had occurred. At the time this first paper was written Clegg had not isolated the acid-fast organism in pure culture.

Clegg (53), 1909, since writing the last article, continued his experiments on the artificial cultivation of the leprosy bacillus in symbiosis with *S. cholerae* and amœba, and at the time of writing this article had succeeded in growing acid-fast bacilli seven times from as many cases of leprosy. All of these seven cultures were grown in symbiosis with amœba and cholera. The cultures were secured from as unlike sources as the skin nodules of a living leper and the splenic pulp of a dead leper.

At the time of publishing this paper he had succeeded in two instances (cultures from two cases of leprosy) in isolating this acid-fast organism in pure culture. He gives a full description of the cultural peculiarities of this acid-fast rod, as well as its morphology, and a description of several probably unsuccessful attempts to produce leprosy in laboratory animals.

He closes this article with the following summary:

1. The leprosy bacillus was first cultivated from leprosy material in symbiosis with other unidentified bacteria and amœba, and later from other cases in symbiosis with amœba and the cholera vibriion.

2. By heating a symbiotic culture of amœba, cholera, and leprosy for half an hour at 60° C. and incubating, the leprosy bacillus was obtained in pure culture.

3. The leprosy bacillus, isolated in this manner, grows readily on the ordinary laboratory culture media.

4. The bacillus is pathogenic for guinea pigs, subcutaneous inoculations having caused lesions, which macroscopically and microscopically resemble the leprosy lesions of the human subjects.

Currie, Brinckerhoff, and Hollmann (54), 1910, working in Hawaii, undertook to either confirm or disprove the work that Clegg had done in the Philippine Islands.

After several failures in the preliminary attempts, these three investigators finally succeeded in growing acid-fast bacilli four times (from three cases of leprosy) in symbiosis with *S. cholerae* and amœba. Of the two symbionts employed the cholera spirillum was obtained from the Hygienic Laboratory in Washington, and the amœba were isolated from guinea pigs' intestines in Hawaii, so it can be seen that there was no connection between symbionts used by Clegg and those used by Currie, Brinckerhoff, and Hollmann, and therefore there existed no common source of possible error.

Currie, Brinckerhoff, and Hollmann (54), after growing these four "strains" of acid-fast bacilli in symbiosis for a number of generations, had succeeded, at the time that this article was published, in isolating one "strain" of acid-fast bacilli in pure culture,<sup>1</sup> and this pure culture was identical in its several peculiarities to the bacilli described by Clegg in Manila.

Duval (55), 1910, working in New Orleans, La., with entirely different "strains" of *S. cholerae* and amœba, as well as with different patients, succeeded in cultivating, by the method of Clegg, acid-fast bacilli from lepra nodules and isolated some of these bacilli in pure culture.

Twort (56), 1910, employed Dorsett's egg media, which he inoculated with leprosy material. To this material he added killed ground-

<sup>1</sup> It may be stated here that the organism just mentioned that was isolated in pure culture by these investigators was designated "B" and will be referred to later in this bulletin under that designation.

up tubercle bacilli, and after considerable time secured a thin, colorless growth, which he believes to be a culture of *B. lepræ*.

Duval and Gurd (57), 1911, refer to Duval's work in confirming the investigations of Clegg. They then state that while amœba and *S. cholerae symbiosis*, plus leprous material, results in the growth of lepra bacilli, the same result can also be obtained by transplanting leprous material (without either the addition of cholera or amœba) into a media containing tryptophan, cystein, etc., and they claim to have grown acid-fast bacilli by this means from the nasal discharges of lepers. They then describe the morphological differences between new and old cultures of their bacilli.

Duval (58), 1911, again describes the cultivation of the bacillus of leprosy by the method of Clegg, and speaks further on his claim that amœba and *S. cholerae* can be dispensed with, and the organism of leprosy grown by adding amino acids to the culture media.

Williams (59), 1911, used ordinary broth and also Rost's media, and succeeded in growing five apparently different organisms from as many cases of leprosy. One of these was an acid-fast bacillus, one a nonacid-fast streptothrix, another an acid-fast streptothrix, and still another a nonacid-fast diphtheroid, etc.

This investigator considers that his work tends to confirm the work of Rost, Deycke, and Clegg, i. e., that all of these investigators have, by different methods, isolated the same organism, which latter is very pleomorphic. He seems, however, to base this opinion on very little data other than that the organisms in question were all grown from lepromata and that local nodules were produced in animals by the inoculation of some of these cultures.

#### TECHNIQUE.

The authors of this article have nothing to add to the technique to be employed in the artificial cultivation of the bacillus of leprosy, beyond that described first by Clegg (52) and repeated by Currie, Brinckerhoff, and Hollmann (54), except possibly to emphasize the great importance of having absolutely pure *S. cholerae* and amœba cultures before the leprous tissue is added; as well as the employment of control experiments to show that no acid-fast or nonacid-fast rod exists in the leprous tissue (that is capable of growing on ordinary media) before the two symbiotic organisms have been added to it. Accidental contamination of symbiants or leprous tissue with saprophytic, acid-fast organisms would probably not often occur: nevertheless such a possibility exists, and therefore the precautions indicated should be invariably taken by investigators carrying on this line of work.

We might mention also, in way of encouragement to others, that after every condition that we are familiar with has been complied

with it is still the exception to obtain a culture of *B. lepræ*; but of many tubes inoculated only a small percentage show multiplication of the acid-fast organisms, and even of this small percentage many cultures die out before they reach the third generation. The reason for this fact can not be given, but it is hardly strange that such should occur, when we know that similar failures often result in attempts to cultivate the bacillus of tuberculosis, even when conditions appear to favor such cultivation.

**PRESENT STATUS OF THE ARTIFICIAL CULTIVATION AND STUDY OF B. LEPRÆ AT THE UNITED STATES LEPROSY-INVESTIGATION STATION, HAWAII.**

Up to the present time the authors of this bulletin (including the independent work of Clegg in Manila, the independent work of Currie, Brinckerhoff, and Hollmann in Hawaii, and the joint work of Currie, Clegg, and Hollmann in Hawaii) have succeeded in growing acid-fast bacilli in symbiosis with cholera and amœba at least 16 times from 15 cases of leprosy, and have succeeded in isolating such acid-fast bacilli in pure culture 7 times.

The following is the designation and source of the seven "strains" of pure culture of acid-fast bacilli that we are now carrying on at the laboratory in Honolulu:

"F," grown and isolated in pure culture by Clegg in Manila and described in his previous article. (53.)

"G," grown and isolated in pure culture by Clegg in Manila and described in his previous article. (53.)

"B," grown and isolated in pure culture by Currie, Brinckerhoff, and Hollmann in Hawaii and mentioned in their previous article (54) as having been isolated in pure culture.

"A," grown and isolated in pure culture by Currie, Brinckerhoff, and Hollmann in Hawaii and mentioned in their previous article (54) as at that time still growing in symbiosis with the *S. cholerae* and amœba.

"E," grown and isolated in pure culture by Currie, Brinckerhoff, and Hollmann in Hawaii.

"H," grown by Currie, Brinckerhoff, and Hollmann and mentioned in their previous article (54) as at that time still growing in symbiosis with the *S. cholerae* and amœba, and later isolated in pure culture by Currie, Clegg, and Hollmann, working jointly in Hawaii.

"18," grown and isolated in pure culture by Currie, Clegg, and Hollmann, working jointly in Hawaii.

Of the above organisms, "18" has been isolated too recently for us to be able to describe fully its cultural peculiarities, but so far appears to be identical with other "strains."

The following is a description of our several organisms, and for comparative purposes we have also described the well-known *B.*



*margarin*, *B. smegmæ* and Moellers grass bacillus (all of them obtained from Harvard Medical School).

DESCRIPTION OF THE CULTURAL PECULIARITIES OF OUR ORGANISMS OTHER THAN "18."

The following is a description of the *B. lepræ* "strains" (except "18"). These organisms resemble each other so closely that it is impossible to tell one culture tube from the other, and we have therefore, for the sake of brevity, made one description apply to all.

*Culture on ordinary bouillon*.—In young cultures a fine flocculent growth, adhering to the sides of the tube, from which attachments it sends out stalactites. No clouding of the fluid; no pellicle formation. On shaking the tube, a thick, tenacious sediment arises from the bottom. In very young cultures the appearance in bouillon is quite similar to a *B. pestis* or Streptococcus culture. Old cultures differ from the above description in having a heavy wrinkled surface growth, which in time becomes of a golden yellow color.

*Glycerin bouillon*.—The same as ordinary bouillon, except that the organism grows more rapidly and more luxuriantly in this media than in the last named.

*Glycerin agar*.—Growth on this media varies in color from a canary yellow to a deep orange, the latter shades being more commonly met with, but slight shades of color variations, independent of any apparent cause, are commonly noted.

The growth extends slightly beyond the track of the needle stroke, and varies from a slimy to a granular appearance. Surface may be smooth and shining, or rough and nodular, but never truly wrinkled, as is noted in some of this group. Edges of the culture are raised, smooth, sharply defined. Growth is always moist, but this varies somewhat with reaction of the media. On media just neutral, cultures are apt to be drier and more granular, while on fully alkaline media the growth is more moist, even to the point of being slimy.

*Plain agar*.—Growth much thinner on this media than on that containing glycerin and other nutrient media. Spreads little beyond the track of the needle stroke (this depends, however, somewhat on the moisture of the media). Except that it is less luxuriant, the culture is of the same appearance as that noted on glycerin agar.

*Ordinary nutrient agar*.—Growth heavier than on plain agar, but not as heavy as on glycerin agar, of light yellow to reddish yellow (orange) color, confined to the track of the needle stroke. Surface usually smooth, but sometimes nodular from the heaping up of colonies.

*Dorsett's egg media*.—Growth invariably of a deep orange shade of yellow, none of these "strains" showing the lighter shades of yellow

on this media. Growth is confined to the path of the needle stroke, or spreads very little beyond it; very dry, "mealy," granular in appearance, showing neither wrinkling nor glistening of surface. Borders clearly defined, slightly raised above the level of the media. No liquefaction of media at the end of a month's growth.

*Potato (neutral in reaction).*—Growth confined to the path of the needle stroke, of a deep orange-yellow color, dry, "mealy" in character, surface rough from the coalescence of numerous small colonies, but without any tendency to show wrinkling.

*Dunham's peptone.*—Fluid clear and devoid of growth of any character, except at the bottom, where a yellowish sediment occurs, which sends up flocculent threads which float in media. At the time these notes were taken, no pellicle<sup>1</sup> had formed on the media.

*Glucose broth (in fermentation tubes).*—A heavy, slightly wrinkled yellow pellicle covers the surface of the fluid and adheres to the sides of the glass in the aerobic portion of the tube. No growth in the anaerobic portion of the tube. No gas is produced.

*Lactose, mannite, and saccharose broth in fermentation tubes.*—Identical in appearance to glucose-broth culture.

*Blood serum (Loeffler's).*—Organism spreads considerably beyond track of the needle stroke, probably due to the moisture of the media; color of a light orange yellow, shading into canary yellow at the edges of the culture. Surface moist, smooth, glistening; growth slimy and tenacious. In our experience at this station blood serum is not liquefied by this organism, even at the end of a month's growth.

*Nutrient gelatin (stab culture).*—A heaped-up growth occurs on surface surrounding point of inoculation, very slight growth along the path of the needle stab, lightness of growth in depths of media as compared to surface, apparently being due to the air-loving propensities of the bacillus, as growth becomes progressively lighter as it proceeds down the needle stroke. No liquefaction of the media occurs.

*Serum tests.*—Medium-sized horse immunized for three months with repeated injections of live cultures of "strains" "B," "F," "G," and "H." After several weeks serum of this animal was collected in the usual manner and employed in various dilutions with the following results:

In any dilution below 1:1000 marked clumping occurs with all the acid-fast organisms that we have isolated.

In any dilution below 1:500 very strong clumping of the above-mentioned organisms occurs.

<sup>1</sup>This is a question of age and chance. If the loopful of bacilli used to inoculate the media sinks to the bottom, in time stalactites come up from the bottom and eventually reach the surface, and from these pellicles are formed; if, on the other hand, care is employed (or better, a drop of sterile oil is used to float the inoculation) to float the loopful of bacilli used to inoculate the tube, a pellicle forms in a few days on the surface of the fluid. This is true in all fluid media employed.

The serum of this horse is not in the least bacteriolytic, or even capable of altering the morphology, in any strength solution, of our organisms.

In the few experiments made this serum, in a dilution of 1:40 prevented the bacilli "B," "F," "G," and "H" from growing after exposure for a short time, while cholera spirilla grew readily when mixed with these organisms as controls and after being subjected to the same action of the serum. This test must be repeated, but our data up to the present appear to indicate that the serum in question, in 1 to 40 dilution, is bacteriocidal for these four "strains" of *B. lepræ*.

#### DESCRIPTION OF OTHER ACID-FAST ORGANISMS.

(For purpose of comparison to the lepra cultures just described.)

##### 1. GRASS BACILLUS OF MOELLER.

*Ordinary broth.*—A thin pellicle of lightish yellow color covers the surface of the fluid and adheres to the glass. There is a fine flocculent precipitate at bottom of the tube, adhering to the sides of the tube. The fluid is perfectly clear.

*Glucose broth.*—Same as ordinary broth, except that the growth is somewhat heavier.

*Glycerin broth.*—Growth spreads far beyond the path of the needle stroke, in fact almost to the border of the media. Almost white in color, with a slight yellow tint; surface smooth, glistening, moderately moist, border sharply defined but irregular in contour.

*Plain agar.*—Growth extends beyond the track of the needle stroke, of light yellow color, thin, transparent, with sharply defined irregular borders, surface smooth, moist, and glistening.

*Nutrient agar.*—Growth extends beyond the track of the needle stroke, to the limits of the media; white in color or of a slight yellow tinge; borders sharply defined but irregular in outline. Surface granular in appearance, moderately moist, without any tendency to wrinkle.

*Dorsett's egg media.*—Growth spreads far beyond the path of the needle stroke and is of a deep orange color; borders slightly raised, sharply defined, but irregular in outline. Surface dry and without luster.

*Potato (neutral in reaction).*—Growth spreads to limit of media, very slightly raised above the surface of the media, of a drab-gray color; dry, granular, and "mealy" in appearance, shows no tendency to wrinkle.

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<sup>1</sup> Moeller has isolated several "strains" of grass bacilli. In passing through many hands the identification of this one has been lost. Our culture was procured from Harvard Medical School.

*Dunham's peptone*.—Media perfectly clear, the only growth present being a slight amount of flocculent precipitate at the bottom of the tube.

*Glucose broth in fermentation tube*.—Heavy white pellicle adherent to glass. The organism, unlike *B. lepræ*, grows for a short distance into the anaerobic portion of the tube; no gas has been formed.

*Lactose, mannite, and saccharose broth in fermentation tubes*.—Growth identical in appearance to that in glucose broth.

*Blood serum*.—Growth extends considerably beyond the path of the needle stroke, is of a light yellow color, with sharp, well defined but irregularly shaped borders. The growth is moist, surface glistening, and shows no wrinkling. No liquefaction of the media occurs.

## II. BACILLUS MARGARIN.

*Ordinary broth*.—A heavy, yellowish sediment at the bottom of tube, with a fine flocculent precipitate adherent to sides of tube. The media remains clear. (This organism, when the culture is several weeks old, often shows a pellicle. The cultures we are describing, like in case of *B. lepræ*, are too young to show a pellicle formation).

*Glycerin broth*.—Same as ordinary broth, except that the growth is heavier.

*Potato (neutral in reaction)*.—Growth rather scant, confined to the track of the needle stroke, very slightly raised above the level of the surrounding media, of a light, golden-yellow color, moist, glistening and smooth surface, without any tendency to wrinkle.

*Dunham's peptone*.—White flocculent precipitate at the bottom of tube; fine flocculi adhere to sides of tube, media clear, no pellicle formation.

*Glucose broth in fermentation tube*.—Flocculent cloud occupying the whole aerobic portion and extending a very slight way into the anaerobic portion of tube. No gas formation is shown.

*Lactose, mannite, and saccharose broth in fermentation tubes*.—Identical in appearance to glucose-broth cultures.

*Blood serum (coagulated)*.—Growth spreading a considerable distance beyond the path of the needle stroke, of a light yellowish color, with sharply defined but irregular borders. Surface moist, glistening, and smooth. No liquification of media.

*Glycerin agar*.—Growth confined to the path of the needle stroke, of light canary-yellow color, with clearly defined but irregular borders. Surface smooth, glistening, moist; in places surface shows slight tendency to wrinkle. With the exception of this last peculiarity, this agar culture could not be told from the cultures of *B. lepræ*, which we have.

*Plain agar*.—Shows a thin, semitransparent, light-yellowish growth, having well-defined borders and a smooth, glistening surface.

*Ordinary nutrient agar.*—Growth of light-yellow color which spreads somewhat beyond the path of the needle stroke. Growth shows well defined, irregularly shaped borders, slightly raised above the general level of the media. Surface smooth, glistening, and moist in appearance.

*Dorsett's egg media.*—Growth spreads considerably beyond the path of the needle stroke, smooth in places, slightly granular in others, depending on the amount of moisture present in the media.

### III. B. SMEGMÆ.

*Ordinary broth.*—Light precipitate at bottom of tube. Heavy white pellicle completely covers the surface of the tube and adheres to side of glass. From this surface numerous thread-like particles hang down into the media or are attached to the sides of the tube, resembling a spider's web in appearance. No clouding of the media.

*Glycerin broth.*—Same as last media, except that the growth is heavier.

*Glycerin agar.*—The whole surface of media covered with a thin, whitish growth, showing slight wrinkling. Borders are not sharply defined. Surface of growth nonglistening and dry in appearance.

*Plain agar.*—Light-yellow growth covers the whole surface of media, borders poorly defined, irregular in outline, surface dry, nonglistening in appearance. Growth is closely adherent to the media, above the level of which it is only slightly raised.

*Nutrient agar.*—Growth is identical in appearance to that noted on plain agar, except that it is somewhat heavier.

*Dorsett's egg media.*—Growth of a bright, golden-yellow color, spreading over whole surface of media. Surface of growth is dry, smooth, nonglistening, and shows no tendency to wrinkle.

*Potato.*—The growth has spread beyond the path of the needle stroke. In the younger portion of the growth it is of a light-creamy, yellow color; in the older portion of a golden-yellow color. Growth composed of numerous, largely raised colonies which, by coalescing, give the surface an irregular appearance. Borders not very well defined. No wrinkling of surface, which is dull and lusterless.

*Dunham's peptone.*—The only growth that has occurred in this media shows as a light flocculent precipitate at the bottom of the tube.

*Glucose broth in fermentation tubes.*—A heavy yellowish pellicle covers the surface of the media. Beneath this is a thick, tenacious precipitate, confined to the aerobic portion of the tube. No gas is produced.

*Lactose, mannite, and saccharose broth in fermentation tubes.*—Identical with glucose broth.

*Blood serum.*—Growth spreads to border of media, of yellowish color, with sharply defined, regular borders. Surface moderately

dry, smooth, nonglistening, without showing tendency to wrinkle. The media is not liquified.

*Serum reactions.*—The serum of the horse, mentioned before as being immunized against “B,” “F,” “G,” and “H” “strains” of *B. lepræ*, does not clump, in any dilution, Moeller’s grass bacillus, *B. margarín* or *B. smegmæ*.

#### SUMMARY.

I. There is no appreciable difference between the individual cultures of the six above-described “strains” of *B. lepræ*.

II. No very marked cultural differences exist in any of the above nine organisms (the six “strains” of *B. lepræ* and three other acid-fast organisms). Slight differences do exist, but it is doubtful whether they are of practical importance as a sure means of distinguishing the organisms one from another, especially as these differences vary from time to time, depending on the media employed, its reaction, its moisture, and other conditions that we do not understand.

III. *B. margarín* especially resembles in its purely cultural peculiarities the cultures we have of *B. lepræ*.

IV. The serum of a horse that has been immunized to four “strains” of the *B. lepræ* strongly clumps all of our organisms, but fails entirely to clump the grass bacillus of Moeller, *B. margarín* and *B. smegmæ*, thus tending to prove that the organisms we have isolated from lepers are different from each of the known acid-fast bacilli tested.

#### CONCLUSIONS.

I. That by the method of Clegg it is frequently possible to grow an acid-fast bacillus morphologically similar to the leprosy bacillus in tissue from the tissues and organs of lepers.

II. That by heating, in the manner indicated by Clegg, a mixture of the cholera and amœba symbiants and the multiplying acid-fast organism it is possible to isolate this acid-fast organism in pure culture.

III. That this acid-fast organism from lepers resembles in cultural peculiarities other members of this group, represented by *B. margarín*, *B. smegmæ*, and the grass bacillus of Moeller, but that serum tests are capable of demonstrating that a difference exists between the organisms we isolated and the three well-known bacilli mentioned.

IV. That up to the present time, the only evidence there is that the acid-fast organism we have isolated is *B. lepræ* is the frequency with which these bacilli can be grown from leprosy tissue, its mor-

phology and acid-fastness, and the fact that it is neither *B. margin*, *B. smegmæ*, or the grass bacillus of Moeller, three common saprophytic acid-fast organisms.

V. That while the above data do not constitute scientific proof that our cultures are *B. lepræ* any more than it has ever been absolutely proven that the acid-fast bacillus found in lepromata is the bacillus of leprosy, nevertheless the latter is no longer doubted, and we feel that the former will soon be, if it is not now, almost as well established.<sup>1</sup>

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<sup>1</sup> In a future publication we hope to include the effects of chemical and physical agents on our organisms.

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# ATTEMPTS AT SPECIFIC THERAPY IN LEPROSY.

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## INTRODUCTION.

Of the many remedies that have been tried for leprosy there exists a group which may be set aside from the remainder and considered as attempts to secure an artificial immunity to this disease in persons already infected with it. For example, as will be seen in the literature to follow, some experimenters have tried tuberculin because of the fact that lepers reacted to this substance, apparently quite similarly to the way in which cases of phthisis reacted to the same substance; as patients with the latter disease were, it was believed, sometimes benefited by this substance, it was natural to suppose that some "group reaction" might be secured in persons infected with this analogous organism and a similar benefit secured in leprosy.

It was also noted that when potassium iodide was given to lepers a similar reaction was produced in them as that caused by tuberculin, and it was thought, therefore, that by stimulating cellular activity in some unknown way it might be possible that this agent set free a certain amount of toxin from the leprosy lesions. If such was the case, it was hoped that this might produce an immunity in the patient. Or, again, as will be seen, several investigators have attempted by the injections of the blood of lepers (or with more understanding of the subject, have injected the juices of the nodules of lepers) into horses, hoping thereby to produce a serum, which would be of benefit to patients suffering from this disease. Still others have by certain means separated the leprosy bacillus contained in the tissues of lepers from the body fluids and cellular agents, and administered these bacilli in the form of a vaccine to cases of leprosy. In doing this they practically but repeated what has been tried with artificial cultures in the therapy of other diseases, and in the

state of knowledge at the time it was used this procedure appeared to be entirely rational; its drawbacks, however, were obvious—the difficulty in getting a sufficient amount of leprosy material and the difficulty in securing a considerable number of washed bacilli from such tissue. Yet up to the time Clegg grew this organism on artificial media it was the only way that a “vaccine therapy” could be tried.

With the successful cultivation of the bacilli of leprosy, it was natural that those persons having cultures of this organism should carry forward the same line of investigation that Koch and others had carried out in tuberculosis.

Whitmore and Clegg, acting on this idea, immediately tried a vaccine (as well as certain extracts prepared from the same bacilli) on a number of lepers in Manila, but their results were negative.

As soon as Currie, Brinckerhoff, and Hollmann, working in this laboratory, had succeeded in confirming Clegg’s cultural work by isolating the bacillus of leprosy, they began most of the experiments which are given in this bulletin, not knowing at that time that Whitmore and Clegg were just completing a similar line of work in Manila. Upon the latter gentleman’s transfer to this station’s force, we learned for the first time of Whitmore and Clegg’s therapeutic experiments and of their failure to produce beneficial effects with vaccines, etc., prepared from their cultures, but as we had carried our experiments on for some weeks at that time we decided to continue them. As will be seen further on in this bulletin, our work along this line has resulted in failure to greatly ameliorate the symptoms of leprosy in our patients, just as the experiments of Whitmore and Clegg resulted in a similar failure.

It will be noted, however, that we have also undertaken a somewhat different line of research in addition to the vaccine and tuberculin-like extract therapy, and we hope to be able to report on this work in a reasonable time. At present, although we give the data covering this latter work as far as we have carried it, we do not consider that we have completed our tests with the serum of a horse, previously immunized or in progress of immunization to our bacilli, nor are we satisfied with the small amount of data we have secured on the effect on patients of small doses of live cultures or of the use of the alcohol-chloroform soluble fatty extract of our bacilli.

## REVIEW OF LITERATURE.

### THE TREATMENT OF LEPROSY WITH TUBERCULIN.

Among the several attempts that have been made at what might be termed specific therapy in leprosy, Koch’s old tuberculin has been employed chiefly during the time when that substance had its first reputation as a beneficial agent in the treatment of tuberculosis.

The resemblance of the bacillus of leprosy and that of tuberculosis naturally directed the attention of investigators at the time mentioned to the use of this substance in leprosy, as the following literature will indicate:

Danielssen (1), 1891, injected tuberculin into 14 lepers in doses of 0.001 to 0.320 grammes. He found that this substance when thus administered, caused both general and local reactions in from 12 to 72 hours after injection. He considered that the ultimate effect of this substance on lepers was to make their condition worse.

Goldschmidt (2), 1891, first experimented on 5 cases and later on 11 cases of leprosy. These patients received regular doses of Koch's old tuberculin. Most of his cases reacted to the substance injected. This author at first felt hopeful as to a final cure of leprosy by the use of this agent, but further experiments showed him that the patients' condition remained stationary or grew worse.

Truhart (3), 1891, administered tuberculin to six lepers. He found that tubercular cases reacted more than mixed or nerve cases did. He noted that leprosy ulcers healed promptly under this treatment.

Babes and Kalindero (4), 1891, urge the greatest caution in the use of tuberculin in lepers. Among their 11 cases that received this substance, they noted twice a severe and prolonged reaction setting in after injection of 0.8 milligrammes of tuberculin. The general effect was so severe as to threaten the life of the patients, while accompanying this there were reactions about the nodules.

Babes and Kalindero (5), 1891, conclude that lepers react to tuberculin in the same manner that tubercular patients do, except that larger doses are required.

Babes (6), 1891, states that in his experience lepers, at least under certain circumstances, react much stronger to tuberculin than tubercular patients do; this is especially true when the patient is young.

Kalindero and Babes (7), 1891, cite some observations made in the treatment of leprosy by tuberculin, and reached the conclusion that after three months' treatment all lepers showed improvement in their local symptoms. This local improvement did not, however, progress to a complete cure.

Editor, *Lancet* (8), 1892, cites the experience of Poupinel de Valence, Danielssen, Loft, Babes and Kalindero, Colcott, Fox, Cheyne, Powell, Morrow, Goldschmidt, Cantlie, Abraham, Crocker, and Hunter, in the use of tuberculin in leprosy. De Valence considered that improvement resulted from its use and recommended its further trial. Others' experiences are not so favorable, however, and a few failed to observe even the febrile reactions reported as following the administration of this substance.

Thin (9), 1893, refers to Danielssen having employed tuberculin in lepers and states that the latter noted the presence of bacilli in the blood of patients after receiving injections of this substance.

Arnaud (10), 1896, treated a leper with tuberculin injections, which caused an apparently dangerous general reaction, accompanied by the softening and disappearance of nodules. Improvement resulted and continued for two years after the administration of the treatment.

See (11), 1902, employed Koch's old tuberculin in lepers and secured general reactions, some of which cases were afterwards necropsied, which examinations showed that these patients did not suffer also from tuberculosis. This answered the objections raised by Arning and Brieger, namely, that lepers reacted to tuberculin because they were also infected with tuberculosis.

Lie (12), 1904, states:

The more I see of the course that leprosy takes, the more I am of the opinion that the effect of tuberculin upon leprosy should be made the subject of renewed experiments, as it seems by no means impossible that favorable results might thereby be obtained.

Lie (13), 1905, is of the opinion that of the numerous remedies, recommended for the treatment of leprosy, tuberculin is one which deserves greater attention and further trials. He considers that small doses offer the greatest hope, and that a careful study of such dosage is important.

Brinckerhoff (14), 1908, employed Moro's "Percutaneous" test on 12 lepers, and secured reactions in 5 of these. Of these 5 positive reactions, 1 is noted as "prompt, marked," while 4 are noted as "delayed, slight." He concludes, in part, as follows:

The fact that lepers react to cutaneous inunction of a tuberculin salve may be taken as additional evidence of the chemical nearness of the product of the lepra and tubercle bacilli, and support the suggestion already made that tuberculin be given another trial in the therapeutics of leprosy.

Slatineano and Danielopolu (15), 1909, state that lepers react to tuberculin only when they are also tuberculous.

Babes (16), 1909, replies to Slatineano and Danielopolu's article, just quoted, and emphasizes his views that lepers react to tuberculin without being tuberculous, and that this reaction runs a different course. He further claims that in his experience the use of small doses of tuberculin, combined with chaulmoogra oil, effected a remarkable improvement in several cases of leprosy.

Campana (17), 1909, injected a leprosy nodule with Koch's old tuberculin and describes certain histological changes that resulted in the nodule referred to.

Nicolle (18), 1909, refers to the well-known fact that lepers react to tuberculin when that substance is injected hypodermically. With

this in view, he used van Piquet's method, as well as Wolff and Calmette's method of administration, but no local reactions were produced.

Slatineano and Danielopolu (19), 1909, state that of 29 lepers that were given Koch's old tuberculin by hypodermic injection, 13 reacted, and of those that did not react, several showed illness after the injection, such as vomiting, headache, accompanied by a drop in temperature to 35° C.

Of 24 lepers, 13 showed positive conjunctivitis when tuberculin was placed in eyes, and these were the same patients that had reacted positively to tuberculin.

We close this review of some of the literature on the use of tuberculin in leprosy, with the statement that this station has employed this agent in the treatment of eight cases of leprosy during a period of several months, without noticing any benefit from the use of this substance. We gave doses of from 0.0001 to 0.00142 milligrams.

#### THE USE OF IODINE PREPARATIONS IN THE TREATMENT OF LEPROSY.

These preparations have long been known to cause both general and local reactions when administered to lepers. The reason for this phenomenon is not understood, but it seems probable that it is in some way connected with the stimulation of cellular activity, bringing about an absorption of bacillary products, and on this hypothesis may fairly be considered as an attempt at specific therapy.

Among the many that have investigated this subject may be mentioned the following persons:

Danielssen (20), 1886, used potassium iodide quite extensively in the treatment of leprosy and as a diagnostic means in that disease.

Arning (21), 1886, speaking of his experiences at the leper settlement at Molokai states that "iodide of potassium failed entirely in my hands."

Fitch (various reports to the president of the board of health of Hawaii, 1882-1884) used potassium iodide in the treatment of leprosy without any notable results.

Neisser (25), 1897, states that of all the known remedies recommended for leprosy, he expects more from iodine than any other, and refers to Danielssen's results with the use of this remedy, and also to the peculiar reaction which lepers show, even after small doses are given them. He mentions eucrophene and iodoform, as well as the potassium salt, and thinks that further experiments of this kind may yet lead to a successful mode of treatment.

Wolff (26), 1897, discusses the effects of potassium iodide in leprosy, mentioning febrile reactions, disappearance of old and reappearance of new nodules. He states that during the fever, caused by



the administration of this drug, lepra bacilli appear in the blood of the patient. He considers that the drug has also diagnostic value.

Lie (27), 1900, reports on the use of "euophene" (an iodine preparation) in the treatment of leprosy. He treated three cases with this agent without favorable results.

Babes (28), 1901, mentions the use of iodine preparations in leprosy and states that the general conditions of the patients apparently improve under its employment.

Leredde and Pautrier (30), 1903, mention the diagnostic value of iodine in leprosy.

Lie (31), 1904, believes that among the remedies recommended for the treatment of leprosy potassium iodide is one that deserves greater attention. He suggests the use of small doses of the drug.

Siebert (32), 1905, discusses the reaction of lepers to iodine preparations and states that this reaction resembles that of tuberculin, only the reaction produced by the former substance is not so constant as that obtained with tuberculin. He states further that the explanation of this reaction is not possible at the present time; nevertheless the possibility of beneficial results from these reactions is such as to make the drug worthy of further trial.

This author treated 12 cases with potassium iodide, and of these 2 showed no reaction to the drug, even in doses of 5 grams a day. The other 10 cases reacted to varying doses; thus one patient reacted to a dose of 0.2 grams, while others required 2 or 3 grams before the reaction resulted, and still others larger doses (3 grams, repeated over a period of several days). He mentions some improvement in one of the cases that received this remedy for one and one-half years.

Diesing (33), 1906, recommends the use of a 30 per cent emulsion of iodoform in olive oil by subcutaneous injection. The same author treated three cases with this mixture, and states that it has been further tried at the leprosarium at Memel, at which latter institution one case receiving this mode of treatment has shown remarkable improvement.

Diesing and Dula (34), 1906, treated lepers with a 20 per cent emulsion of iodoform in olive oil and painted the lepromata with tincture of iodine. They state that favorable action can not be expected from this treatment until it has been employed for a long period of time.

Diesing (35), 1907, again refers to the treatment of leprosy with the subcutaneous injection of iodoform suspended in olive oil and states that in his experience all mild, uncomplicated cases and a large percentage of severe cases were cured by this treatment. In most cases, he states, a month's treatment completes the cure. He cautions, however, that organic diseases of the brain, leukæmia, and cardiac lesions contraindicate the use of this remedy.

Marchoux and Bourret (36), 1909, state that the iodide reaction in lepers is always accompanied by the destruction of a large number of lepra bacilli, which, under the action of this drug, lose their acid fastness.

Sorel (37), 1909, being interested in the report of Marchoux and Bourret on the effect of iodides in leprosy, and reasoning by analogy from a similarity of the two diseases, employed this drug in patients suffering from tuberculosis and found that the downward course and spread of the latter disease was hastened by the use of iodine preparations. He thinks that this may be due to the active phagocytosis.

To the above literature we may add a summary of the experience at this station in the use of iodine preparations on some of our patients. In most instances we found that severe febrile reactions follow the administration of 2 or 3 grams of the potassium salt, and such reactions were accompanied by hyperemia of the leprosy nodules of the skin. There were some exceptions to this, however, for example, in one well-developed and progressive case of nodular leprosy, we failed to produce febrile reactions or any disturbances, even when 6 grams of potassium iodide were given at a single dose; and again, in another case, which reacted strongly to a dose of 2 grams, an apparent immunity to the drug later developed, so that at the end of a few weeks 30 grams daily failed to cause any reaction whatever. In a third case of early nodular leprosy, the patient was placed on rapidly increasing doses, but he experienced no reaction until a daily dose of 33 grams was received.

In a limited way we have tried subcutaneous injections of iodoform emulsion in olive oil, solutions of potassium iodide by mouth, and inhalations of from 15 to 30 minims of ethyl iodide. It is interesting to note that in the two cases in which the last-named substance was tried, severe febrile reactions invariably occurred a few hours after this drug had been inhaled. Our employment of the iodides has not extended over a sufficient length of time to form any opinion as to their value, if any, in the treatment of leprosy.

#### THE TRIAL OF CARRASQUILLA'S SERUM IN THE TREATMENT OF LEPROSY.

Following the success met with in the use of diphtheria antitoxin, it was natural that attempts should be made to obtain a curative serum for other diseases, and the following review shows that leprosy was among the diseases that did not escape such efforts. Viewed from the light of our present-day knowledge, there was nothing in Carrasquilla's serum that could be expected to offer the slightest hope as a curative agent. Nevertheless, the attempts are worthy of recording for their historical value, and possibly also to show the patient consideration that is apt to be accorded to the most shadowy claim of a cure for leprosy.

The following review contains the better known publications on the manufacture, trial, and final rejection of this serum:

Carrasquilla (38), 1896, at a meeting of the Medical National Academy of Colombia, reported on what he claimed to be a complete success in the treatment of 15 lepers by means of a serum which he had prepared. At this meeting Carrasquilla did not describe the method he employed to obtain this serum.

Fournier, Besnier, Roux, and Hallopeau (40), 1897, investigated the claims of Carrasquilla and reported that in their opinion there was no improvement in the patients that received this treatment, and that therefore the claims of Carrasquilla were without foundation.

Carrasquilla (41), 1897, reports on the manufacture of his serum and the results obtained therewith. He draws 250 c. c. of blood from young lepers, allows it to coagulate, and pipettes off the serum. He states that this serum varies from a perfectly clear, odorless fluid through various grades of cloudiness to a greenish fluid with an offensive odor. He further states that this variation in the serum's properties was due to the condition of the patient at the time the bleeding was made, apparently not considering that it might have been due to the amount of bacterial contamination that had accidentally taken place.

At intervals Carrasquilla administered from 50 to 150 c. c. of this serum of lepers to healthy horses, with the result that the animals became ill and often developed abscesses. After the horse had recovered from its illness produced by the injection of the human serum (and possibly its contained bacterial contamination) the animal was bled, its serum collected in the usual manner and given to lepers.

Lepers that received this treatment had, following their injections, a chill, succeeded by a temperature of from 38° to 39° C., occasionally as high as 41° C., and this reaction was followed by recovery of the patient from leprosy.

Buzzi (41), 1897, reports on the results which he has obtained in a 15-year-old boy treated with Carrasquilla's serum. Following the injection there was a local reaction at the site of the needle puncture, accompanied by collapse and chills, lasting over a period of days after the injection. During this illness, apparently produced by the serum, his leprosy lesions showed reddening, swelling, and softening, followed by absorption or discharge.

Ashmead (43), 1897, cites Havelburg, Goldschmidt, Hansen, and Alvarez as being skeptical as to the utility of Carrasquilla's serum. He further quotes Roman and Rojas as believing that this serum might have value.

Barillon (44), 1897 (under the direction of Carrasquilla), manufactured a similar serum and tried it on 5 lepers. He succeeded in producing fever and serious general symptoms in his patients, but they failed to improve in so far as their leprosy was concerned.

Polakowsky (45), 1897, reviews the experiences of those who have employed Carrasquilla's serum.

"Discussion," Lepra Conference, Berlin (47), 1897: At this discussion Alvarez thought he had observed improvement in 2 out of 14 cases that had received Carrasquilla's serum, and Arming claimed to have secured a distinct influence and temporary improvement by using this serum. The other persons that took in this discussion were in accord that this serum was noneffective in the treatment of leprosy.

Carrasquilla (48), 1898, again refers to his treatment and is enthusiastic in its praise.

Atherstone and Black (49), 1898, report on the treatment of 2 cases of leprosy with Carrasquilla's serum, as well as Herman's serum. They state that "considering the improvement which any leper may show spontaneously, and further the psychical effect of such treatment, they are of the opinion that the slight objective change and the improved general condition of the patient furnish no positive proof that this agent is of benefit."

Dehio (51), 1898, reports on the treatment of lepers under his care with Carrasquilla's serum. In his experience, extending over a period of two and one half months, he obtained no results whatever from the use of this substance, and believes that the reactions secured by Carrasquilla were due to "einfache Proteinwirkungen."

Grunfeld (52), 1898, treated 4 lepers with Carrasquilla's serum, and reports as a result of this treatment that the nodules decreased in size, the facial infiltration lessened, and ulcers healed.

Tidswell (54), 1900, treated 2 lepers with this serum with entirely negative results.

Thompson (55), 1900, reviews the reports of others who have tried this serum, and these reports, coupled with his own experience, leads him to believe that there is no evidence of the value of this treatment; and that, further, Carrasquilla "seemed to have been unfamiliar with the common methods and precautions ordinarily employed in the manufacture and use of serum, as well as some of the usual effects of the administration of horse serum to man."

Medina (56), 1910, states that Carrasquilla's serum sometimes induces marked febrile reactions, accompanied by headache, etc., and that cases that thus reacted showed marked and apparently permanent improvement. On the other hand, cases which did not have this febrile reaction after the injections showed no improvement. The author states further that arrangements have been made to continue the use of this substance on a large scale, and that at present 120 patients are receiving this treatment.

Morrow states that Putnam of Colombia (*Twentieth Century Practice of Medicine*, vol. 18, p. 588) used Carrasquilla's serum on 40 cases of leprosy without success.

SERA OTHER THAN CARRASQUILLA'S THAT HAVE BEEN TRIED IN THE  
TREATMENT OF LEPROSY.

Babes (57), 1893, immunized animals with avian tuberculosis and injected the serum from such animals into lepers. As a result of this treatment he noticed increase in weight and general well-being, but no changes in the leprosy lesions.

Abraham and Herman (58), 1897: Following correspondence with Carrasquilla, Herman undertook the manufacture by a method entirely different from that employed by Carrasquilla; that is, he took a leprosy nodule and subjected it to pressure, thereby expressing the fluid contents of the nodules, and it may be presumed he also expressed many lepra bacilli. He then diluted this fluid with normal salt solution and gave it to a horse by hypodermic injections, several cubic centimeters of this serum being given the animal every week or two for a period of four and one-half months. In all, the horse received 10 injections; very slight or no reactions occurred in the animal after these injections. Four weeks following the ninth injection the horse was bled and the serum collected and preserved with thymol. After the tenth injection the animal was again bled and more serum collected.

This serum was then administered by Abraham to 2 cases of leprosy; and on Robben Island it was administered to other cases, but of these, with the possible exception of 1 patient, no favorable results were noted from the use of this substance.

Laverde (59), 1897, secured leprosy nodules and used the tissue fluids of these to inoculate goats and donkeys. These animals were afterwards bled, their sera obtained and administered to patients suffering from leprosy.

The patients receiving this treatment showed febrile reactions, malaise, and other general disturbances. Following these reactions, the author states, marked improvements occurred in the leprosy lesions and a disappearance of anæsthesia was noted. He continued the treatment for periods varying from three months to a year, and continued to produce improvement in his 60 patients up to the time of writing; in fact, he reports that 6 of these 60 patients have been cured.

Babes (60), 1899: In this article Babes refers to the bacillus which he cultivated and at that time believed to be *B. lepræ*. He prepared an extract (similar to the method used by Koch in the preparation of tuberculin) from this organism, which he had isolated from lepers, and administered it to certain patients suffering from leprosy. This treatment caused febrile reactions in the patients. He then attempted to immunize certain animals against this organism and later administered their serum to lepers. He expected to report on the results at some future date.

RATTLESNAKE VENOM IN THE TREATMENT OF LEPROSY.

This unique mode of treatment in leprosy apparently had its origin in the popular belief that exists in certain countries, that lepers that had been bitten by a poisonous snake and recovered from the effects of the bite often also recover from leprosy.

Carreau (61), 1892, refers to a case reported by Dechambre, in which a leper was bitten by a poisonous snake and recovered from both the snake bite and leprosy. Carreau, acting on the supposition that the supposed beneficial effect of snake bite on leprosy was due to hemolysis, administered poisonous doses of potassium chlorate, hoping thereby to produce hemolysis in lepers with somewhat less danger than by means of snake venom.

Marcoudes de Moura (62), 1900, speaks of a superstition that exists among the country people of Brazil, viz, that if a leper is bitten by a rattlesnake and does not die from the effects of the bite he will recover from his leprosy. This investigator attempted to confirm this by artificial administration of rattlesnake venom intravenously, and reports that under the influence of this treatment leprosy nodules and anæsthesia disappear, and suggests that more success might be met with if the venom of the rattlesnake was given mixed with the antivenom serum of Calmette.

Lewin (63), 1900, reports unfavorably on the use of rattlesnake venom in the treatment of leprosy.

Marcoudes de Moura (64), 1902, reports further on the use of rattlesnake venom in the treatment of leprosy, and states that he has used it in 15 patients and has been led by the results he has obtained so far to believe that this treatment offers hopes of a cure for leprosy. He promises to furnish a more complete report at an early date.

Goldschmidt (65), 1902, calls attention to the fact that in 1892 Carreau called attention to the beneficial influence of snake venom in leprosy.

Morrow (66) quotes Laverde as stating that lepers in Colombia purposely allowed snakes, scorpions, centipedes, etc., to bite them, but the only definite information on this subject as to the effects secured was that the experiment often produced fatal results.

THE USE OF ANTIVENENE IN THE TREATMENT OF LEPROSY.

Dyer (67 and 69), 1897 and 1905, after mentioning the different sera that have been applied in the treatment of leprosy by Carrasquilla, Babes, Abraham, and Herman, refers to a publication of Carreau (*Contribution au Traitement de la Lèpre, Jamaica, textbook, 1892*), and further refers to a case reported by Winslow, in which a leper was bitten by a rattlesnake with a fatal result.

Impressed by the article of Carreau, Dyer conceived that a possible benefit might result from the use of Calmette's "antivenene," and therefore placed 5 cases of leprosy on this treatment. Four of these patients, Dyer reports, showed marked improvement, and in 1 case there was a disappearance of the leprosy lesions. He states that it is his purpose to continue these experiments, so satisfactorily begun.

Woodson (68 and 68a), 1899, reviews Dyer's report on the use of antivenene in the treatment of leprosy, and employs the same treatment himself on 1 case of leprosy. This patient is reported to have shown improvement. Woodson doubts, however, that this improvement was due to the serum alone, as the patient also received "Hoang-nan."<sup>1</sup>

#### THE LEPROLIN OF ROST IN THE TREATMENT OF LEPROSY.

In 1905 considerable interest was aroused among leprologists by the claim of Rost to have grown the bacillus of leprosy on salt-free media, and that from these cultures he had produced a substance that bore the same relation to leprosy that tuberculin did to tuberculosis. The following review gives the most important literature on the use of this substance in leprosy:

Rost (70), 1905, claims to have grown the bacillus of leprosy by the use of various kinds of salt-free media. From his cultures he prepared a substance, which he believes to be analogous to Koch's tuberculin in tuberculosis, and administered this to lepers. This treatment, he claims, caused reactions in his patients, followed by an improvement in their conditions.

Rost (71), 1905, reports again on the treatment of leprosy with his tuberculin-like substance, which he terms "leprolin," and states that patients that received his substance have return of perspiration in areas which had lost this function. There is also return of sensation in anæsthetic areas, accompanied by gain of strength, healing of nodules, etc.

Editor, *Lancet* (72), 1905, speaks of the use of leprolin of Rost in the treatment of leprosy, and states that the three patients that have received this treatment in India have been declared practically cured, while other patients similarly treated have shown improvement.

Semple (73), 1905, investigated the claims of Rost and concludes that--

1. Capt. Rost has failed to demonstrate a growth of the leprosy bacillus in his media at Kasauli.
2. The material used to inoculate the media was without doubt taken from leprosy cases and contained leprosy bacilli in large numbers.
3. The leprosy bacillus has not yet been cultivated, and the preparation of leprolin is for the present an impossibility.

<sup>1</sup> *Strychnos gaultheriana*, natural order Loganiaceæ.

4. Defective technique in the preparation of his media and in eliminating subsequent contaminating growths are the probable causes which have given rise to Capt. Rost's mistakes.

De Beurmann and Gougerot (76), 1909, studied the action of leprolin prepared by Rost, and affirm that it produces febrile and general reactions in persons suffering from leprosy, as well as changes in their lesions. On the other hand, healthy persons, they claim, do not react to this substance; they believe that the substance may have diagnostic value.

#### NASTIN IN THE TREATMENT OF LEPROSY.

Deycke-Pascha and Reschad-Bey (or the first author alone), in numerous articles (77, 78, 79, 80, 82, 83, 84), describe their work which led up to the preparation of a substance that they call "nastin," or "nastin-B," and which they employed in the treatment of leprosy.

Stated briefly, these two investigators succeeded, by placing leprosy material in saline solution and incubating this for a long period, in obtaining a growth of an acid-fast organism from a severe case of leprosy. They did not consider that this organism was the bacillus of leprosy, but probably that it was an "atavistic throwback" of that organism. Later, however, they concluded that it was a streptothrix. From this organism they then prepared a killed suspended culture (vaccine) and administered it to the patient from whom they had isolated the organism in question. This patient reacted severely to the injection of this vaccine, and following these reactions there was an improvement in his condition.

Believing that it was probable that the good effect noted in this patient was due to immunization with the acid-fast constituents of this organism, they abandoned the use of the vaccine and turned their attention to the isolation of this acid-fast substance. After many efforts on their part they succeeded, by fractional extraction with ether, in securing a number of chemical products from the organisms that they were dealing with. Some of these they rejected as useless and possibly injurious, and finally isolated pure a fatty substance, which they call "nastin."

Still later in their work they thought that this substance "nastin" would be improved by mixing it with benzoylchloride, and the new product thus formed they called "nastin-benzoyl" or "nastin-B." This latter substance, they claim, can be given to lepers without causing the severe reactions that nastin alone is said to produce. They report that 73 out of 81 cases of leprosy have shown improvement under the administration of nastin-B, but in another article they call attention to the uselessness of treating far advanced cases with this agent.



Thompson (81), 1907, refers to the claims of Deycke-Pascha and Reschad-Bey.

Lenz (85), 1909, obtained no marked improvement in cases treated by him with nastin.

Kupffer (86), 1909, states that he has secured some very good results from the use of nastin alone, and recommends that this agent be employed in conjunction with chaulmoogra oil.

Much (87), 1909, states that patients suffering from tuberculosis react to nastin and, vice versa, lepers react to tuberculin, and also that tubercular patients react to the fatty substance of tubercle bacilli, which he calls "tuberkulonastin."

Rodrigues (88), 1909, treated 23 lepers with nastin and reports favorable results, such as healing of ulcers, loss of anæsthesia, and improvement in general condition, but none of his patients have been completely cured.

Smith and Bisset (89), 1909, treated 6 patients with nastin with such favorable results as the healing of ulcers and the loss of anæsthesia.

Thompson (9), 1909, states that patients that received nastin react both locally and generally, and that these reactions demonstrate the activity of nastin, but of the 2 patients treated by him with this substance 1 grew worse and the other's condition remained stationary.

Teague (91), 1909, treated 4 cases of leprosy with nastin for a period of 9 months without any effect.

Davidson (92), 1909, reports that all of the cases of leprosy that he has treated with nastin have improved under its use.

Peiper (93), 1909, employed nastin in the treatment of 2 lepers with absolutely negative results.

Raschid (94), 1909, reports the improvement of 2 lepers after treatment with nastin.

Williams (95), 1909, publishes a letter that he has received from Deycke, describing the method employed in the manufacture of nastin, together with its use and effects in leprosy. Williams then speaks of his own experience with the substance.

Brinckerhoff and Wayson (96), 1909, employed nastin-B on 6 cases of leprosy, for periods of time varying from 5 to 15 months, without securing any notable results. Their conclusions were as follows:

1. In our hands the administration of nastin to 6 cases of leprosy gave slightly encouraging results in 2 cases. In 1 of these the lesions decreased in extent and took on a focal character. In the other case a tubercle disappeared during the treatment.

2. Four cases seemed unaffected by the treatment, even when persisted in for over a year.

3. Constitutional reactions were only seen when the dosage was large. No local reaction or puriform softening of tubercles was observed.

## LOCAL TREATMENT IN HOPES OF PRODUCING GENERAL SYSTEMIC EFFECTS.

Several investigators have attempted to employ what was obviously only a local treatment of the skin lesions of leprosy, hoping thereby not only to benefit the lesions actually treated, but, by the stimulation of cellular activity in the region of the lesion, to cause an absorption of lepra bacilli or their products, and possibly bring about an active immunity to the infecting organism.

It is impractical to review all the attempts of this character, especially those in which various stimulating ointments have been employed (such as chrysarobin and pyrogallol, used by Unna and others), but the following literature contains the recorded experiences of several authors who have tried what appeared to logically offer the greatest hopes in this direction.

Belot (97), 1904, reviews the work that has been done up to the time of his writing on treatment of leprosy by means of the X and radium rays. He cites the work of Segueira (1901), and states that under this treatment Segueira's patients' symptoms improved, the nodules softening and partially disappearing. He further cites de la Camp as having tried X rays in leprosy without any noticeable results, and Scholtz as reporting the successful treatment of 2 cases of leprosy by this means. He further cites the work of Oudin (98) in the treatment of leprosy by means of radium rays.

Oudin (98), 1904, reports on the treatment of 2 cases of nodular leprosy with radium rays, and claims that these cases improved.

Lie (99), 1905, states that he is inclined to believe that both X rays and Finsen rays exercise a certain influence on the leprosy process.

Lassar, Siegfried, and Urbanowitz (100), 1905, report on the treatment of 9 lepers by means of the X ray, and state that the results have not been the same in all their cases. From their experience they discourage the use of this treatment in advanced cases, but think that it should be tried further in incipient cases of leprosy.

Wilkinson (101), 1905, reports on the treatment of 13 cases of leprosy with X ray, and reports 3 of these cases as cured and 7 improved, while the other 3 cases remained entirely unimproved.

Heiser (102), 1906, reports the recurrence of symptoms in 2 of the 3 cases of leprosy, supposed to have been cured by Wilkinson (vide supra) by means of the X ray.

Black (103), 1906, states that the utility of the X ray in the treatment of leprosy is very doubtful.

Pasini (104 and 105), 1907, reports on a case of nodular leprosy, treated by him with the X ray and Finsen light. The patient has apparently recovered, and, at the time of writing, eight months after his recovery is supposed to have taken place, there had been no return of symptoms.

Matthews (106), 1908, reports on 7 cases of leprosy treated with the X ray, and, from the results he has obtained in these patients, considers this a valuable therapeutic means in handling this disease.

Heiser (107), 1908, reports on a case of leprosy treated by the X ray. At the time this article was written the patient had apparently recovered. (We have been informed since, however, that this patient afterwards suffered a relapse.)

Bulkley (108), 1909, refers to the work of Heiser and Wilkinson on the use of the X ray on lepers in Manila.

#### MISCELLANEOUS VACCINES EMPLOYED IN THE TREATMENT OF LEPROSY.

Campana (109), 1882, inoculated 2 lepers with erysipelas without any beneficial results.

Havelburg (110), 1891, inoculated lepers with cultures of the streptococci of erysipelas; reaction was so severe that inoculation had to be discontinued. He then tried the same method plus antistreptococci serum, but neither of these treatments were beneficial.

Alvarez (111) employed injections of the *Bacillus prodigiosus* alone in lepers without any favorable results.

Chapin (112), 1899, used Coley's toxine (suspended cultures of the streptococcus of erysipelas and the *B. prodigiosus*). The patients were not benefited by this treatment.

Ashmead (113), 1908, writes of the subcutaneous injection of yeast cells as a treatment for leprosy.

#### THE TREATMENT OF LEPROSY BY THE EMPLOYMENT OF INJECTIONS OF SUSPENDED LEPROBACILLI.

Scholtz and Klingmuller (114), 1900, expressed the tissue juice from lepromata and administered this fluid to lepers. Their object was to secure a tuberculinlike substance. It may be presumed, however, that such a fluid would also contain many leproba bacilli in suspension, and this treatment they employed may therefore be considered to have been a leproba vaccine. So far as we know, this is the first attempt of this kind in the treatment of leprosy.

Castellani (115) (date unknown): This author is said to have vaccinated human lepers with emulsions prepared from their own tissues.

Woolley (116), 1907: The original article is inaccessible to us, but it is stated that he proposed the treatment of leprosy by the injection of graded doses of leproba bacilli killed by gentle heating. He obtained his suspensions from ground-up lepromata. He reports the beginning of treatment of 1 case, but was unable to continue the treatment.

Nicholls (117), 1908, prepared a vaccine, as follows: A skin incision was made down to the nodule, which latter was removed, together with a quantity of the surrounding subdermal tissue. This

tissue was placed in a tube of glycerin broth and incubated for a fortnight. The broth and tissue are then placed into a shallow vessel and slowly desiccated. The dried mass was finally powdered in an agate mortar, a suspension made, and the bacilli counted by the usual manner of comparison with blood corpuscles, and killed by heating to 60° C. He believed that during the time of incubation the bacilli multiplied in the tissues.

Nicholls treated a case of leprosy, a patient of Sir Malcolm Morris, with this vaccine, which substance contained 50,000,000 organisms per cubic centimeter. He repeated this injection every 4 days at first, and later every 7 to 10 days. Under this treatment some nodules disappeared and others softened.

Rost (vide supra), in employing what he believed to be cultures of lepra bacilli, must have inoculated many lepra bacilli that had been carried over directly from his leprous tissue into the salt-free media he employed, and therefore his "leprolin," being a more or less concentrated suspension of lepra bacilli, may be considered as an example of a vaccine treatment for leprosy.

Whitmore and Clegg (118), 1910: After the latter had grown the bacillus of leprosy and isolated it in pure culture (Philippine Journal of Science, Vol. IV, pp. 77, 403), he and Whitmore prepared a vaccine as follows: A vaccine was made in the ordinary way and standardized to 500,000 bacteria per cubic centimeter. The bacteria in this vaccine showed a great tendency to form clumps on being allowed to stand without shaking. Injections were given once a week, in doses varying from 0.25 to 1 c. c. of this substance. Any increase above this dose produced a local reaction, preventing the absorption of the bacilli, and later an abscess would form at the site of injection.

They treated 11 cases of leprosy in this manner for eight months and 21 cases for seven months. None of these cases showed any improvement, and the abscess production was a serious obstacle to this treatment.

They then employed a glycerin extract made in a similar manner to that prepared by Koch from the tubercle bacillus. They tested lepers with this material to see if they would give an analogous reaction to Von Piquet's skin reaction in tuberculosis, but their results were negative. They then used this glycerin extract in the treatment of the 32 cases of leprosy that had previously received the vaccine. No reaction followed this latter treatment, and there was no improvement. They then made a preparation by emulsifying their cultures of *B. lepræ* in 1:60 aqueous solution of sodium oleate. The bacteria were almost completely dissolved by this fluid. They employed this soapy solution of the lepra bacilli on the previously mentioned patients. Under this last-mentioned treatment 2 of the patients had

a sharp febrile reaction, accompanied by swelling and redness around the leprosy lesions. There was no local reaction at the site of injection, however. They continued this treatment for two and one-half months, but the patients showed no improvement under its use.

They then took the spleen of a leper (which organ was rich in lepra bacilli), ground up the tissue, added a 1:60 aqueous solution of sodium oleate, filtered it through cotton, and heated it for one hour at 60° C. This latter was given to the above-mentioned cases, but none of the patients so treated showed any improvement.

Williams (118a), 1911, by the use of ordinary broth and Rost's media, grew several organisms from cases of leprosy, no two of which organisms, however, appeared to be similar, varying from an acid-fast diphtheroid to a streptothrixlike form; and in one case an acid-fast bacillus. He considers it at least probable that the organism believed to have been grown by Rost, the streptothrix grown by Deycke, and the acid-fast bacillus grown by Clegg are the same as his organisms, and all of them pleomorphic forms of *B. lepræ*. His reasons for believing the above, however, are far from convincing.

From this organism, or more probably organisms, he has prepared a vaccine and used it on lepers, producing thereby febrile reactions, accompanied, apparently, by some improvement in some cases.

#### SPONTANEOUS CURES.

While all attempts to artificially immunize lepers against this disease have resulted in failure, nevertheless it is apparent that in exceptional cases the body itself is capable of establishing a sufficient degree of natural immunity in individuals once infected with leprosy to bring about what appears to be a spontaneous cure. The literature of leprosy contains many such examples; in fact, it is probable that every leprologist of any considerable experience could recall to mind cases of this kind. Some observers have gone so far as to state that it was doubtful whether a person ever had active leprosy more than 15 years, i. e., if he did not succumb to this disease by that time, that the active progress of the disease ceased, although, of course, the damages that had already occurred remain permanent.

Sufficient for the purpose of illustrating this point are the following references bearing on such spontaneous cures:

Cottle (119), 1889; Crespin (120), 1897; Montgomery-Douglas (121), 1903; Tonkin (122), 1905; Dubreuilh (123), 1905; Dyer (69). 1905; Hutchinson (124), 1905; and Kayser and van Houtom (125). 1905.

#### SUMMARY OF SOME OF THE KNOWLEDGE GAINED FROM THE ABOVE LITERATURE.

In studying the effects of the above-mentioned agents that have been used in the treatment of leprosy, it will be noted that most if

not all of them in the hands of certain observers and in certain cases have caused the patients to experience febrile reactions, followed by softening of old nodules, the reappearance of new nodules, etc. Such effects have often been considered as evidence that the substance administered was specific in its nature, and that the reaction that was obtained was analogous to that obtained in tuberculous patients when given tuberculin.

It appears to us, however, to be extremely doubtful that such conclusions are in the least justifiable, but rather that the mass of evidence we have up to the present indicates that anything that causes disturbances in the metabolism of a leper is often capable of bringing about the febrile and other disturbances mentioned. Similar febrile reactions are noted in lepers, accompanied often by disturbances in old lesions and the reappearance of new lesions, from many causes; not only from the hypodermic injection of the foreign substances, but from as unlike causes as exposure to cold, surgical operation, wounds and injury, pregnancy, etc., all of them causing more or less profound disturbances of metabolism.

For these reasons it seems to us that in treating leprosy and attempting to estimate the value of a remedy errors in judgment are especially liable to occur, and the irregular course of the disease itself further increases this difficulty of determining, after a short trial, the amount of benefit produced by a therapeutic agent.

While on the subject of literature we may mention that we have reviewed many articles bearing on the manufacture and use of various toxines, vaccines, etc., that have been employed in other diseases; but for the sake of brevity, and from the fact that the leading articles on these subjects are usually well known, we have not included these in our list of references. In our work of preparing the extracts of lepra bacilli we have especially followed the work of Koch in the preparation of his tuberculin and the other substances, and have in this connection reviewed, in the original, all of his articles bearing on his work along this line, from the time that he first announced his "old tuberculin" up to the preparation of his "bacillary emulsion." Most of our technique, in the preparation of these extracts, have therefore been but imitations of his work, with such modifications as the difference in the biological peculiarities of our bacilli and the tubercle bacilli seemed to make desirable. Thus, we started by using (like Koch did with the tubercle bacilli) suspended cultures of our organism, but we found, as Koch did with his organism, that such vaccines produced abscesses, or were at least slow of absorption. We then, like he, prepared a glycerin extract by growing our bacilli on glycerin bouillon, concentrating the latter down, and filtering it. Still later we ground our bacilli and centrifugated the mass, throwing down the unbroken, still acid-fast organisms to the bottom of the tube, and

saving the superimposed fluid, analogous to Koch's "T. O.," and by repetition of this process produced the analogue of "T. R." Of this we used very little, however, and next tried the complete grinding up of the bacilli (without separating "T. O." and "T. R." analogues) until no longer acid fast, followed by the collection of this structureless mass and its suspension in saline fluid; this latter corresponded to Koch's "bacillary emulsion," or, as is usually referred to, "B. E."

The use of live cultures and the use of the fatty extract was, of course, a departure from Koch's methods, but was not novel so far as the method is concerned, as live tubercle bacilli have been given to tubercular patients<sup>1</sup> and Deycke has previously used the fatty extract of another acid-fast organism in the treatment of leprosy.

### PRELIMINARY WORK.

Before the cultivation of the bacillus of leprosy by the method of Clegg had been effected at this laboratory one of us (D. H. C.) prepared two substances and employed them on lepers. Neither of these substances proved to be of value, but it is considered advisable to mention them here merely as records in the history of the attempts at specific therapy in this disease.

One of these substances was prepared as follows:

Six flasks were chosen, filled with 500 c. c. of glycerin bouillon and sterilized in the usual manner. One of these flasks was inoculated with *B. smegmæ*, another with one of the acid-fast grass bacilli of Moeller, another with the margarin bacillus, another with the urine bacillus, one with the nasal bacillus of Karlinski, another with an acid-fast bacillus labeled "Lombard's pellagrine" bacillus. These 6 cultures of acid-fast bacilli were allowed to grow for a month at 37° C., when a heavy pellicle formed on the surface of the media. The cultures were then filtered, the pellicle collected and dried. The dried cultures of the 6 organisms were mixed together and ground in an agate mortar until the clumps had been entirely broken up. They were weighed and a 10 per cent suspension made in normal saline solution. These organisms were killed at 70° C. for one hour, and 1 c. c. given intraperitoneally to each of 6 rabbits and 6 guinea pigs. These animals lost weight rapidly and died some six weeks after inoculation. The necropsy on these animals showed a white cheesy

<sup>1</sup> Klemperer ("Experimenteller Beitrag zur Tuberkulose-Frage," Zeitschrift für klinische Medizin, vol. 56, 1905, p. 258) took tuberculous material from cattle (bacillus of bovine tuberculosis), and after passing this through guinea pigs, in hopes of lowering their virulence, administered these live organisms, taken from the guinea pigs, to persons suffering from pulmonary tuberculosis.

Webb, Williams, and Barber (Journal of Medical Research, vol. 20, 1909, p. 1) inoculated 5 tubercular patients with live tubercle bacilli, and these authors quote a verbal communication from Moeller that the latter investigator had inoculated tubercular patients with a culture of human bacilli after the organisms had been modified by passage through a crocodile.

mass in the peritoneal cavity at the site of inoculation. This mass was filled with acid-fast bacilli. As would be expected, the bacilli being dead, there had been no spread of the lesions beyond the site of the inoculation. It was therefore presumed that the animals died of a slow toxemia from the gradual breaking down and absorption of the bacillary bodies. Smaller doses ( $\frac{1}{4}$  c. c.) were then given to other laboratory animals of the same species. They became greatly emaciated, but after several months' illness they all recovered.

After these preliminary experiments on animals this suspended, killed, mixed culture was given to 2 cases of nodular leprosy in doses of 1 to 2 minims by subcutaneous injection after diluting with normal saline solution. This treatment was continued over a period of nearly four months.

The injection of this material into the patients caused no local or general disturbances other than a slight redness at the site of injection, which, however, soon disappeared.

Two or three weeks after the beginning of treatment one of the patients had many of his nodules (which had not previously shown any tendency to soften) soften in the center and discharge, leaving round, punched-out, "craterlike" ulcers, surrounded by a rim of firm leprosy tissue. At the beginning of treatment it was estimated that there were something over 300 small nodules present over this patient's body, varying in size from that of a pea to half an inch in diameter. At the end of three months' treatment about one-half of these nodules had broken down in the manner described. The patient's weight and general health remained unchanged throughout the treatment. Up to the time of discharge most of the ulcers mentioned remained unchanged, i. e., showed no tendency to granulate over, but a few of them had healed over. During the last two or three weeks this patient was under observation no further breaking down of the nodules occurred. For administrative reasons this patient, together with several others, had to be discharged at this time, so could not be treated any further.

The other patient that received this treatment began to experience the same breaking down of the nodules on their centers that the first-mentioned patient had shown, but in the case of the second patient, after 12 or 15 nodules had thus broken down into ulcers, the phenomenon ceased, and from that time up to the time of his discharge (four months from the beginning of the treatment) there were no changes in either his general condition or his lesions.

It was our intention to continue this form of treatment on other patients, but about this time the work which led to the isolation of *B. lepræ* by Clegg's method changed our plans, and all of our energies were devoted to studying the effect of our newly acquired *B. lepræ* cultures and their products in the treatment of our patients.



The other substance which we referred to was prepared as follows: The six acid-fast organisms above mentioned were grown in the same manner as that described under the preparation of the vaccine just referred to. After being thoroughly dried these organisms were extracted, first with hot alcohol, then with equal parts of alcohol and ether, then with pure ether. These extracts were filtered to remove all suspended matter. The alcohol, ether-alcohol, and ether extracts were then mixed together and evaporated to dryness. The resulting substance was a waxlike material of an orange-yellow color. This was again dissolved in ether and alcohol added to this solution (which partially precipitated it), and to this ether-alcohol partial solution, partial suspension, was added an equal bulk of sterile water. This caused the substance that had been dissolved by the ether to further precipitate in a fine, flocculent mass, which, however, could be shaken to a uniform emulsion. The ether was then evaporated off until only a trace of it remained, and this alcohol-watery suspension, containing a trace of ether (which latter substance is found, even if present in small quantities, to be of assistance in keeping the emulsion from separating), was given to two cases of nodular leprosy. These patients received large injections of this substance for a period of four months without experiencing either general or local reactions; nor was there the slightest improvement in their condition.

## **PRODUCTS OF OUR CULTURES OF B. LEPRÆ THAT WE HAVE PREPARED AND USED IN THE TREATMENT OF LEPROSY.**

### **I. VACCINE.**

We chose young cultures from four to six "strains" (i. e., isolated from as many cases of leprosy) of our organisms that had been grown upon glycerin-agar, rendered just alkaline to phenolphthalein (on a less alkaline media than this the organism appears to be more difficult to emulsify perfectly, tending to remain in small clumps). These cultures were rubbed in normal saline solution and heated to 70° C. for one hour and control cultures taken, which showed the organisms to be dead. As soon as the control cultures were taken one-half per cent phenol was added to the suspension of killed bacilli. We then standardized the organisms in comparison with red blood corpuscles. Later we standardized by comparison with suspensions of known strength vaccines. These vaccines were always freshly prepared at intervals of one or two weeks, as we feared that either the phenol or the action of light might have some deleterious effect on the bacilli. The strength of the vaccine we prepared varied, depending upon our needs; we found that a suspension of 500,000,000 bacilli was a convenient form of stock vaccine, which could be easily diluted to meet the requirements of the case.

In all our subsequent references in this article in which we employ the word "vaccine" the above suspension is meant.

## II. LIVE CULTURES OF *B. lepræ*.

We chose a very young culture of the organism which had been grown on glycerin agar. We usually employed the organism we have designated as "H" (isolated from a Hawaiian case of leprosy) for this purpose, but at times we employed three or four "strains" of our organisms, some of them isolated in Hawaii and some of them in the Philippine Islands. In the preparation of these live culture suspensions we took a definite quantity of normal saline solution and added to it a definite number of loopfuls of our cultures. By manipulation this was made into a perfectly homogeneous suspension of the bacilli. We administered 1 c. c. of these preparations at a dose.

## III. LEPRATOXINE.

We prepared 2 per cent glycerin bouillon, sterilized it under pressure and rendered it alkaline to phenolphthalein, and inoculated it from the cultures of our organisms, each flask being inoculated from a single "strain." These flasks were kept at incubator temperature from one to three months. From time to time we gently shook the contents of the flask, so as to cause the surface growth to sink to the bottom and thus make room for the formation of a new pellicle. At the end of the time indicated a very heavy growth of the bacilli was present, forming a sediment half an inch or more in thickness on the bottom of an ordinary 1,000 c. c. Koch's flask that contained 500 c. c. of media. In the early part of our work we were undecided as to the best method of killing and extracting these organisms; we at first used only a little more than the minimum amount of heat necessary to kill them, namely, 65° to 70° C. for one hour, thinking possibly that more intense or prolonged exposure to heat might destroy some toxic substance in the organism. With increasing experience, however, it appeared to us that the most marked effects were obtained from the use of extracts prepared by bringing the bouillon culture to a boil and allowing it to remain at this temperature for one or two hours. Still later we found that by subjecting the cultures to 60° C. for three to four days, followed by boiling for one hour, we obtained what appeared to be the most potent extract we had thus far secured, and after reaching this conclusion we experimented no further along this line, but continued this mode of preparation of the extract.

After thus killing and partially extracting the organisms we placed the fluid at from 60° to 76° "vacuum" and evaporated it down until the extract was 50 per cent glycerin, or about one twenty-

fifth of its original bulk. This we then diluted with several times its volume of sterile distilled water, and filtered it through porcelain. After this it was returned to the vacuum and again evaporated down to 50 per cent glycerin. The resulting fluid was dark brown in color, due in part to the beef extract and peptone contained originally in the bouillon; but, besides this, it was evident that a distinctly yellowish shade of color had been imparted to the fluid from the bacilli themselves, as could be shown by diluting a portion of it to the original bulk and comparing it to the bouillon before extraction. The filtered product had a peculiar odor, similar to but more pronounced than that of the culture itself before extraction, and suggesting the odor of beeswax. This substance was employed during most of our experiments under the name of "lepratoxine," although in the latter part of our work, when the glycerin contained in the extract was interfering with the progressive increase of our doses, we endeavored to further strengthen this extract, without increasing its glycerin contents, by grinding (like Koch did in the preparation of his T. O. and T. R. and later in his preparation of B. E.) the bodies of the bacilli in an agate mortar, without the addition of glass or other foreign substances. We found that this grinding process, if sufficient labor and patience was exercised, was completely successful in reducing the bacilli to a nonacid-fast granular mass. We added one-half per cent by weight of this ground material (dry) to the "lepratoxine" just described.

Inasmuch, however, as we could note very little difference in the effect produced by the filtered toxine and the filtered toxine reenforced by the ground extract, we have not separated these two substances in our description of the employment of the "lepratoxine" on our patients. If there was any difference between these two extracts, it was that the extract containing the ground-up organisms showed a greater tendency to produce local irritation at the site of injection.

By means of grinding and centrifuging repeatedly (after the method of Koch), we also prepared what corresponds to Koch's T. O. and T. R.; but inasmuch as the "lepratoxine" that had been reenforced with the ground bacilli contained all the elements that are met with in T. O. and T. R., we did not systematically employ the latter substances alone on our patient, chiefly because we were limited as to the number of patients that we could secure for treatment, so were forced to limit the number of modes of treatment.

#### IV. FATTY SUBSTANCES OF THE *B. lepræ* CULTURES.

After some preliminary experiments with various fat solvents, such as alcohol, alcohol and ether, ether, chloroform, chloroform and alcohol, xylol, sodium hydroxide, solution of soap in alcohol, and solution

of sodium hydroxide in absolute alcohol, we reached the conclusion that the greatest amount of yellowish-colored fatlike material could be extracted from our bacilli when a mixture of chloroform and alcohol was employed. No systematic attempt was made to identify this fatlike substance, or (what is more probable) mixture of fatty substances, except that we were able to show that a certain percentage of this material extracted with chloroform and alcohol was soluble in acetone and a certain percentage was insoluble in acetone. It was noted that bacilli that had been extracted with chloroform and alcohol lost some but not all of their acid-fastness. On the other hand the bacilli, after this treatment, seemed to be separated one from another and no longer occurred in bundles, and it was thought from this that possibly some fatty material that acted as a binding substance in holding together zooglœic masses had been extracted by this mixture—more than the fatty material within the body of the bacillus, that gives the latter its acid-fastness..

This fatty extract, when filtered and evaporated down to a solid mass, was of an orange-yellow color, could be stained with Ziehl-Nielsen carbol-fuchsin, and held that stain against treatment by acid.

Considerable difficulty was experienced in getting this fatty material in a suspension capable of being used as an injection, and in doing this, for fear of causing emboli, we avoided employing any of the heavy oils as our vehicle. We found, however, that if this bacterial fat was freed from its chloroform and alcohol and ether added to it a *partial* solution of the substance occurred. To this ether solution a quantity of alcohol was added, the mixture shaken, and a quantity of water added. This made a fairly perfect suspension, which was not usually broken by the subsequent evaporating off of a large part of the ether. The final product, consisting of a menstruum of water and alcohol, containing a trace of ether, suspending the bacterial fat.

As will be seen from the above, this substance was prepared somewhat similar to Deycke's "nastin," but it presented, of course, decided differences, not only being from an entirely different organism, but in our experience ether was not a satisfactory extracting agent for *B. lepræ*, although it proved to be with Deycke's *Streptothrix leproides*. Nor did we, on account of the dangers just mentioned, care to imitate Deycke by using a heavy oil as our menstruum.

#### V. "SENSITIZED" KILLED CULTURES OF *B. Lepræ*.

We chose a large young *Macacus rhesus* monkey, and inoculated him heavily with the cultures of several of our "strains" of our *B. lepræ*. One month later we extracted 1 c. c. of the animal's heart blood during life by puncturing that organ with a hypodermic needle. We diluted this blood with equal volume of water and added the

mixture to one agar-slant culture of our organism (strain "H"). Instead of forming a suspension, as would have occurred had saline solution or water alone been used, this mixture of monkey blood and water, soon after its transfer to a test tube, caused clumping of the whole suspension of bacilli. To this test tube we added as "complement" 1 c. c. of guinea pig's blood and incubated the mixture for several hours. At the end of this time we found that the clumping still continued, but that no morphological changes had occurred in the individual bacilli. We then diluted freely with a definite quantity of saline solution and placed the mixture in the ice chest. After 48 hours the clumping action had ceased, and the bacilli could easily be shaken up into a perfectly homogeneous emulsion. We then heated this mixture to 60° C. for one hour to kill the lepra bacilli and to inactivate the animal's blood sera. In order to preserve this mixture, we added 1 per cent phenol and kept the flasks and their contents in the ice chest.

VI. SERUM OF A HORSE, WHICH ANIMAL HAD BEEN MORE OR LESS COMPLETELY IMMUNIZED AGAINST STRAINS B, F, G, AND H OF OUR CULTURES OF *B. lepræ*.

We chose a horse, weighing about 1,000 pounds, and injected, at short intervals, live cultures of our several strains of acid-fast bacilli, suspended in normal saline solution. The injections were given into the jugular vein by means of an ordinary large hypodermic syringe and every precaution taken against contamination of the material. We began with relatively small doses of our cultures, but increased the dose with each administration, until finally we gave 18 to 20 agar cultures of the bacilli at a dose. After these injections the animal became quite ill, and its temperature rose as high as 40° C. None of the injections, however, caused abscesses, possibly due to the fact that they were given directly into the general circulation.

After several months' treatment of this kind we bled the animal and found that its blood serum clumped *all* our cultures of *B. lepræ* in a dilution of 1:1000 and strongly clumped them in a dilution of 1 to 500. On the other hand, as a control, neither *B. margin*, *B. smegmæ*, or the grass bacillus of Moeller was in any way affected by the action of the serum, not the slightest clumping occurring even when we used 1 part of serum to 50 parts of salt solution.

This clumping was not accompanied by *bacteriolytic* action, nor was such action brought about by supplying normal guinea pig serum to the mixture (on the possibility that it would serve as complement). The *bactericidal* properties of the serum have not at the present writing been thoroughly worked out, but the following experiment was tried:

A quantity of serum of a dilution of 1 to 40 was added to a mixture of cholera and leprosy bacilli (which mixture was growing well

together up to the time of treatment with serum); after exposure to the serum the *S. cholerae* grew readily, while *B. leprae* failed to show any growth when planted on glycerin agar.

It is only fair to state here that we did not consider it at all probable that this horse had been immunized long enough to possibly produce a curative serum, but when we secured this evidence of agglutinin production we felt justified in temporarily discontinuing the injection of the animal in order that we might obtain a quantity of its serum and employ it on our patients. After obtaining a quantity of this animal's serum for our purposes we again resumed our attempts to immunize it, and are still carrying on these injections of our horse in hopes of obtaining a more potent serum.

#### **ANIMAL EXPERIMENTS WITH THE ABOVE-MENTIONED SUBSTANCES.**

We injected ordinary laboratory animals with all of the above-mentioned substances in order to first ascertain whether they were free from pathogenic extraneous organisms, and also to note any physiological effect that these substances might produce. A number of animals were used in these tests, but for sake of brevity we will summarize the effects noted with each substance employed.

The vaccine caused the same local effect on rabbits, guinea pigs, and rats, namely, an area of coagulation necrosis at the site of injection, followed either by absorption or abscess formation, depending on the dose and strength of the vaccine given. There was no general effect appreciable.

The live cultures usually caused nodules at the site of injection, accompanied by about the same pathological changes as were noted when the killed cultures (vaccine) were given. It was thought that the animals receiving the live cultures showed more evidence of a general effect than when the vaccine was employed, but this was only in a general way, and most of the animals appeared unaffected by the injection. One guinea pig died, apparently as a result of placing a loopful of live cultures, recently isolated from a leper, under the animal's skin, and some of the other animals were made ill.

The "lepratoxine" that did not contain ground bacilli caused neither local nor general effects in the animals inoculated with it. The "lepratoxine" which contained ground bacilli produced a slight local reaction at the site of injection, but in the few experiments tried it did not cause abscesses, as the unground vaccine had.

The fatty extract, obtained by the use of chloroform and alcohol, when given in large doses, caused an abscess to form at the site of inoculation, without any appreciable general disturbances.

The "sensitized" killed cultures of the lepra bacilli caused neither general nor local effects, even when injected into the peritoneal cavity.

This absence of local effects may have been due to the fact that the suspension contained a much fewer number of organisms per cubic centimeter than our "vaccine" did.

The horse's serum was without any appreciable effect on the animals that received it.

#### **THE USE OF THESE SUBSTANCES ON THE PATIENTS UNDER OUR CARE.**

Owing to the fact that the number of our patients was limited, we had in most instances to employ one of the above substances for a time, and then, after abandoning its use, employ another one of our substances on the same patient. As none of the substances employed, however, have apparently been of much if any benefit to the patients receiving it, we do not consider this to be a serious flaw in the data that we have to present. Inasmuch, however, as a single patient received more than one substance, it will be convenient to give a history in tabular form of each of the patients treated, and in this table to include the data on the use of the substances which we are discussing.

Patient.	Sex.	Age.	Type of disease.	Duration.	Nature of product used.	Dose.	Number of injections.	Duration of treatment.	Local reaction.	General reaction.	Remarks.
16	Female.	18	Nodular leprosy.	1 year...	Vaccine.....	Initial, 20,000,000, increasing to 250,000,000.	7	35 days..	Following 3d, 4th, and 5th injection. Abscess following 6th and 7th injection.	Following the 5th injection.	Erythematous induration on the face almost entirely absorbed. Macular eruptions disappeared from the trunk. Many nodules on the extremities were absorbed, leaving pigmented areas. Lesions in the nose became healed.
17	Male.	18	Nodular leprosy.	1 year...	Lepratoxine.	Initial, 0.04 c. c., increasing to 2 c. c.	23	121 days.	Following the 12th, 13th, 17th, 19th, 22d, and 23d injections.	Following the 17th, 21st, 22d and 23d injections.	Hyperemia increased on buttocks, ulceration of the septum healed. Acid-fast bacilli disappeared from the nose.
18	Male.	18	Nodular leprosy.	3 years..	Vaccine..... Lepratoxine.	Initial, 2,500,000, increasing to 250,000,000. Initial, 0.06 c. c., increasing to 2 c. c.	24	121 days.	Abscess following the 6th, 7th, 8th, and 9th. All caused local reactions except 4th, 5th, 7th, 9th, and 10th; 20th and 21st causing abscess.	Following the 17th, 18th, 21st, 22d, 23d, and 24th.	There is less infiltration of the skin of the face, and the nodules are softer.
19	Male.	16	Macular leprosy.	2 1/2 years.	Live culture vaccine. Vaccine..... Live culture vaccine.	6,000,000, 10,000,000, and 20,000,000. Initial, 5,000,000 to 375,000,000. 250,000.....	3	62 days..	Following the 6th, 7th (abscess), 8th (abscess), and 9th (abscess) injections. Following the 12th (abscess), 13th (abscess), 14th, 15th, 16th, and 17th (abscess) injections.	Following the first injection.	No improvement.



Patient.	Sex.	Age.	Type of disease.	Duration.	Nature of product used.	Dose.	Number of injections.	Duration of treatment.	Local reaction.	General reaction.	Remarks.
					Lepratoxine.	Initial, 0.04 c. c. to 2 c. c.	25	103 days.	Following the 4th, 5th, 7th, 14th (abscess), 17th, 18th, 20th (abscess), 22d (abscess), 24th, and 25th injections.	Following the 5th, 12th, 10th, 18th, 23d, and 24th injections.	
20	Female..	12	Nodular leprosy.	4 years..	Lepratoxine.	Initial, 0.01 c. c. to 2 c. c.	16	251 days.	Following the 2d, 3d (abscess), 4th, 8th, 11th, 12th (abscess), 13th (abscess), and 15th injections.	Following the 4th, 5th, 7th, 8th, remittent temperature for 55 days, with an eruption, in successive crops, of papules and nodules, 9th, 10th, 14th, and 15th injections.	A considerable decrease in the infiltration of the face and the ears.
21	Female..	27	Nodular leprosy.	3 years..	Lepratoxine.	Initial, 0.02 c. c., increasing to 5 c. c.	16	253 days.	Following the 3d, 4th, 9th, 11th, and 12th (abscess), 13th, 15th, and 16th injections.	Following the 3d, 10th (remittent or inter-mittent temperature, in successive crops of papules and nodules for 77 days, many old nodules entirely absorbed during this period), 12th, 13th, 15th, and 16th injections.	No improvement.
22	Female..	19	Nodular leprosy.	5 years..	Lepratoxine.	Initial, 0.04 c. c., increasing to 2 c. c.	32	260 days.	Following the 3d, 4th, 10th, 12th, 18th, 19th, and all injections from 22d to 30th, inclusive; 31st injection (abscess).	Following the 4th injection.	The nodules on the forehead were partially absorbed.
23	Male....	17	Macular leprosy.	3 months	Vaccine.....	50,000,000.....	1	7 days....	.....	.....	Hyperemia and infiltration of the face increased.
					Lepratoxine.	Initial, 0.04 c. c., increasing to 2 c. c.	14	59 days..	Following the 14th injection.	Following the 4th (frontal headache) and 12th injections.	
					Live culture vaccine.....	.....	10	133 days.	.....	.....	
					1st injection, 1/3 case.	.....			.....	.....	
					2d injection, 1/3 case.	.....			.....	.....	
					3d injection, 2/3 case.	.....			.....	.....	

24	Female..	14	Macular leprosy.	9 months	Vaccine..... 500,000,000.....	1	7 days..	.....	.....	Marked improvement in leprosy lesions.
					4th injection, 1 ccs. 5th injection, 2 ccsen. 6th injection, 5 ccsen. 7th injection, 8 ccsen. 8th injection, 1 ccs. 9th injection, 2 ccsen. 10th injection, 3 ccsen.					
26	Female..	27	Nodular leprosy.	2 years..	Lepratoxine. Initial, 0.04 c. c., increasing to 1 c. c.  I m m u n e horse serum. Initial, 20 c. c.; 10 days later, 45 c. c.; 34 days later, 35 c. c.; 14 days later, 45 c. c.; 21 days later, 40 c. c.	5	89 days..	Following the 1st, 2d, 6th, and 11th injections.  Following the 3d and 6th injection urticaria.	Following the 6th and 11th injections.  Following the 1st injection (chest pains and cough), 2d, 3d, and 4th injections (general muscular pains), 6th injection pains in left arm, neuralgia in character.	No improvement noted. Subjectively, patient claimed around eyelids has decreased, permitting her to move easily open her eyelids.
40	Male....	40	Nodular leprosy.	3 years..	I m m u n e horse serum. Initial, 45 c. c.; 21 days later, 40 c. c.	2	21 days..	.....	.....	Patient is still under same treatment and observation.
27	Male....	42	Anæsthetic leprosy.	7 years..	Acid-fast fatty substance of <i>B. Lepræ</i> . Initial, 1 c. c., increasing to 3 c. c.	5	44 days..	Following the 2d and 3d injections.	Following all the injections.	No change noticed.
36	Male....	36	Nodular leprosy.	1½ years.	Acid-fast fatty substance of <i>B. Lepræ</i> . 1 c. c.....	2	10 days..	.....	Following the 2d injection.	Treatment discontinued by request of patient.

**SUMMARY AND DISCUSSION.**

It will be seen from the above that we have prepared and tried, more or less thoroughly, a number of substances, prepared directly or indirectly from our cultures of *B. lepræ*. Our efforts along this line appear to us to have been sufficient to permit us to form some opinion as to the possible utility of such therapeutic means, and from the data we have it appears to us that the following may be stated:

First. That vaccine (ordinary, suspended killed cultures of *B. lepræ*) can not be advantageously employed in the treatment of leprosy unless very small doses are used, owing to the slow absorption of the material and its tendency to cause abscesses.

Second. Live cultures of *B. lepræ*, while they have produced no beneficial results in our hands, are deserving of further trial. Small doses should be used to avoid abscess formation.

Third. Toxines prepared from *B. lepræ* after the method of Koch's "old tuberculin" and his "B. E.," appear to be of little or no value, in our experience, in the treatment of leprosy.

Fourth. The extract, consisting of fatty material, obtained from lepra bacilli has not been employed for a sufficient length of time to determine whether it is of value in the treatment of leprosy.

Fifth. The serum of a horse, which animal had received injections of lepra bacilli, has been without any beneficial results to patients suffering from leprosy during the short period we have used it; but from the fact that this animal's serum strongly agglutinates *B. lepræ* cultures, we are not without hopes of increasing the potency of this serum to a point where it may be of benefit in the treatment of this disease.

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## LIST OF PUBLIC HEALTH BULLETINS.

The following is a list of the Public Health Bulletins that have been issued:

- \*1. Report on Trichinæ and Trichinosis. By W. C. W. Glazier. 1881. 212 pages. 87 il. 1 map. Paper. Senate Executive Document No 9, Forty-sixth Congress, third session. Out of print.
- \*2. Report on the Etiology and Prevention of Yellow Fever. By George M Sternberg. 1890. 271 pages. 21 pl. 20 il. Cloth. Out of print.
- \*3. Mortality Statistics in the United States for the year ending December 31, 1897. From Annual Report Marine-Hospital Service, 1898. 24 pages. Paper. Out of print.
4. Yellow Fever: Its Nature, Diagnosis, Treatment, and Prophylaxis and Quarantine Regulations Relating thereto. By officers of the Marine-Hospital Service. Reprint from Annual Report Marine-Hospital Service, 1898. 176 pages. 1 il. Paper.
- \*5. Shipment of Merchandise from a Town infected with Yellow Fever. By H. R. Carter. 1899. 15 pages. Paper. Out of print.
6. Report of Commission of Medical Officers detailed by authority of the President to Investigate the Cause of Yellow Fever. By Eugene Wasdin and H. D. Geddings. July, 1899. 98 pages. 26 charts 2 il. Paper.
- \*7. The Bubonic Plague. By Walter Wyman. January, 1900. 50 pages. Paper. Superintendent of Documents, 5 cents.
- \*8. Report of Commission appointed by the Secretary of the Treasury for the Investigation of Plague in San Francisco. By Prof. Simon Flexner, Prof. F. G. Novy, and Prof. L. F. Barker. January 23, 1901 23 pages. 1 map. Paper. Out of print.
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12. Transactions of the Second Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. June, 1904. 95 pages. Cloth.
13. The Public Health and Marine-Hospital Service of the United States. A Brief History. Prepared for the Louisiana Purchase Exposition. December, 1904. 16 pages. Paper.
- \*14. Sanatorium for Consumptives, Fort Stanton, N. Mex. By P. M. Carrington. Reprint from Annual Report Public Health and Marine-Hospital Service, 1904. 19 pages. Paper. Out of print.

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\* Exhausted and not for distribution.

15. Transactions of the Third Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. May, 1905. 52 pages. Cloth.
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19. Trachoma, Its Character and Effects. By Taliaferro Clark, and J. W. Scherschewsky. 1907. 34 pages. 6 il. Paper
- \*20. The Public Health and Marine-Hospital Service of the United States. A Brief History. Prepared for the Jamestown Ter-Centennial Exposition. 1907. 12 pages. Paper. Out of print.
- \*21. Transactions of the Sixth Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. April, 1908. 79 pages. Cloth. Out of print.
- \*22. The Present Pandemic of Plague. By J. M. Eager. 1908. 30 pages. Paper. Out of print.
- \*23. Pellagra—A Precip. By C. H. Lavinder. July 24, 1908. 22 pages. 1 il. Paper.
24. The Marine-Hospital Sanatorium, Fort Stanton, N. Mex. Prepared for the International Congress on Tuberculosis, held in Washington, September, 1908. 32 il. 56 pages. Paper.
- \*25. Hookworm Disease. Reprint from Annual Report P. H. and M. H. S., 1908. 5 pages. Paper. Out of print.
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  - I. The Present Status of the Leprosy Problem in Hawaii.
  - II. The Reaction of Lepers to Moro's "Percutaneous" Test.
  - III. A Note Upon the Possibility of the Mosquito Acting in the Transmission of Leprosy. By W. R. Brinckerhoff. 1908. Investigations made in accordance with the act of Congress approved March 3, 1905. 24 pages. Paper
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  9. Rodents in Relation to the Transmission of Bubonic Plague. By Rupert Blue.
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32. Hookworm Disease (or Ground-Itch Anemia), its Nature, Treatment, and Prevention. By Prof. C. W. Stiles. 1910. 40 pages. Paper.
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43. Experimental Studies of Plague and a Plague-like Disease among Rodents. By George W. McCoy. April, 1911. 71 pages. 7 pls. Paper.
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TREASURY DEPARTMENT

Public Health and Marine-Hospital Service of the United States

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PUBLIC HEALTH BULLETIN No. 48

SEPTEMBER, 1911

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# PELLAGRA

A PRÉCIS

[REVISED EDITION]

BY

PASSED ASSISTANT SURGEON C. H. LAVINDER

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PREPARED BY DIRECTION OF THE SURGEON GENERAL



WASHINGTON  
GOVERNMENT PRINTING OFFICE  
1911

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## PREFACE.

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The second edition of this bulletin is prepared to meet a demand for a brief general account of a disease which, at the time the first edition was issued, was practically unknown to most of the American medical profession, and which probably still remains almost unknown to many of them.

Long stated to be nonexistent in the United States, pellagra was recognized but a short time ago, with almost startling suddenness, as being not only existent, but quite prevalent in various localities of this country. In the short space of the four or five years since intervening, this disease has assumed a position of great importance in the attention of both the medical and lay worlds.

While the malady is still largely confined to certain sections of the United States, it has shown itself to be a respecter of neither locality nor person, and may now be met with anywhere in this country. It deserves the careful consideration of every American medical man.

The kind reception accorded the first edition of this bulletin leads the writer to hope that this edition may also prove of some value to those who seek information regarding this important disease.

My indebtedness to the general literature of pellagra is evident, and, in addition to the references given, I desire to make here a general acknowledgment. I take pleasure also in expressing my thanks to my friend, Dr. J. W. Babcock, for helpful suggestions in the preparation of this bulletin, as well as for many other courtesies.









SOUTH CAROLINA CASE. NOTE THE DARK COLOR OF THE ERYTHEMA, AND THE LINE OF DEMARCATION.

Courtesy of Dr. J. J. Watson, Columbia, S. C.

# PELLAGRA.

(Maidismus, psychoneurosis maídica, and a variety of other names.)

## HISTORICAL.

There is naturally some uncertainty as to just when pellagra<sup>1</sup> was discovered, but this disease seems to have been first recognized among the peasantry of northern Spain, and the credit for its first description (1735) is almost unanimously given to Gaspar Casal, of Oviedo, a small town in the Asturias. From its characteristic erythema it was called *mal de la rosa*, and was regarded by Casal as "a peculiar kind of disease consisting of a combination of scurvy and leprosy."

About 20 years after Casal's observations a distinguished physician of the Venetian States, Antonio Pujati, independently described a similar disease in the district of Feltre in northern Italy under the name *Alpine scurvy*. In 1771 F. Frapolli, of Milan, published an account of a similar disease, to which he applied the popular name *pelagra* (with one l). Publications now followed by Zanetti, Odoardi, Gherardini, and others. In 1784, by order of Joseph II of Austria, the first *pellagrosario*, or hospital for pellagrins, was established at Legnano, and Gaetano Strambio was placed in charge. From there he published many of his well-known studies of the disease.

Through the publications of F. Fanzago (1789) the identity of *Alpine scurvy* and *pelagra* began to make itself manifest, and later, through Roussel's observations, *mal de la rosa* was shown to be the same affection.

By the beginning of the nineteenth century the disease was widely known all over northern Italy. It had apparently spread rapidly, showed a marked intensity, and was accompanied by a high mortality. From then till now *pellagra* has attracted much attention in Italy, and numerous authors have made notable contributions to the disease. Lombroso's work should be especially mentioned.

In France the disease was first observed early in the nineteenth century by the elder Hameau in the vicinity of *Teste-de-Buch*, whence the name, *maladie de la Teste*. Many French authors have made

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<sup>1</sup> The etymology of the word is usually given: Italian, *pelle*, skin, and *agra*, rough. The name *pellagra* was first adopted by Frapolli, who already found it in use among the people. He spelled it "*pelagra*," and it is still seen so written, at times, in Spanish literature.

contributions to the disease, notably Théophile Roussel, whose most important work was published in 1866.

The disease later was reported in Roumania by Théodori (1858), in Egypt by Pruner (1847), and from other parts of southern Europe and the Mediterranean littoral by various observers.

The United States apparently for many years remained singularly free of this malady. The general consensus of opinion among medical writers had always been that pellagra did not occur in this country, and among the American medical profession its features were, up to a short time ago, almost universally unknown.

Sporadic cases were reported by Gray, of New York, and Tyler, of Massachusetts, as early as 1864. Sherwell, of Brooklyn, N. Y., reported a case in an Italian sailor in 1883, and also another case in 1902. Bemis is reported to have diagnosed a case in New Orleans in 1889, and a case is said to have occurred in North Carolina the same year (Wood and Bellamy). Harris, of Atlanta, reported a case in 1902. An epidemic of the disease occurred at the Mount Vernon (Ala.) Asylum for Negroes in 1906. These cases were studied by Searcy, McCafferty, Bondurant, and Dyer, and the outbreak was reported by Searcy in 1907. During the same year the diagnosis of pellagra was independently made by Babcock at the State Insane Asylum, Columbia, S. C., and a careful report made regarding the matter. Shortly after this Wood and Bellamy, of Wilmington, N. C., reported cases. The American disease was identified with Italian pellagra in 1908 independently by Watson and Babcock. In the spring and summer of this year pellagra began to be recognized quite generally through the southern United States.

Reports of the disease were made by the writer from Wilmington, N. C., to the Surgeon General of the Public Health and Marine Hospital Service in 1908; and in the succeeding months of this and the following years much interest was manifested in this disease by various municipal, county, and State medical organizations. In addition, two large conferences were held at Columbia, S. C., under the auspices of the South Carolina State Board of Health, and a national organization was formed for the study of the disease (November, 1909). During this same period several outbreaks of the disease were recorded in various parts of the country, especially in insane asylums, and the malady was found existent in some of the Northern States, notably Illinois and, later, Pennsylvania.

This, in a general way, gives a brief outline of the recognition and progress of this disease in the United States. An analysis of these various reports and a careful study of the development of pellagra in this country give good reason for the belief that the disease has, in all probability, existed in this country for many years; just how many it is difficult to say, perhaps 40 or 50, possibly longer. It does

not seem likely, however, that the disease had existed to any great extent; on the contrary, it seems far more probable that in all likelihood it was sporadic. Certainly it is hardly credible that it could have existed unrecognized in anything like the number of cases found in 1907 and subsequent years.

The recognition and development of pellagra in the United States bears a marked similarity to the history of the recognition and development of this disease in northern Italy in the eighteenth century. In both countries pellagra seemed to appear with almost startling suddenness, apparently spread with great rapidity, and was characterized by a marked intensity and a high mortality.

#### GEOGRAPHICAL DISTRIBUTION AND STATISTICS.

In 1866 Roussel<sup>1</sup> wrote:

Recently this malady has invaded new countries, and to-day it is found to the south of 47° of north latitude, between 10° of longitude west and even beyond 25° of longitude east, meridian of Paris, extending over a long zone of the temperate region of Europe from Cape Finisterre to the banks of the Sereth, across the Pyrenees Provinces of Spain and of France, upper and central Italy, and, in the basin of the Danube, upon the eastern and southern slopes of the Carpathians even to the frontiers of the Russian Empire.

Within the last half century, however, pellagra has been found more extensive than this and is now known to be endemic in various parts of both the Eastern and Western Hemispheres.

It is highly probable that the real geographic distribution of pellagra is unknown, but the disease has been reported from parts of Italy, Roumania, Austria-Hungary, Spain, France, and other places in southern Europe; from Asia Minor, India, and the Philippine Islands; also from Lower Egypt and some other places in North as well as South Africa. It is said to occur in New Caledonia, and sporadically in parts of South America, and possibly in Central America. It is also found in the West Indies, Mexico, and the United States.

At the present time it is most prevalent in northern and central Italy, certain parts of Roumania, and Austria-Hungary, and the United States.

It is thus seen that pellagra is rather widely spread, and occurs quite generally within the Tropical and the warmer parts of the Temperate Zones. A more detailed study, however, will show that while thus widely spread its local geographic distribution often displays many peculiar and striking limitations. The disease has been, and still is, a veritable scourge to certain parts of Europe, and it seems not unlikely that the United States may also have a similar experience. Without attempting to give full data, some idea of its extent may be gained by quoting certain statistics.

<sup>1</sup> *Traité de la pellagre et des pseudo-pellagres*, Paris, 1866.

According to official statistics, Italy had, in 1879, nearly 100,000 pellagrins; the number increased by 1881 to nearly 105,000. Since then there has been a steady decline, and at the present time there are said to be less than 50,000 cases in the entire kingdom. Up to recent years there have been from 2,500 to 4,000 deaths annually in Italy from pellagra, but of late this number has been greatly reduced and in 1908 fell to less than 1,500. In some restricted localities of Italy the percentage of the population suffering from pellagra is very high. But in considering comparatively large areas, in those places where the disease is most prevalent, the percentage of the total population stricken will run from 1 to 3, rarely 5 per cent. It has been stated that in Italy from 4 to 10 per cent of pellagrins suffer from serious mental disorder. The disease is almost entirely confined to northern and central Italy, but seems of late to be slowly spreading southward.

In certain parts of Austria the disease is quite prevalent; and recently it is reported that among a population of 2,250,000 investigated there were found 78,163 pellagrins (3 per cent). In Roumania there were reported to be, in 1906, over 100,000 cases of the disease. It is largely confined to southern Roumania, but in recent years seems slowly advancing northward. The disease is also very prevalent in Lower Egypt.

In the United States statistical data are lacking. The disease is not required to be reported except in four States, and in only one are such reports required by law. It is difficult even to make an estimate of how many cases there may be. It has been reported quite generally, but its chief area seems to be in the Southeastern States—in a general way those which lie south of the Potomac and Ohio and east of the Mississippi Rivers, with Louisiana and Texas included. The malady is undoubtedly increasing in numbers and spreading into new territory. There are certainly many thousand cases of the disease in this country, and the present situation must be looked upon with grave concern. A recent editorial writer<sup>1</sup> has said: "This is one of the most, if not the most, important public health problem of the present."

#### ETIOLOGY.

While the etiology of pellagra is obscure, the disease has nevertheless almost unanimously been regarded as a food poisoning, allied to ergotism or beriberi, and attributed to the use of Indian corn<sup>2</sup> as an article of diet.

The idea of some causal relation of this kind between corn and pellagra seems to have originated with Casal, who first described the disease; but probably also was independently suggested by other

<sup>1</sup> Journal American Medical Association, LVII, 10, Sept. 2, 1911.

<sup>2</sup> In this bulletin the words corn, Indian corn, and maize are used interchangeably.

early observers. Such a thought was founded apparently to some extent on an historical basis. Medical men having found a new disease of rather striking characteristics, sought some new, recently acting cause to account for it. For certain reasons their attention was directed to Indian corn. The introduction and subsequent cultivation and use of this grain as food was thought to have been of comparatively recent occurrence in Europe, and pellagra was believed to have followed in its wake.<sup>1</sup>

In whatever way it may have occurred, the corn theory of pellagra in some form originated almost simultaneously with the discovery of the disease, and from then till now has held a dominant place in the consideration of its etiology.

This idea was for a long while entertained in a loose, vague sort of way. It was probably first formulated (about 1810) by Marzari, who thus created what is called the zeist (from *Zea mays*) school. Marzari's idea that corn caused pellagra by its deficiency in certain nutritive principles was soon supplanted by Balardini, who first introduced the view that the disease was due to a certain mold sometimes found on the grain. The greenish color of the mold gave the name *verdet* to this theory. Balardini was thus the creator or inspirer of the idea that pellagra is due, not to the use of good corn, but to the use of damaged or fermented grain.<sup>2</sup> Later Lombroso, actuated largely by philanthropic motives, devoted many years of his life to the development and defense of this theory of the cause of pellagra.

As is to be expected, in a disease of obscure etiology, theories are numerous. It has long been customary to divide all theories of pellagra into two general classes: The zeists, or those who hold the view that there is some causal relation between corn and pellagra, and the antizeists, who oppose this view.

In support of their theories the zeists make the following general statements:

(1) The disease appeared for the first time in Europe after the introduction of maize, probably from America, and followed everywhere the extension of the cultivation of this new grain and its adoption as an article of food.

(2) Pellagra is found endemic only in countries where maize is extensively used as an article of diet.

(3) Pellagra diminishes or disappears, among individuals or groups of individuals, whenever maize is eliminated from their diet-

<sup>1</sup> In the history of the introduction and subsequent cultivation of corn in Europe there are many obscure points, concerning which no opinion is here expressed.

<sup>2</sup> Throughout this bulletin the words "spoiled," "damaged," or "fermented," as applied to corn, are used interchangeably to express a deterioration of the grain accompanied by the development of various parasites (bacteria and molds) thereon. This deterioration is doubtless a complex process and not always uniform. Under certain conditions it may also occur in food prepared from corn.

ary. On the other hand, it is likely to appear among people who adopt this cereal as a large part of their food supply.

Sharing the general opinion of some etiological relation between corn and pellagra, the zeists, however, hold many different opinions as to the exact nature of this relation. Their principal views may be briefly stated thus:

1. The idea that maize as a foodstuff is wanting in proper nutritive value. This conception is in reality no longer held, having been rather effectually discredited by many careful analyses of maize, which show that this cereal possesses high nutritive value, is rich in fats and nitrogenous substances, and is easily assimilable. Pellagra is, moreover, not infrequently found among well-nourished individuals, and its symptomatology is not that of inanition. It is, however, worthy of comment that in the writer's experience the average Italian practitioner, especially in the country districts, seems to regard spoiled corn only as a predisposing cause and the disease apparently as a nutritional disturbance. Studies on the metabolism of pellagrins have yielded some interesting results, but so far have shed little light upon etiology.

2. The idea that good, sound maize contains certain toxic substances which cause pellagra. This is another view which has been largely discredited by the absence of pellagra in so many places where maize is, and has been for long periods, extensively used as food.

3. The toxico-chemical idea that under the influence of saprophytes (bacteria or molds) maize may undergo certain changes with the formation of one or more toxic substances of a chemical nature (exogenous poisons). This is the great spoiled-corn theory that "in pellagra we are dealing with an intoxication produced by poisons developed in spoiled corn through the action of certain microorganisms, in themselves harmless to man." This idea has a host of adherents. It was established through the admirable labors of Lombroso, who has been its great advocate and exponent, and is perhaps to-day the most popular of all the various phases of the maize theory. This is the view accepted by the Italian Government in its extensive prophylactic measures. It is not without critics and antagonists, however, and Lombroso's experimental work and conclusions have been seriously called in question by many able students of the disease.

Lombroso<sup>1</sup> failed directly to incriminate any particular microorganism. Investigating chemically the poisons involved, he described three substances, a red oil, a highly toxic substance, or pelligrosine, and a resinous substance. Pelligrosine he found the most toxic of all. It is probably not a pure substance and may contain more than one active principle. Experimenting with these sub-

<sup>1</sup> Trattato profilattico e clinico della pellagra, Turin, 1892.



stances on man and certain lower animals, he observed phenomena allied to pellagrous symptoms, but it is a fairly general opinion that such phenomena are not comparable to pellagra in man.

A great many students have accepted Lombroso's ideas in a general way, and followed him in this field, seeking principally to determine the character of the toxic substances produced and the microorganisms responsible for them. Many toxic substances have been obtained from spoiled maize, and a rich flora has been described occurring on the damaged grain, but no evidence has yet been submitted which can be accepted as conclusive.

It may be of interest to state that Babes<sup>1</sup> and other workers claim to have shown that there exists in the blood of pellagrins a substance which is antagonistic to the toxic action of extracts made from spoiled maize (antibodies).

Evidence of quite contrary character has, however, been brought forward by Raubitschek and others.<sup>2</sup>

4. The toxico-infective idea that from spoiled maize there is formed within the body certain toxic substances (endogenous). Neusser<sup>3</sup> advocated the view that under some circumstances there is formed in maize, largely under the influence of the *Bacterium maydis*, a certain "receptive mother substance" which later, in the body, underwent a further change. Under other circumstances, however, he viewed the disease as a direct intoxication.

De Giaxa<sup>4</sup> attributed great importance to the action of the colon bacillus on ingested maize. His idea seems to have been that the vegetating properties of this bacillus may become greatly modified on a culture medium of maize, and he alleges that he has shown the production, by the colon bacillus on maize media, of specific toxic substances.

Many similar views that the disease is an autointoxication of some kind have been entertained by various writers.

5. The idea that pellagra is a specific infection, derived from maize, either a mold or a bacterium.

The flora of maize has been frequently studied, and a great number of parasites named and described. Most of these, however, have attracted little attention with the exception of the fact that all may cause changes in the grain upon which they vegetate. *Penicillium glaucum*, the ordinary blue mold, has perhaps of late attracted most attention.

Pari incriminated the maize smut (*Ustilago maydis*), Majocchi and Cuboni attributed great importance to the *Bacterium maydis*, and Carrarioli described a *Bacillus pellagræ*.

<sup>1</sup> Pellagra, in Nothnagel's *Specielle Pathologie und Therapie*, XXIV, 1901.

<sup>2</sup> See Public Health Reports, Public Health and Marine-Hospital Service, XXVI, 8, Feb. 24, 1911.

<sup>3</sup> *Wein. med. Presse*, 4, 146, 1887.

<sup>4</sup> *Annali d'Igiene Sper.*, Roma, 1892 and 1903.



In 1902 Ceni<sup>1</sup> declared pellagra to be due to an infection by two molds, *Aspergillus fumigatus* and *flavescens*—a true aspergillosis. In a series of highly interesting papers he defended this view with great skill, but his work has not been confirmed. This infection he thought usually, but not necessarily, derived from spoiled corn.

In 1906 Tizzoni<sup>2</sup> began a series of publications advocating a specific bacterium which he called *Streptobacillus pellagrae*. This microorganism he found both in spoiled corn and in the blood, spinal fluid, and certain tissues of pellagrins. He has done a great deal of interesting work, but his results are also without confirmation.

*Oospora verticilloides*, *diploдия*, and other molds and bacteria found on spoiled maize have all received a share of attention.

(6) Quite recently Raubitschek<sup>3</sup> and other writers have brought forward a photodynamic view of pellagra and sustained the opinion that all corn contains some toxic substance which, circulating in the blood stream, does not display its deleterious action until sensitized by the chemical rays of sunlight falling on exposed body surfaces. Attention is directed to the analogy with fagopyrismus seen in certain animals fed on buckwheat; and various experiments on animals, as well as other data, are quoted to support their idea.

The antizeists have always been greatly in the minority, but under the more or less recent stimulation of certain new ideas their side of the question has created widespread interest.

There have always been two general arguments against the maize theory:

(1) The extensive territory over which corn is and has been cultivated and used as food for many generations without the appearance of pellagra.

(2) The numerous cases of pellagra which may be found among individuals who do not use corn in their dietary.

To these of late have been added:

(3) Certain epidemiologic data, especially the peculiar topographical distribution of the disease, even in marked endemic centers. These reported observations do not readily lend themselves to the theory of a food poison from maize.

The antizeist schools may be classed as follows:

(1) The idea that pellagra is not a morbid entity has for a long while been entertained by a group of writers in France. They regard it as a morbus miseriae and deem it a symptom complex which may arise in many cachectic states and especially in alcoholics and insane persons. They usually speak of it as the pellagrous syndrome. It was in the controversy with this school of thought that there was

<sup>1</sup> Rivista Sper. di Freniat., etc., 1902.

<sup>2</sup> Estratto del Bollettino del Minist. di Agricolt., Indust. e Comm., Rome, 1909.

<sup>3</sup> Public Health Reports, loco citato.

born the term pseudo-pellagra, which will be found mentioned elsewhere.

This idea has never been very broadly accepted. It is difficult to understand how doubt can arise that pellagra is a disease *sui generis* when consideration is given to its consistent symptomatology and morbid anatomy and its unique epidemiology.

(2) The idea that pellagra is a parasitic disease transmitted by a blood-sucking insect. This is the simulium theory of Sambon, first suggested by him in 1905, and later much amplified.<sup>1</sup> Sambon has not expressed any definite opinion as to the nature of the parasite, but thinks it may possibly be a protozoal organism. The transmitting agent, however, he thinks he has shown to be some one or more species of simulium or buffalo gnat.

This theory is based by Sambon upon the analogy of pellagra with certain other insect-borne, parasitic diseases, upon important epidemiologic studies made by him in Italy, and upon the agreement existing between certain phenomena peculiar to pellagra and the distribution, characteristics, and life history of the *Simuliidæ*. In his work he has most thoroughly emphasized the peculiar topographical distribution of pellagra and its connection with the running stream in which the simulium breeds. This peculiar local distribution of the disease, in his opinion, can not be brought into harmony with any theory of a food poisoning.

His very interesting epidemiologic studies have marked a new and important departure in etiological researches upon pellagara. The conception is a brilliant one. It has attracted wide attention and has stimulated everywhere renewed interest in the study of pellagra. It must, however, still be regarded as a theory until further work is done. Evidence is accumulating that American and Italian pellagra may show, on their epidemiologic side, many important differences. Studies in other countries may show even further variations.

(3) The idea that pellagra is a parasitic disease, caused by a water-borne, nematode worm. This is the hypothesis of Alessandrini, first brought out by him in 1910.<sup>2</sup>

His argument is very similar to Sambon's and rests upon the analogy between pellagra and some other diseases due to nematode worms, as well as upon epidemiologic studies made by him in Italy.

Both note the importance of the peculiar local distribution of the disease, and both connect it with water; but Alessandrini connects the disease with potable waters, and he claims to have found constantly in the shallow wells and small, slowly flowing streams of pellagrous regions numerous larvæ of the family *Filaridæ*. They were rare or absent in the better potable waters found in regions where

<sup>1</sup> Progress Report on the Investigation of Pellagra. Journal of Tropical Medicine and Hygiene, XIII, 18, 19, 20, and 21, 1910.

<sup>2</sup> Sulla pellagra in Italia. Annali d' Ig. Sper., n. s., Vol. XX, fasc. IV, 1910.

pellagra did not occur. He also claims to have found certain very small ova in the little vesicles of the erythematous skin of pellagrins. To these he attributes possible importance.

(4) The idea that pellagra is a form of amebiasis. Siler and Nichols<sup>1</sup> first drew attention to the frequency of amebiasis in pellagrins. Long<sup>2</sup> later advocated a modified autointoxication idea of the cause of the disease, with the ameba as a large factor in the process. Young<sup>3</sup> suggested that there might exist some hitherto undescribed species of ameba which would prove to be the specific cause.

It has often been observed that amebiasis is not infrequent in pellagrins, but apparently slight attention has been given to any discrimination between pathogenic and nonpathogenic forms. This would seem a point of essential importance.

The striking intestinal phenomena of pellagra almost inevitably suggest that here perhaps may be found the etiologic factor, but so far studies on the intestinal flora and fauna of pellagrins have not yielded any striking results.

Among the host of suggestions which have come to light on this matter, a recent one may be noted. Not so much for its scientific value, but more especially for the reasons that it incriminates what is regarded as a wholesome article of food in general use, and adds another to the many fears from which the laity already suffer with regard to this disease.

This suggestion attributes pellagra to the use of cotton-seed and other semidrying oils as articles of diet. By interweaving certain known chemical reactions with certain unsupported personal opinions, and then applying unwarranted inferences to the metabolism of the human body, it has been made to appear possible that some of the end oxidation products of these oils may cause the disease.

To the writer such a suggestion does not seem in harmony with many of the well-known facts of pellagra, and does not appear in accord with either its history, its epidemiology, or its clinical and pathological phenomena.

In the present state of this question the publication of immature speculations of this character, especially when they tend to arouse unjustifiable fears in the mind of the public, is strongly to be deprecated.

The above is but a brief summary of the many theories which have been put forward to account for this obscure disease.

From a careful review of the subject it would certainly seem safe to assert that in any definite, scientific sense, the cause of pellagra is unknown.

<sup>1</sup> Aspects of the pellagra problem in Illinois. National Conference on Pellagra, 1909.

<sup>2</sup> Pellagra. Journal American Medical Association, LV, 9, 1910.

<sup>3</sup> Amœbæ as the cause of pellagra. Jour. S. C. Med. Assn., VI, 11, 1910.

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ILLINOIS CASE.—ERYTHEMA, SHOWING DESQUAMATION AND SUPERFICIAL ULCERATIONS.

Courtesy of Dr. George A. Zeller, Superintendent Peoria State Hospital, Peoria, Ill.



SOUTH CAROLINA CASE.—THE WET TYPE OF ERYTHEMA.

From South Carolina State Board of Health Bulletin, December, 1910. Courtesy of South Carolina State Board of Health.

Further, the idea of some etiological relation between maize and pellagra has long been accepted by the medical world, and is approved by the mature judgment and long labors of many experienced and able men. It is not, indeed, an established doctrine, but it is not in consonance with that conservatism which has usually characterized the medical profession totally to reject an accepted hypothesis unless it can be replaced by something much more tangible. It would be equally unwise to assume an attitude of dogmatic adherence to such a theory.

The theories of Sambon and Alessandrini mark a new and important departure in this field, and deserve the most careful consideration. For the present, at least, the various other ideas suggested do not promise much of consequence.

#### PREDISPOSING CAUSES.

Among predisposing causes may be mentioned:

*Age.*—The disease occurs at all ages, and has been seen in the infant at the breast as well as in the octogenarian. It is probably most usual between 20 and about 40 years. It is, however, by no means infrequent in children.

*Sex.*—It is frequently said by foreign authors that sex exerts no influence. In the United States, however, it can hardly be doubted that the disease is more frequent in the female, and, in the Southern States, the negro female.

*Race.*—This does not seem a factor of great importance. Reference has just been made, however, to the incidence of the disease in the negro.

*Occupation.*—In Italy undoubtedly the field laborer is the greatest sufferer from the disease; and it is the rural population among whom the disease is largely found in other countries of Europe. There are reasons, however, for thinking that such is not the case in America, the disease being frequent among well-to-do town and city dwellers.

In the pellagrous sections of Europe the field laborer subsists largely on corn in some form; in Italy it is polenta.

*Alcoholism, previous illness, depression, hygienic conditions, etc.*—It is a fact which has been noted by all observers that pellagra is often a secondary disease, engrafted upon some previous illness or depressing condition. It not infrequently follows pregnancy or lactation.

A history of alcoholism is often obtained from the sufferer. In the foreign literature of pellagra much is said of an "ethylic pellagra," which is by some regarded as a pseudo-pellagra. It is a zeist idea that alcohol distilled from spoiled corn may contain pellagrogenous toxins.

The disease in Europe is usually found in association with wretched poverty and poor hygienic conditions, but this does not seem so in America.

*Climate and seasons.*—Pellagra is not confined to the tropical zone, but it has been found only in the comparatively warmer parts of the earth. Apparently it does not occur in cold latitudes. The disease has the remarkable characteristic of showing definite seasonal exacerbations, and the actinic rays of the sun undoubtedly act as an exciting cause in the production of the erythema. The relation of the disease to the seasons and the sun's rays is important, but not definitely understood.

*Heredity.*—The disease is believed to be hereditary by many writers, but this has been denied by others. This point needs further observation. It is difficult to determine satisfactorily.

*Contagion.*—The contagiousness of pellagra may best be mentioned at this point. This has very naturally been a matter of much concern. So long as the etiology of the disease is unknown, it is of course impossible to make positive statements, but those who have had longest experience do not regard the disease as transmissible from one person to another. In Italy no precautions of quarantine or isolation are practiced, and the sick associate intimately with the well. Doctors, nurses, and others in attendance on the sick do not contract the disease. In the present state of our knowledge, measures of quarantine or isolation do not seem to the writer wise or necessary. They serve only to increase an already widespread pellagraphobia.

If communicable at all pellagra certainly does not seem to be so in any very direct way from one individual to another. Evidence is not lacking that pellagra is possibly a disease of place or locality, somewhat after the apparent nature of beriberi. This, however, does not necessarily imply anything as to its transmissibility.

#### PATHOLOGIC ANATOMY.

The morbid anatomy is neither constant nor characteristic. In a disease presenting such a variety of symptoms and characterized by such great chronicity, with the frequent presence of intercurrent affections and senile evolutionary changes, one could hardly expect to find a definite, single, morbid condition, and must learn to discriminate the manifold, accidental changes so frequently found.

Tuczek<sup>1</sup> describes as part appearances of cachexia the following: Wasting of adipose and muscular tissues, brittleness of the bones (*fragilitas ossium*), atrophy and fatty degenerations of the internal organs (chiefly those innervated by the vagus), heart, kidneys, spleen, intestines, liver, and lungs.

He also describes three further groups of morbid changes: (1) *Intestinal*: Atrophy of muscular coat, with occasional hyperemia and

<sup>1</sup> *Klinische und anatomische Studien über die Pellagra*, Berlin, 1893; and Tuke's *Dictionary of Psychological Medicine*, Philadelphia, 1892.

ulceration of the lower part of the tract; (2) abnormal pigmentation (similar to senile change), especially of ganglionic cells, heart musculature (brown atrophy), hepatic cells, and spleen; (3) alterations in the nervous system. The variously described conditions of hyperemia, anemia, edema, and at times inflammatory affections of the central nervous system and its coverings, together with the obliteration of the central canal of the cord, he regards as not peculiar to pellagra, but as accompanying conditions present in many chronic affections of the central nervous system and in senility.

The findings in the brain are in most cases negative except for occasional fatty degeneration or calcification of the intima of small blood vessels and pigmentation in the adventitial coats. In cases where a long-continued psychosis has led to a high degree of imbecility atrophy of the cerebrum may be found. In the cord the changes are fairly constant and important; degenerations in the lateral columns in the dorsal region and in the posterior columns in the cervical and dorsal regions. Very few changes are found in the lumbar cord.

With regard to degenerative changes in the peripheral nerves, he thinks such changes should be viewed with caution, when one considers their great frequency in chronic illness of many kinds.

He says further:

Microscopically, the affection seems to be a primary degeneration of the nerve fibers, with secondary proliferation of the neuroglia, the walls of the vessels not being necessarily implicated. Sometimes granular cells, and more frequently amylaceous corpuscles, are met with in the degenerated areas. Degeneration of the anterior root fibers along the anterior cornua has also been demonstrated, while there is to be found in addition a more or less considerable degree of pigment atrophy of the ganglion cells in the anterior cornua, with sclerosis of the matrix and atrophy of the nerve roots. Besides the excessive pigmentary deposit found in the peripheral ganglia, both spinal and sympathetic, there are no characteristic microscopical evidences in other parts of the nervous system.

Typhus pellagrosus furnishes us with definite post mortem results, chronic gastro-enteritis with formation of ulcers and swelling of the mesenteric glands and well marked changes in the central nervous system, associated with secondary affections of the kidneys, lungs, pleuræ, etc., being the main features on examination. It is to be noted that the spleen is usually involved in the general visceral atrophy and is never enlarged.

He draws a strong analogy between pellagra and ergotism both etiologically and pathologically.

Lombroso,<sup>1</sup> from observations on 113 necropsies, thus sums up the pathology of pellagra:

There are found irritations, exudations, and hyperemias localized more commonly in the membranes of the brain, spleen, liver, kidneys, inferior portions of the intestines, and above all in the spinal cord and its coverings.

<sup>1</sup> Trattato profilattico e clinico della pellagra, Turin, 1892.



Atrophy of many organs occurs, especially those innervated by the pneumogastric—heart, kidneys, spleen, liver, intestines, and lungs. Besides these, the ribs and the muscles. Brown atrophy of the heart with cellular infiltration and diminution of weight was found frequently in the absence of general marasmus, and this, with other visceral atrophies, is common even in well nourished individuals. Fragility of the bones is ordinarily confined to the ribs. Fatty degeneration of the muscles is infrequent, and then usually confined to certain muscle groups.

Fatty degenerations are common, and such changes are observed in the kidneys, liver, and at times in the heart, and, what is of more import, in the spinal and cerebral vessels.

Very characteristic of pellagra is the great frequency of pigmentary degenerations. Thus, as noted, one finds brown atrophy of the heart, which is an atrophy with pigmentation, pigmentation of the liver cells, and sometimes pigmentation of the cerebral vessels and of the spinal and ganglionic cells, with or without fatty degeneration. In one case was seen a general pigmentation of the kidneys, the heart, the liver, and the vessels of the brain (hemolytic cellular disintegration).

There are rarely also other forms of anatomic degeneration, such as calcereous degeneration of the cerebral vessels and at times aneurysmal dilatations. These alterations, together with the thickening of the membranes of the brain and of its vessels, suffice to explain the psychic troubles so frequently met with.

To be noted finally is the tendency to precocious senility, with athromia, a great number of amylaceous bodies in the spinal cord and in the sympathetic ganglia, precocious baldness and scleroses and pigmentation of the ectodermic structures.

Much importance is attributed by Lombroso and some other writers to changes formed in the sympathetic system.

Extensive and detailed reports on the pathologic anatomy of pellagra from American observers are as yet wanting. It has, however, been shown by several workers that the American disease pathologically shows no essential deviation from Italian pellagra. The morbid anatomy of the disease is nevertheless important, and the work needs a careful revision with modern methods.

#### EPIDEMIOLOGY.

The epidemiology of pellagra, like so many other features of the disease, is not well known. This phase of the subject has of late attracted much attention, and observations of this character are now of great importance.

The epidemiological data at present recorded for the malady rest largely on studies made in Italy. There is reason to think that perhaps some of these observations may not be in accord with what occurs in the United States. Time and work alone can determine

this. In addition to the many epidemiological facts and observations mentioned elsewhere in this bulletin, it is desired briefly to notice here one or two others. Space does not permit any general discussion of epidemiology.

In the first place, pellagra is essentially an endemic disease, but also shows the characteristics of affecting at times large numbers of persons, of extending its area to some extent, and of appearing in new places remote from its known endemic centers, so that it may with justice probably also be called epidemic. It has never shown, however, any of the characteristics of the great epidemic diseases, and is never pandemic.

Disregarding, for the present, any hypothesis as to the cause of the disease, the work of Sambon and of Alessandrini has brought out sharply the probability that the disease is one of place or locality. Investigating pellagra in Italy, the writer has repeatedly been impressed with the fact that so many physicians, in pellagra districts, assert that all of their cases of the disease come from this or that restricted locality. This observation has to some extent been confirmed in the United States, but as yet the number of such observations is too few for a final conclusion. Should further work confirm this observation, and show it to be a general characteristic of the disease, it would certainly be a decided step in advance.

It may be noted also that both Sambon and Alessandrini connect the disease with water. Terni and Fiorani<sup>1</sup> have recently made a similar observation. Such an idea may also be found among some of the older writers, and in the United States also some such idea prevails to a slight extent. There are wide differences of opinion, however, as to the nature of the relation.

Finally, there is the old question: Is there a pellagra without maize? Certainly the most pronounced zeist can not deny that numerous cases of pellagra have been reported by credible observers in whom there is no history or evidence of the consumption of this cereal. The real question, however, is whether there exists an endemic pellagra unassociated with maize. Reports of such from Spain are not credited by the Italian zeists, who still claim that endemic pellagra unassociated with a maize diet does not exist. It may be pointed out that maize is very extensively cultivated over the earth's surface, and to say that a disease does not occur except where this cereal is used as food is to make a very broad statement. A premise which includes too much weakens the conclusion.<sup>2</sup>

#### SYMPTOMATOLOGY.

Pellagra is an endemic disease characterized pathologically by serious organic changes in the central nervous system, and clinically

<sup>1</sup> *Rivista Pellagologica Italiana*, March, 1910.

<sup>2</sup> See Public Health Reports, P. H. and M. H. Service, XXVI, 39, Sept. 29, 1911.

by a chronic course with the periodic manifestations of acute phenomena referable to the gastrointestinal tract and the nervous system as well as by the appearance of an erythematous exanthem on certain exposed body surfaces. It not infrequently leads to insanity or to a fatal cachexia.

To give any clear and succinct description of a disease so protean in its manifestations is by no means easy. Almost all writers seem to have been impressed with this fact, and hence Lombroso's epigram, "There is no disease; only the diseased." Pellagra is, however, a definite, morbid entity, and many consistent descriptions have been given of the disease.

Largely for purposes of description, writers for a long time have divided its symptoms into stages or periods, much as we do with syphilis. Many different divisions have been suggested, but since all of them are largely artificial, none seems entirely satisfactory. Perhaps, therefore, it is just as well to make use of the simplest—prodromal, first, second, and third stages. It should not be forgotten, however, that such a division is, to a large extent, arbitrary; that there is no sharp line of demarcation between the various stages; that nothing is implied as to the length of time the disease may have existed; and that the various stages represent rather differences in degree than in kind. The disease is essentially chronic, but is not, of course, always uniform in the rapidity of its development and evolution. Reference is often made to acute or florid types of pellagra, but such references apply to certain acute incidents which may occur in its chronic course. These will be described later. An acute pellagra, *ab initio*, probably does not exist.

Remembering, then, that the disease is chronic and that there is no definite length of time or regular succession about the various stages, the following general statements may be made:

The prodromal stage often consists of little more than vague symptoms and a feeling of general malaise. The first stage has reference to the gastrointestinal and skin symptoms. The second stage includes the cerebrospinal and psychic phenomena. The third stage is the terminal one, characterized by cachexia. It may be noted here that pellagra is often spoken of as wet or dry. These terms are more convenient than scientific and have reference to the differences in the erythema. One form remains dry and scaly; the other develops bullæ and is associated frequently with grave constitutional disturbances.

Pellagra runs its course in a series of periodic attacks—alternating ameliorations and exacerbations. The exacerbations occur as a rule in the spring, sometimes in the fall, and subside after a time, only to recur again the next year. Following the somewhat indefinite prodromal period, there arise next gastrointestinal and nervous dis-

orders, usually accompanied in a short while by the striking erythema. The brunt of the successive attacks is borne by the nervous system, and each annual recurrence leaves a deeper and more ineradicable impression upon the nervous and mental condition of the sufferer. At the outset it is to be emphasized that while the erythema is the striking symptom of the disease, the essential morbid process involves the central nervous system. This conception of the malady is fundamental.

#### PRODROMAL STAGE.

The prodromal stage is indefinite both in length of time and symptomatology. Patients may complain of fleeting pains and various paresthesias. Neurasthenic symptoms may be present, and it is important to remember that such symptoms may represent a prodrome of pellagra.

There may be complaint of burning in the mouth and stomach with occasional stomatitis or ptyalism.

Progressive weakness, especially of the lower extremities, may appear weeks or months before the erythema. There may be loss of appetite and a feeling of general malaise. Sometimes there is vertigo. The prodromal stage is not so often seen. As a rule the patient presents himself with the developed disease. Pronounced symptoms usually appear in early spring, sometimes fall, the time incidence varying in accordance with the weather—April to June and September to October.

#### FIRST STAGE.

The first stage usually begins with gastrointestinal disturbances. There is a sensation of heat in the mouth and stomach, taste is altered, appetite usually lost, but there may be bulimia, and ptyalism is often present. The tongue is coated centrally and red and smooth at the tip and edges. The papillæ are frequently prominent and injected, and in the negro occasionally blackish, giving the organ a stippled appearance. Sometimes the tongue is smooth and red, denuded of its superficial epithelial coat—the “bald” tongue, or, if very red, the “cardinal” tongue. At other times the papillæ over the upper surface are very long, giving a heavy coating, which splits in places to form fissures, and then we have the “checkerboard” tongue. Appearances thus vary, but the tongue in pellagra is to some extent characteristic. An examination of the mouth will often show general redness of the mucous membrane, with vesiculation or even superficial ulceration. Dyspeptic symptoms, with flatulency and abdominal distention, are noted, and sometimes abdominal pain. Occasional vomiting may occur, especially in alcoholics. Diarrhea is frequent, at

times constipation, and the diarrhea, as well as the vomiting, may in some cases be of a spasmodic type. Sometimes it is dysenteric in character, muco-sanguinolent, with colic and tenesmus.

Muscular weakness, especially of the lower extremities, is usually evident early, and patients tire very easily.

The temperature is normal, though there may be a slight evening rise. If there is much fever complications should be sought for. Ordinarily in pellagra there is little fever. The pulse may be accelerated, though at times slow. Functional heart murmurs may occur, but should be sought later.

Vertigo is often present and very annoying; headache, usually occipital, is frequent, and often severe; rebellious insomnia occurs; various neuralgias are not seldom in evidence, and especial stress is laid by some on spinal neuralgias, with cramplike pains extending to the extremities. The knee jerks at this stage are usually exaggerated.

Intelligence, even at this early period, is often affected, and there is mild mental weakness with depression of spirits. Neurasthenic manifestations are frequent and important.

The blood and urine show the changes described later.

Along with these symptoms the characteristic erythema appears, selecting nearly always the uncovered parts of the body, and being symmetrical in its distribution. Its appearance is usually accompanied by a sensation of heat and swelling, with slight itching, in the affected parts. The itching of the erythema is never marked.

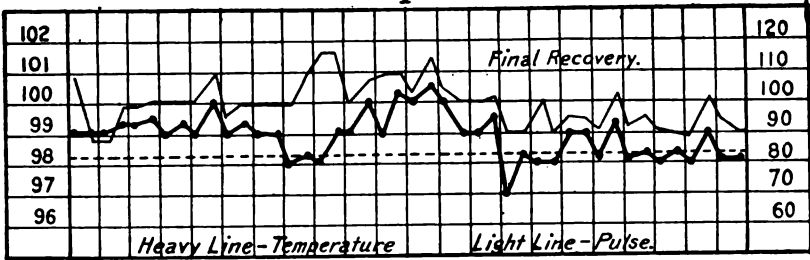
#### SECOND STAGE.

While erythema, digestive, and some nervous disturbances characterize the first stage, the second is marked by an aggravation of all of these symptoms and the appearance of new and marked evidences of involvement of the nervous system which now dominate the scene. The characteristics of this stage are serious cerebrospinal disturbances which, following largely Scheube's<sup>1</sup> description, may be thus enumerated:

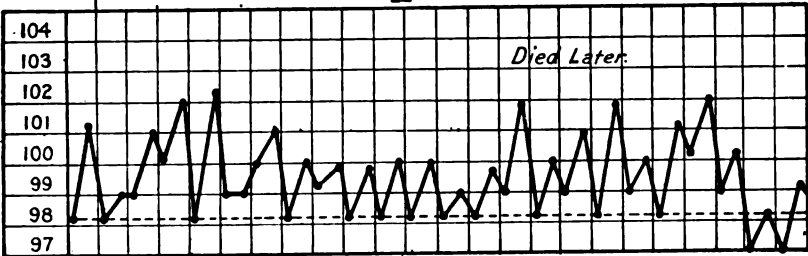
*Motor disturbances.*—There is usually considerable muscular weakness, especially of the lower extremities, and not infrequently partial paralyses are observed. Among motor symptoms of irritation may be seen muscular tension and tonic contractions in the extremities, which sometimes increase to tetanic rigidity. There may also occur tremor of the arms, head, and tongue, as well as cramplike seizures and convulsive movements. Exceptionally have been noted epileptiform convulsions with loss of consciousness.

<sup>1</sup> Diseases of Warm Countries. Philadelphia, 1902.

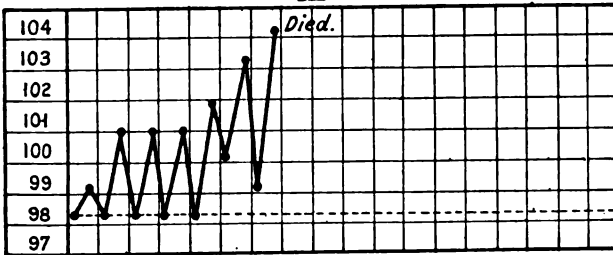
## I



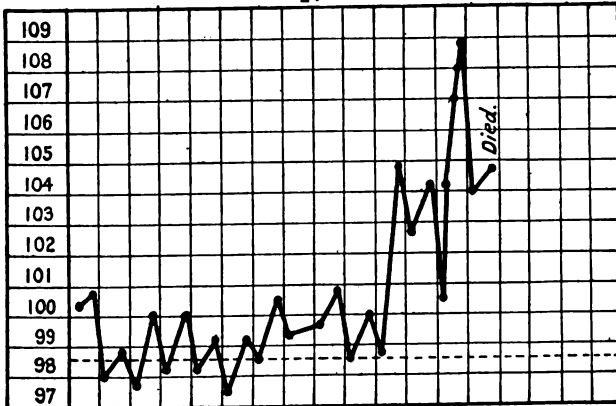
## II



## III



## IV



I. Ordinary temperature curve. II. Erythema of the wet type. III. Typhoid pellagra; tetanoid state; early death. IV. Terminal acute delirium with hyperpyrexia. All temperatures Fahrenheit, and recorded twice daily.

(From Pellagra, by A. Marie, trans. by Lavinder and Babcock, slightly modified.)

(Courtesy of the publishers, The State Company, Columbia, S. C.)

The gait is paralytic or paralytic-spastic. Ataxia is said not to be observed. Partial muscular atrophy may appear, and the disease may simulate amyotrophic lateral sclerosis. The muscles show no important or constant reactions to electric stimulation, but their mechanical excitability is increased.

*Sensory disturbances.*—The sensibility of the skin varies. The sense of touch and temperature remains intact, the sense of pain is sometimes diminished. The muscular sense is normal.

Paresthesias are frequent and of great diversity. Sensations of burning, especially on the extremities, are most often complained of, and are described as so intolerable in some cases as to result in suicide. There are also sensations of formication, hot and cold flushes, numbness, burning of the eyes, dragging in the neck, suffocation, a girdle around the body, heaviness in the groins and uterus, peculiar feelings in the penis, and heaviness of the testicles.

There may occur neuralgic pains in the head, neck, and back, and sensitiveness to pressure is described over the spine, especially in the dorsal region.

With regard to reflex activity, the skin reflexes are usually normal. The tendon reflexes, especially the knee jerks, are ordinarily much increased, but may be weak or absent. They are often unequal on the two sides.

*Organs of special sense.*—Occasionally are seen weakness of vision, diplopia, photophobia, and other ocular disturbances. Pupillary reactions are often indolent, dilatation, more rarely contraction, is observed, and such disorders may be unilateral. Organic changes may occur and conjunctivitis is seen at times. The sense of taste is sometimes perverted. A salty taste has been so frequent in parts of Italy as to give the popular name *salso* to the disease.

*Vasomotor and trophic changes.*—General contraction of the cutaneous vessels with sensations of cold are encountered, and sometimes goose skin may be found. During the later stages a neuro-paralytic dilatation of the cutaneous vessels may arise, with possible edema. The face at times assumes the alcoholic appearance. The nails may show disorders of nutrition.

The changes associated with the erythema have been described elsewhere.

*Psychic disorders.*—It has long been recognized that the mental condition of sufferers from pellagra frequently undergoes an early modification. This condition may be ill defined or show itself by a greater psychic excitability, indicating a lowered inhibitory power. Again the patient may be depressed or neurasthenic. Later distinct psychoses may develop. These manifestations are probably toxic in their nature. This is an important phase of the disease and will be

found mentioned under pellagrous insanity. For fuller information the reader must consult more extensive works.<sup>1</sup>

*General symptoms.*—Fever in uncomplicated cases is slight. Cases with the wet erythemas, however, usually have temperature. The pulse shows nothing characteristic. The gums sometimes display the scorbutic condition. The acidity of the gastric juice is diminished. There is usually decided loss of weight. Signs of premature senility—baldness, gray hair, arteriosclerotic changes, etc.—are frequently observed. Disturbances of the menstrual function and other disorders of the reproductive system are not infrequent. If their true significance is overlooked they may lead to useless, if not harmful, surgical procedures.<sup>2</sup>

The blood shows the changes common to a secondary anemia, but very marked anemias are not frequently seen. In addition to this there is seldom any leucocytosis; on the contrary, leucopenia is not infrequent. The leucocyte formula is somewhat disturbed, and there is described a relative large mononuclear increase. This, however, is denied by some writers. The urine is seldom much diminished in quantity. It is often of low specific gravity. Its acidity is frequently diminished and it may be alkaline in reaction. Indican is excessive in a great many cases. The diazo reaction occasionally appears. An albuminuria, with an associated nephritis, is not seldom met with.

Lombroso and Roncorini found the urea, chlorides, and phosphates diminished.

#### THIRD STAGE.

This is really the terminal stage and is chiefly characterized by cachexia. The symptoms already described do not give place to new ones, but, on the contrary, they are present and aggravated. The cachexia now, however, stands boldly in the foreground, with dementia, paralyses, and other cerebrospinal phenomena still prominent in the picture.

There is an increasing marasmus, with marked anemia, atrophy of subcutaneous fat and musculature, and a lack of resistance against intercurrent diseases. In addition there are great muscular feebleness, perhaps paralyses, including the bladder, and an uncontrollable, painless, serous diarrhœa. Death follows, with the signs of heart weakness and its consequences, edema, and effusions; or some intercurrent disease, such as acute tuberculosis of lungs, which is common at this period, or septicemia following decubitus, may close the scene.

<sup>1</sup> See J. W. Babcock's *Psychology of Pellagra*, Journ. S. C. Med. Association, November, 1910; and Proceedings American Medico-Psychological Association, 1910. An excellent brief article with bibliography.

<sup>2</sup> See Saunders, E. B. The gynaecological, obstetrical and surgical aspects of pellagra. Transactions National Conference on Pellagra, Columbia, S. C., 1909, and *American Journal Insanity*, LXVII, 3, 1911.



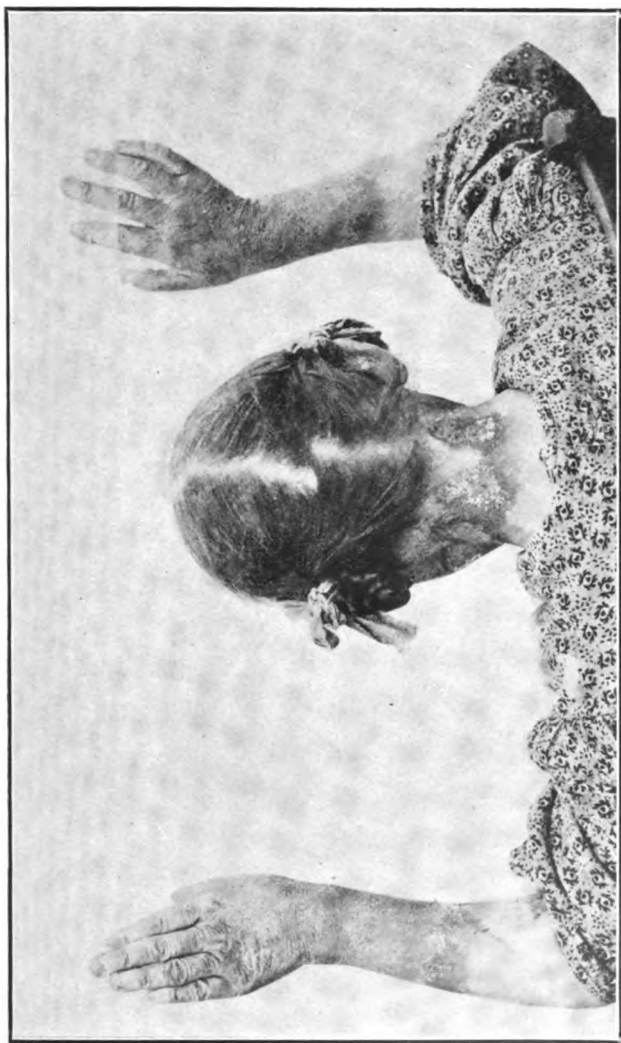
## THE PELLAGROUS ERYTHEMA.

The erythema<sup>1</sup> is the characteristic symptom of the disease. It makes its appearance usually in the springtime, sometimes in the fall. It appears symmetrically and on the uncovered parts, selecting at first especially the extensor surfaces, backs of hands and forearms, face, back of neck, upper chest, and dorsal surfaces of feet. Later the flexor surfaces may become involved, but the palmar and plantar surfaces frequently escape. Cases are, however, seen with the erythema on the covered parts of the body, and rarely it may be generalized.

Its relation to the sun's rays has been a subject of much discussion, but the most generally accepted idea is that the actinic rays of the sun simply act as an exciting cause in persons already victims of the disease.

It usually makes its first appearance on the backs of the hands, developing later in other places. The skin in the beginning becomes red with sensations of burning and perhaps slight itching, and usually some puffiness is observed—all very similar in appearance to a marked sunburn. This red color disappears on pressure, but promptly returns when pressure is released. After some days bullæ may appear, and these may fuse into large plaques filled with serum, or even seropurulent or sanguinolent fluid. The edema may then disappear, the epidermis dries and falls in small, grayish scales. This bullous, or wet erythema, is not infrequent in the United States, and is ordinarily accompanied by serious constitutional symptoms. Locally it sometimes results in extensive loss of the epithelial layer of the skin, with almost necessarily secondary infections and a distressing condition, which requires much attention. At other times the epidermis, after the initial redness described, may take on a dark color, described as brownish or blackish, chocolate colored, or plum colored, after which it dries and scales, with no bullous formation. Desquamation without erythema has been reported; also pustular erythema, especially on the face. Among some exfoliation may occur in large flakes. After the first attack the skin remains pigmented for some time, and as repeated attacks occur it gradually undergoes chronic thickening with pigmentation, often of a dirty yellow, yellowish green, or bronzed color. The skin is then indurated, thickened, hard, and rough. Later its elasticity partially disappears, the articular folds grow deeper, painful fissures and thick crusts may develop, or even small ulcerations after exfoliation. Ecchymotic spots may sometimes be seen. After repeated attacks the skin, especially of the hands, may become atrophic, thin, and parchment-like.

<sup>1</sup>Howard Fox ("Personal observation on the skin symptoms of pellagra," *Medical Record*, Feb. 5, 1910) has questioned the accuracy of the term erythema for the pellagrous skin lesions and suggested its replacement by the term dermatitis.



**ILLINOIS CASE.—ERYTHEMA ON HANDS, FOREARMS, AND NECK. NOTE THE MARKED SYMMETRY.**  
Courtesy of Dr. George A. Zeller, Superintendent Peoria State Hospital, Peoria, Ill.



with almost entire loss of elasticity, and show whitish spots like the *striae gravidarum*. When compared with the skin of the rest of the body the difference is then striking.

Merk<sup>1</sup> has summed up the distinctive characteristics of the erythema briefly thus:

(1) An eruption which is an erythema in the dermatologic sense of that word, comparable to the erythema exsudativum multiforme of Hebra, and also to certain toxic, endemic, erythemas like lupine disease in animals, the so-called clover disease, and buckwheat erythema (*fagopyrismus*); also lathyrisism and ergotism.

(2) The eruption appears suddenly, and its genesis is not necessarily connected with atmospheric or solar influences.

(3) Its limitations are peculiarly typical—sharp with red border—and as it develops it shows a more or less broad zone of scaling with a peculiar color.

(4) The eruption does not reach its height for many days or weeks, and requires a still longer time for its retrogression (several weeks). First there occurs loss of the rosy border, then the center gradually fades, while the scaly, crusty zone remains for a long while the seat of the receding process. The changes in the central zone vary with location, but are always characteristic of an erythema.

(5) By its external characteristics the erythema is strongly allied to the so-called hyperkeratosis. Still, especially on the dorsal surfaces of the hands, the erythema may show enormous exudations.

(6) The erythema is nearly always remarkably symmetrical, and shows certain places of predilection—first, backs of hands (“glove”), more rarely backs of feet (“boot”), still more rarely the face (“mask”), and finally the neck (Casal’s “neckband” and “cravat”); in the second place, the female genitalia and perineal region. It is also seen in asymmetrical, isolated situations, as elbows, knees, axillary folds.

(7) Some time after its appearance the erythema shows the typical, dirty gray-brown color of changes peculiar to hyperkeratosis. At the same time the bright red of the erythema may be seen through this, and gives to the whole a kind of bronze coloring which is especially sharp during the retrogression of the process.

(8) In an individual it appears as a rule only once annually, generally, but not necessarily, in springtime. The following year it recurs, and finally leads to atrophic changes, especially on the backs of the hands.

#### DURATION.

As stated, the disease is essentially chronic in its nature, but shows acute phenomena in the spring and less often in the fall. Its duration is indeterminate, and there is no regularity about the succession

<sup>1</sup> Verhandl. der Gesellsch. deut. Naturf. u. Aerzte. Versamml. 77, 1905.

of the various stages. A pellagrin may be very ill one year and suffer lightly the next. The disease in some may remain almost stationary in the first stage for many years, while in others it may reach the second, or even the third, in the course of a few months.

A great many cases in the United States have been characterized by rather rapid development with the early appearance of grave conditions. This intensity of the American disease has been noted by nearly all observers, and is in marked contrast with the disease as now observed in Italy. Even in the United States, however, cases are not infrequently seen which have existed some years.

#### FORMS OF PELLAGRA.

In a disease so varied in its manifestations as pellagra one or more symptoms may dominate the clinical picture, and so permit artificial classifications. Many forms of the disease have been described and various divisions made. Most of these may be disregarded, but there are two conditions which deserve some consideration.

*Typhoid pellagra (typhus pellagrosus).*—This condition is one of the important and striking manifestations of pellagra. The name is somewhat unfortunate, as it is not a typhoidal condition, nor is it related to the specific disease, typhoid fever, which is sometimes seen, however, as a complication of pellagra. It is an acute explosion which is peculiar to pellagra, and occurs as an incident in the chronic course of this disease. It is thus described in the graphic language of Belmondo,<sup>1</sup> who has made especial studies of this condition:

It is rare that typhoid pellagra develops suddenly, for, as a rule, the ordinary symptoms of pellagra show a characteristic intensity; the enteritis and the nervous phenomena (neurasthenia and paresis), as well as the general weakness, assume an unwonted importance, and even on the psychic side there are a clouding of consciousness, depressed tone, and a tendency to suicide.

Most of the cases are poorly nourished and at times much emaciated; however, there are others in which the panniculus adiposus is abundant and the general development of the muscles remains almost normal. There is often almost absolute unconsciousness, at times verberation or visual hallucinations of a terrifying nature.

The entire musculature is in a very pronounced state of tonic contraction, and there is marked rigidity evident on making passive movements of the extremities. In these manifestations the reflex rigidity increases and generally the passive movements ultimately became impossible. Often the patient makes spontaneous, inco-ordinate movements, especially with the hands and arms, from time to time. In these movements, apparently intentional, there is shown frequently a tremor of the upper extremities, with wide oscillations and a certain grade of ataxia. The speech is drawling, the voice trembling and often nasal.

<sup>1</sup> "Le alterazioni anat. del midollo spinale nella pellagra, etc." Riv. Sper. di Freniat., Reggio-Emilia, 1889 and 1890, XV and XVI.

The face has a rigid and contracted appearance; however, at intervals the mimic muscles, principally those of the mouth, are agitated by tremors which spread from one muscular fasciculus to another and reach even distant muscles.

The lower extremities are habitually in forced extension, the feet in plantar flexion. The exaggeration of the reflexes increases up to the last hour of life, the knee jerks being especially exaggerated. Even a definite ankle clonus is not rare. Under a light percussion on the tendon of the quadriceps there is often a spasmodic reaction of the leg, accompanied by convulsive movements of the whole body. At times, together with the plantar clonus, there is a paradoxical contraction of the extensors of the foot, and hyperesthesia to tactile stimuli so marked that a breath of air or a ray of light may provoke motor disorders or tonic convulsions.

To this it may be added that fever is the rule in this condition, the temperature being continuous, often with marked remissions, and usually high. Roseola is lacking. In most cases death occurs in one or two weeks, often in a terminal bronchitis.

Typhoid pellagra is not very frequent, but it is observed in America. There have been observed also certain allied acute states, usually fatal, which do not display all of the above-described symptomatology.

*Pellagra sine pellagra*.—Strambio recognized a pellagra without skin manifestations, and the Italians do not hesitate to make such diagnoses. Roussel doubted whether there ever occurred a pellagra without skin lesions at some time in the course of the disease.

Certainly cases of the disease may be under observation for a long while without the appearance of an erythema. Diagnosis must, however, often be difficult and uncertain, and should be made with caution. A tentative diagnosis, with the institution of treatment, would be safer.

Harris<sup>1</sup> has recently discussed this condition as seen in the United States.

#### PELLAGROUS INSANITY.

The association of mental phenomena with pellagra is a matter of much importance. In Italy it has been variously estimated that from 4 to 10 per cent of pellagrins become insane. It is now well established that this relationship is that of direct cause and effect and not an accident or coincidence.

In the United States up to the present time there are no data in existence which will give us a definite idea of the ratio between sane and insane pellagrins, but the number of cases with mental disturbance is undoubtedly large. This highly important phase of the subject, which can only be touched upon in a paper of this character, has been briefly summarized as follows:<sup>2</sup>

From observation and study of the subject in America it would appear that while depression (melancholia), stupor, and mutism are the ordinary psychic

<sup>1</sup> The diagnosis of pellagra. *American Journal of the Medical Sciences*, May, 1911.

<sup>2</sup> *Pellagra*: Marie, translated by Lavinder and Babcock, Columbia, S. C., 1910.

expressions of the pellagrous intoxication, yet excitement (mania, exaltation) occurs under different conditions. First, we may have temporary episodes of excitement lasting only a few hours or a few days. Second, an acute, collapse delirium may occur at any stage of the malady and usually terminates in death in from one to two weeks. It may even be an initial delirium (this is not uncommon in the United States, and it is sometimes called acute pellagra). Third, typhoid pellagra which occurs as a terminal phase of chronic pellagra. It is rare in Italy and far from frequent in the United States.

Strictly there appears to be no mental symptom-complex characteristic of pellagra, but pellagra may act as the exciting cause of several different nervous and mental states. These are: Neurasthenia, hysteria, polyneuritis, meningitis, epilepsy, acute confusional insanity (including stupor, hallucinosis, collapse delirium, and katatonla), anxiety psychoses, and the manic-depressive group, pellagrous pseudo-general paralysis, and several other forms of dementia.

It is not unlikely that the mental symptoms of pellagra may differ by seasons, or in different countries and in different parts of the same country, just as, broadly speaking, do the physical signs and symptoms of the disease.

The tendency of pellagrins to suicide has been dwelt upon from the time of Strambio by many writers and observers. Our experience in America is beginning to teach us how painfully true this observation is.

The protean and often paradoxical expressions of this strange malady deserve emphasis and the clinician is warned to be on the alert for many unexpected nervous and mental phenomena when dealing with pellagra.

#### PSEUDO-PELLAGRA.

In the foreign literature of pellagra one is constantly reminded that there are false or pseudo-pellagras which must be carefully distinguished from the true disease. References to such conditions in American literature are rather conspicuous by their absence.

Roussel, in a controversy with some of his confrères, first made use of this word to describe certain states which resembled pellagara, but which on careful analysis, in his opinion, showed essential differences from that disease. In some respects the introduction of the word has been unfortunate, and it has proven a cause of confusion to many and an object of ridicule to others. The antizeists assert that pseudo-pellagra is the kind of pellagra which the zeists can not make conform to their maize theory; while, on the other hand, the zeists seem convinced that there are certain morbid conditions, closely simulating pellagra, which yet do not permit that diagnosis.

The diagnosis of pellagra is not always easy. Indeed it is not infrequently difficult, and in the absence of any laboratory or other procedure by which it may be definitely determined, there are frequent occasions for confusion. It is possible, of course, but rather unlikely, that more than one morbid entity may at present be included under pellagra. The determination of such a question must await more definite etiologic knowledge.

#### DIAGNOSIS.

The diagnosis of pellagra in well-marked cases with both the skin manifestations and the constitutional phenomena in evidence—the

so-called pellagrous triad of erythema, nervous and digestive disturbances—should offer no difficulty. Yet, in spite of its striking characteristics, instances are not infrequent in parts of the United States to-day where competent diagnosticians fail to recognize the disease, even in pronounced cases. Such errors can be attributed only to ignorance of its symptomatology and inattention to the literature of the current journals.

The diagnosis in many cases, and especially the early diagnosis, is frequently difficult, and in cases which do not present skin manifestations—pellagra sine pellagra—it must very often be tentative. Careful inquiry into the history of the case and a search for pigmentation or other evidence of a previous skin lesion will often be of aid. The erythema is of first importance in the diagnosis and, according to Merk, possesses the same value as does the exanthem of scarlatina, measles, varicella, and variola in the respective diagnoses of these diseases. There is no laboratory or other definite method of making the diagnosis and dependence must be placed on the general symptomatology.

In the differential diagnosis ergotism, lathyrism, and acrodynia are often spoken of, but are not likely to cause confusion in this country. Scurvy, leprosy, and beriberi are also mentioned, but in most cases should be easily discriminated. Occasional cases of sprue may be met with in the United States and should be kept in mind.

Various skin lesions, such as solar erythema, lichen, eczemas, and erythema multiforme are important. The differentiation must be made on local appearances and general symptomatology.

Dementia paralytica and certain functional neuroses may cause confusion. Neurasthenia is especially to be kept in mind.

Typhoid pellagra and allied acute conditions may be mistaken for an acute infectious disease, uremia, or diabetic coma. The history of the case is of importance; and the temperature curve, condition of internal organs, and development of the process will be of service in arriving at a conclusion.

#### PROGNOSIS.

The prognosis of pellagra in America is undoubtedly serious. The disease here has been marked by an intensity not seen in the Italian pellagra of to-day, and foreign statistics furnish us with no reliable guide. The case mortality in the United States is probably diminishing. It still remains high, however, and doubtless exceeds 25 per cent.

Certain considerations are of importance. The opinion is almost unanimous that early cases offer the most hopeful results from treatment; and early diagnosis has therefore a definite bearing on prognosis. The disease is essentially chronic and, untreated, advances in-



exorably. With ultimate serious involvement of the central nervous system the outlook is not promising. Mental involvement also adds to the gravity of the case.

Pellagra is not a febrile disease, and the occurrence of fever, especially if high or constant, must be regarded as a danger signal. The character and extent of the skin manifestations have long been thought to bear no relation to the constitutional disturbance, but cases with a bullous or wet type of erythema usually show grave general symptoms. Steadily progressing emaciation, especially if accompanied by an inveterate diarrhea, often ends fatally.

Complications are of importance and their presence should not be overlooked in prognosis. Intestinal parasites, nephritis, bronchitis, pneumonia, decubitus gangrene, and tubercle should be borne in mind. The occurrence of such complications of course adds to the seriousness of the situation.

It is to be especially noted that pellagra is characterized not infrequently by the rather sudden appearance of grave acute phenomena, such as typhoid pellagra and allied conditions. These states are of the utmost gravity, and usually lead to a fatal result. The possibility of their occurrence should not be forgotten. Occasionally very sudden death may occur in cases unassociated with these conditions.

Apparent recovery from the disease is likely to be followed by a recrudescence, sooner or later, and all patients should remain under medical supervision for a long period of time.

#### TREATMENT.

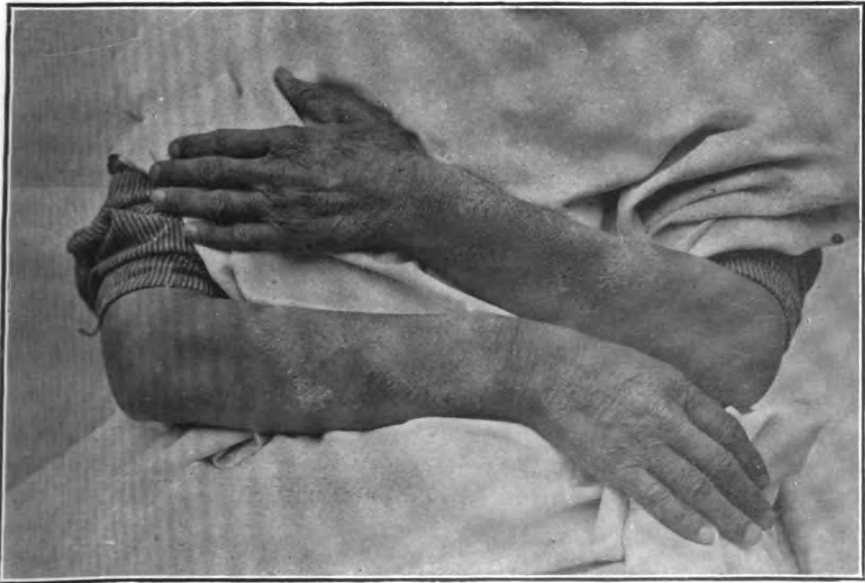
The treatment includes prophylaxis and the management of the developed disease.

*Prophylaxis.*—The lack of definite knowledge regarding the etiology of the malady renders all prophylactic measures of doubtful value. Damaged corn, however, can certainly not be considered a suitable article of diet, and such corn should not under any circumstances be used as food for human beings. There is undoubtedly no little corn of this kind on the market, and its elimination as an article of food can be advised on general principles alone. Further than this, in the present state of our knowledge, the writer feels inclined to give the patient the benefit of the doubt and advise those who suffer from the disease to avoid the use of all corn products, good or bad.

It may be stated here that under the national law of 1902 the Italian Government has instituted a number of prophylactic measures against pellagra, all based on the assumption that the disease is due to spoiled corn. These measures include inspections of corn, reports of the disease, special hospitals, sanitary stations, special bakeries, educational propaganda, and many other things. As a



EGYPTIAN PELLAGRA.



ITALIAN PELLAGRA.

From *Pellagra*, by A. Marie (translated by Lavinder and Babcock), slightly modified. Courtesy of the Publishers, The State Company, Columbia, S. C.



result of this work it is claimed that the disease has been much reduced both in numbers and intensity.

*Management of the disease.*—There is no specific for pellagra, and the treatment is to a great extent symptomatic. Experience is teaching us, however, that careful attention to details will often produce surprisingly good results. Space permits only a brief outline of the essential points in the treatment.

*General measures.*—Rest is a matter of prime importance. Severe cases, and all cases with acute symptoms, should be in bed; and even in mild cases careful attention should be given to this point. It can not be too much emphasized, and should be continued through convalescence for at least part of the day.

Diet is a matter of almost equal importance. It should be abundant, carefully selected, easily assimilable, and, whenever possible, should include meats. It must, of course, be regulated to meet the needs of the individual case, but abundance of food must be insisted upon. Eggs and milk can, of course, be made use of, and sugar can often be added with benefit. Care should be taken to include a liberal supply of salt. Sometimes an antiscorbutic diet seems of benefit. Corn and all corn products had best be prohibited. The patient should be weighed regularly. Increase in weight is of favorable significance.

Hydrotherapeutic measures may often be used with benefit. Cold and warm baths, simple or medicated, as well as douching may be employed. Such treatment must, of course, be used with discretion and consideration given to the state of the patient and the result to be obtained. Salt rubs are of benefit, and massage may often be employed as an adjuvant to the hydrotherapy. Enemata, simple or medicated, may be advantageously used for the diarrhea.

Change of climate, especially to colder latitudes, may at times be advised. Avoidance of strong direct sunlight will often prevent a bad erythema. Fresh air and cleanliness are of course to be enjoined.

Saline solution by the bowel may be of service, and such a solution intravenously may be of much service in severe cases like typhoid pellagra.

*Medical.*—Following Lombroso's teaching, arsenic has long enjoyed a reputation in the treatment of pellagra. It has not given the results in the United States that are claimed for it by the Italian and Roumanian observers. It is, however, of value, and deserves not to be neglected. Fowler's solution may be used in ascending and descending doses. The so-called arsenical preparations, like atoxyl, soamin, and arsacetin, may be used, and salvarsan certainly deserves a more extensive trial in carefully selected cases.

Hexamethylenamine and quinine have been recommended; also thyroid gland in some form has been used.

Symptomatic remedies must be used as needed. For insomnia, the bromides, chloral, paraldehyde, sulfonal, trional, and veronal; for the diarrhea, some of the bismuth preparations, atoxyl, guaiacol carbonate, ergot; for the anemia, some bland preparation of iron; for the erythema, a calamine lotion or a bland ointment, or, if necessary when there is exfoliation and infected raw surfaces, a moist antiseptic dressing. Strychnine is of value in convalescence. Symptoms must be met as they arise.

Complications, such as malaria, syphilis, and intestinal parasites, should be promptly treated with appropriate remedies. It is wise to examine the feces for the ova of parasites.

*Surgical.*—Cole<sup>1</sup> has directed attention to the value of the direct transfusion of blood in the treatment of pellagra. Under some circumstances it is doubtless a valuable surgical resource. The operation, however, requires surgical skill and experience.

In a few cases of pellagra in the United States appendicostomy, with subsequent flushing of the bowel, has been employed. Such treatment does not seem logical unless there be some complication such as amebiasis.

In conclusion, the mental depression so often associated with pellagra sometimes results in suicide, and this should always be kept in mind. It must also be remembered that pellagra is a disease which is very chronic in its nature, and patients even when apparently recovered should nevertheless be kept for a long while under medical supervision.

#### BIBLIOGRAPHY.

The literature of pellagra is extensive. Most of it is in Italian, French, German, and Spanish, but since the advent of the disease in the United States the English literature has rapidly accumulated. For those who desire to go thoroughly into the subject the Index-Catalogue of the Surgeon General's Library at Washington, and the volumes of the Index Medicus will be found indispensable.

Salveraglio (*Bibliografia della pellagra*, Gior. d. Soc. ital. d' Ig., Milano, 1887, IX, 1-156) has carefully compiled the literature up to 1887. In Marie's monograph on pellagra, as translated by Lavinder and Babcock, will be found an exhaustive compilation of the English literature up to 1910, as well as extensive references to foreign literature.

In the files of many American journals since 1907 will be found numerous articles on various phases of the disease. Brief articles may also be found in the recent editions of many medical works in English—works on tropical medicine, practice, diagnosis, skin diseases, mental and nervous diseases, as well as encyclopedias, reference handbooks, annual reviews, etc.

<sup>1</sup> Winthrop, G. J., and Cole, H. P. *New Orleans Medical and Surgical Journal*, LXIII, 90-97, 1910-11.

For the benefit of those who may desire to go a little more deeply into the subject, yet lack the time and opportunity for very extensive reading, there is given below, with critical comments, a brief list of literature. All of this may be found in the Surgeon General's Library, and some of it may be found in smaller collections.

## SPANISH.

CASAL, GASPARE. Obra póstuma del Dr. Casal, publicada en 1762. Del padecimiento que vulgarmente se llama en esta region (Austurias) mal de la rosa. *Corresp. Med.*, Madrid, 1870, V, 78, 85, 93, 101, 111, 125, etc.

CALMARZA, J. B. Estudios sobre la pelagra. *Siglo Med.*, Madrid, 1869 and 1870, XVI and XVII.

HUERTAS, F. La pelagra en España. *Archivos Latinos de Medicina y de Biología*, Madrid, año 1, núm. 1, October 20, 1903.

The Spanish literature of pellagra is not of great importance. Casal's paper is of much interest from an historical standpoint. The reference given above is to a very good Spanish translation of the original, which is in Latin. Calmarza's work is of interest. He has written a good deal on the subject. The reference given is to a prize essay, antizest in tone. Huertas is one of the best modern writers, and appended to the reference given will be found a very good bibliography of the Spanish literature.

## GERMAN.

NEUSSER, E. Die Pellagra in Oesterreich und Rumänien. *Wien. med. Presse*, 1887, 4, 146. Also reprint.

———. Das Krankheitsbild der Pellagra. *Verhandl. der Gesellsch. deutsch. Naturforsch. und Aerzte. Versamml.* 77, 1905.

BABES, V. and SION V. Die Pellagra. In *Nothnagel's Spec. Pathol. und Therapie*, Wien., 1901, Bd. XXIV, Hft. II, Abt. II, III.

GREGOR, A. Beiträge zur Kenntniss der pellagrösen Geistesstörungen. *Jahrb. f. Psychiat. u. Neurol.*, Lelpz. u. Wien, 1907, XXVIII, 215-309.

MERK, L. Die Hauterscheinungen der Pellagra. *Innsbruck*, 1909.

TUCZEK, F. Klinische und anatomische Studien über die Pellagra. *Berlin*, 1893.

The German literature is important. Neusser has had a rich opportunity for observation of the disease in Roumania, as well as in Italy. He is the creator of the autointoxication idea of the cause of the disease. His view is discussed in the first reference given. The second reference gives an excellent brief account of the clinical picture of the disease. The article by Babes and Sion is a very good one and contains a good bibliography. Gregor's work is among the best on the psychic side of the disease. Tuczek's studies on the pathology of the disease are well known. Merk's handsomely illustrated volume on the skin manifestations is a fine study.

## FRENCH.

ROUSSEL, TH. *Traité de la pellagra et des pseudo-pellagres*. Paris, 1866.

BILLOD, E. *Traité de la pellagre*. Paris, 1870.

LANDOUZY, H. *De la pellagre sporadique*. Paris, 1860.

PROCOPTU, G. *La pellagre*. Paris, 1903.

TRILLER, B., *La Pellagre*, Paris, 1906.

NICOLAS, J., and JAMBON, A. Contribution à l'étude de la pellagre et du syndrome pellagreux. *Ann. de Dermat. et de Syph.*, Paris, 1908, 4. s., IX, 385-480.

The French literature is extensive. Roussel's work is a classic. It is perhaps the best single book in existence, but has a strong zest bias. Billod and Lan-

**douzy's work is important from the side of pseudo-pellagra. Procopiu's small monograph is a good account of the disease. Triller's thesis may be recommended, but it contains some errors. The contribution of Nicolas and Jambon is among the best of the many modern French articles which take the broad view that pellagra is really not a morbid entity.**

## ITALIAN.

**STRAMBIO, G.** Dissertazioni sulla pellagra. Vols. I and II, Milano, 1794. Also Lettere ad un amico, 1822.

**LUSSANA, F., and FRUA, C.** Su la pellagra. Milano, 1856.

**LOMBROSO, C.** Trattato proflattico e clinico della pellagra. Turin, 1892.

**BELMONDO, E.** Le alterazioni anat. del midollo spinale nella pellagra. Rivista Sper. di Freniat., 1889, 266, 394; 1890, 107.

**ANTONINI, G.** La pellagra. Milano, 1902.

**GOSIO, B.** Sul problema etiologico della pellagra. Atti del Terzo Cong. Pel. Ital. Udine, 1907.

**ALESSANDRINI, G.** Sulla pellagra in Italia. Annali d' Igiene Sper., n. s., XX, fasc. IV. Also reprint.

**Rivista Pellagologica Italiana.** (A bimonthly journal devoted exclusively to pellagra. Its files extend from 1901.)

**Atti del Congresso Pellagologico Italiano, I-IV.** (These congresses were held in 1901, 1902, 1907, and 1909. There is a volume of transactions for each congress.)

There is such a wealth of Italian literature that selection is very difficult. The files of the Rivista Pellagologica Italiana and the Transactions of the National Congresses will put the reader in touch with all of the modern literature. Of the references given above Strambio's Dissertations are interesting and instructive. This is the elder Strambio, one of the first great writers on the disease. This family for three generations have been students of pellagra. Lombroso's writings are voluminous; the reference given is to his last important work. The article by Belmondo is a discussion of typhoid pellagra. Antonini's manual is a small handbook and gives a good general account. He has written many other things. Gosio's article gives a good study of the etiology. He is the author of many other articles and may be classed as one of the sanest of the zeist writers on etiology. Alessandrini's article is an epidemiologic study made in support of his hypothesis. It contains many new facts.

## ENGLISH.

**SANDWICH, F. M.** Pellagra. In his Medical Diseases of Egypt, London, 1905; and many other articles.

**ALLBUTT, T. C., and ROLLESTON, N. D.** Pellagra. In their System of Medicine. London, 1906.

**MANSON, Sir P.** Pellagra. In his Tropical Diseases, fourth edition, London and New York, 1907.

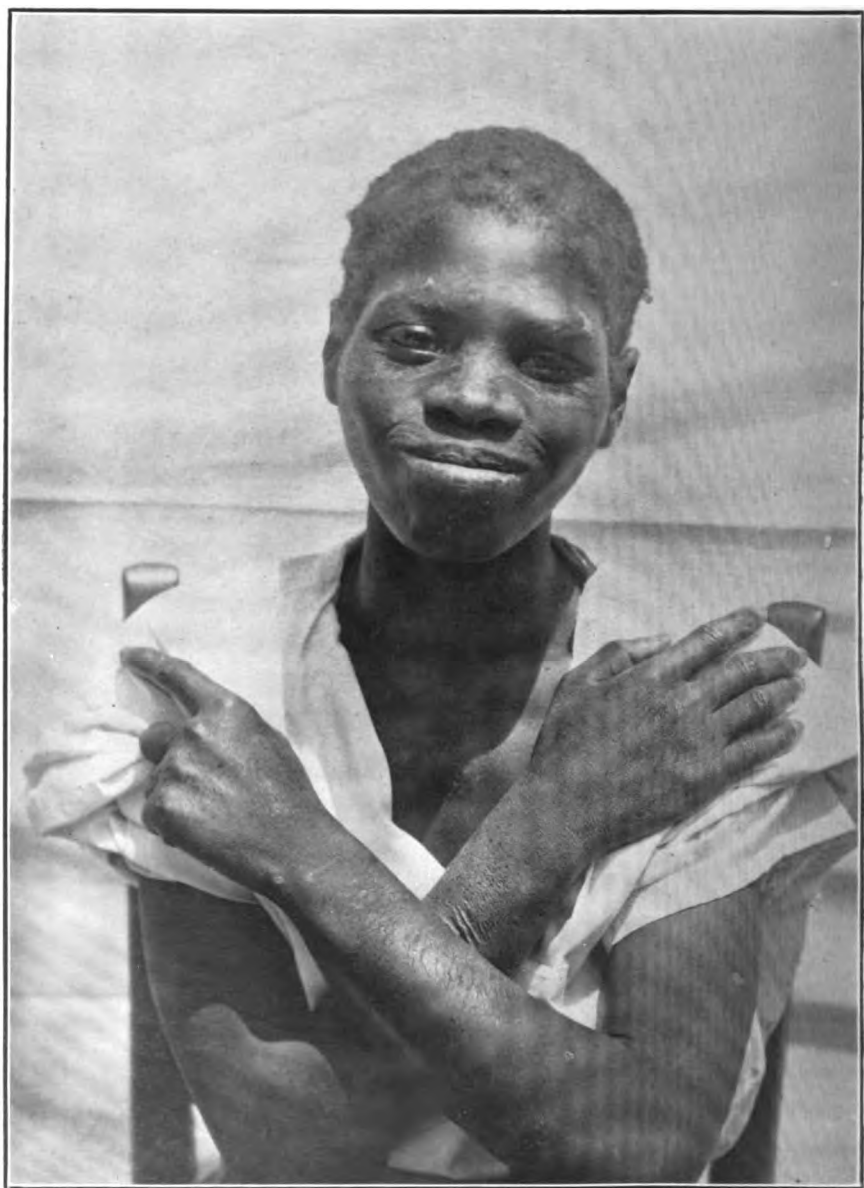
**SCHEUBE, B.** Pellagra. In his Diseases of Warm Countries, edited by Cantlie, Philadelphia, 1902.

**SAMBON, L. W.** Progress report on the investigation of pellagra. Journal of Tropical Medicine and Hygiene, XIII, 18, 19, 20, and 21, 1910.

The British literature is not very extensive. Sandwith has written of pellagra in Egypt and has directed attention to the gravity of the disease in that country. The article in Allbutt's System is not long. The article in Manson's book is very good, but is not an unbiased treatment of the subject. The article







SOUTH CAROLINA CASE.—ERYTHEMA OF FACE, HANDS, FOREARMS, AND UPPER CHEST. NOTE THE PECULIAR DISTRIBUTION ON THE FACE.

Courtesy of Dr. J. W. Babcock, Physician and Superintendent State Hospital for Insane, Columbia, S. C.

by Scheube is an excellent one and gives a bibliography. Sambon's report is an epidemiologic study of the disease in Italy, made in support of his hypothesis. It contains many new and interesting observations. There has recently been advertised a more extensive treatise along the same lines by Sambon.

The American literature will be found largely in the journals since 1907. Excellent contributions have been made by Harris, Searcy, Babcock, Watson, Wood, Bellamy, Taylor, McCampbell, King, Randolph, Alsberg, Bass, Bondurant, Cole, Siler, Nichols, Zeller, Saunders, Dyer, Pollock, Hyde, Long, Thayer, Anderson, and many others. There have been several official publications by the Public Health and Marine-Hospital Service; also the publication, as a Senate document, of Cutting's consular report. The transactions of the two conferences on pellagra held at Columbia, S. C., in 1908 and 1909 contain many articles. Reference has already been made to the translation of Marie's monograph. Some of the State Boards of Health have published bulletins on the disease, notably in South Carolina and Illinois.



## LIST OF PUBLIC HEALTH BULLETINS.

The following is a list of the Public Health Bulletins that have been issued :

- \*1. Report on Trichinæ and Trichinosis. By W. C. W. Glazier. 1881. 212 pages. 87 il. 1 map. Paper. Senate Executive Document No. 9. Forty-sixth Congress, third session. Out of print.
- \*2. Report on the Etiology and Prevention of Yellow Fever. By George M. Sternberg. 1890. 271 pages. 21 pl. 20 il. Cloth. Out of print.
- \*3. Mortality Statistics in the United States for the year ending December 31, 1897. From Annual Report Marine-Hospital Service, 1898. 24 pages. Paper. Out of print.
4. Yellow Fever: Its Nature, Diagnosis, Treatment, and Prophylaxis and Quarantine Regulations Relating Thereto. By officers of the Marine-Hospital Service. Reprint from Annual Report Marine-Hospital Service, 1898. 176 pages. 1 il. Paper.
- \*5. Shipment of Merchandise from a Town Infected with Yellow Fever. By H. R. Carter. 1899. 15 pages. Paper. Out of print.
6. Report of Commission of Medical Officers Detailed by Authority of the President to Investigate the Cause of Yellow Fever. By Eugene Wasdin and H. D. Geddings. July, 1899. 98 pages. 26 charts. 2 il. Paper.
- \*7. The Bubonic Plague. By Walter Wyman. January, 1900. 50 pages. Paper. Superintendent of Documents, 5 cents.
- \*8. Report of Commission Appointed by the Secretary of the Treasury for the Investigation of Plague in San Francisco. By Prof. Simon Flexner, Prof. F. G. Novy, and Prof. L. F. Barker. January 23, 1901. 23 pages. 1 map. Paper. Out of print.
- \*9. Report Relating to the Origin and Prevalence of Leprosy in the United States. By a Commission of Medical Officers of the U. S. Marine-Hospital Service. 1902. 119 pages. 25 il. Paper. Senate Document No. 269, Fifty-seventh Congress, first session. Superintendent of Documents. Cloth, \$1.00.
- \*10. Plague Conference. Containing a copy of the address of the chairman, and resolutions passed by a conference called in accordance with requests from a number of State Boards of Health, and under authority of section 7, act of Congress approved July 1, 1902, to consider the plague situation. Reprint from P. H. R. No. 4, Vol. XVIII, January 23, 1903. 9 pages. And February 6, 1903. 41 pages. Paper. Out of print.
- \*11. Transactions of the First Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. June, 1903. 120 pages. Cloth. Out of print.
12. Transactions of the Second Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. June, 1904. 95 pages. Cloth.
13. The Public Health and Marine-Hospital Service of the United States. A Brief History. Prepared for the Louisiana Purchase Exposition. December, 1904. 16 pages. Paper.

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\* Exhausted and not for distribution.

- \*14. Sanatorium for Consumptives, Fort Stanton, N. Mex. By P. M. Carrington. Reprint from Annual Report Public Health and Marine-Hospital Service, 1904. 19 pages. Paper. Out of print.
15. Transactions of the Third Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. May, 1905. 52 pages. Cloth.
16. How to Prevent Yellow Fever—No Mosquitoes, No Yellow Fever. By Walter Wyman. July 31, 1905. 3 pages. Circular.
17. Transactions of the Fourth Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. May, 1906. 75 pages. Cloth.
18. Transactions of the Fifth Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. May, 1907. 47 pages. Cloth.
19. Trachoma, Its Character and Effects. By Talliaferro Clark and J. W. Schereschewsky. 1907. 34 pages. 6 il. Paper.
- \*20. The Public Health and Marine-Hospital Service of the United States. A Brief History. Prepared for the Jamestown Ter-Centennial Exposition. 1907. 12 pages. Paper. Out of print.
- \*21. Transactions of the Sixth Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. April, 1908. 79 pages. Cloth. Out of print.
- \*22. The Present Pandemic of Plague. By J. M. Eager. 1908. 30 pages. Paper. Out of print.
23. Pellagra—A Précis. By C. H. Lavinder. July 24, 1908. 22 pages. 1 il. Paper.
24. The Marine-Hospital Sanatorium, Fort Stanton, N. Mex. Prepared for the International Congress on Tuberculosis, held in Washington. Sept., 1908. 32 il. 56 pages. Paper.
- \*25. Hookworm Disease. Reprint from Annual Report P. H. and M. H. S., 1908. 5 pages. Paper. Out of print.
26. Studies upon Leprosy.
- I. The Present Status of the Leprosy Problem in Hawaii.
- II. The Reaction of Lepers to Moro's "Percutaneous" Test.
- III. A Note upon the Possibility of the Mosquito Acting in the Transmission of Leprosy. By W. R. Brinckerhoff. 1908. Investigations made in accordance with the act of Congress approved March 3, 1905. 24 pages. Paper.
27. Studies upon Leprosy.
- IV. Upon the Utility of the Examination of the Nose and the Nasal Secretions for the Detection of Incipient Cases of Leprosy. By W. R. Brinckerhoff and W. L. Moore. 1909. Investigations made in accordance with the act of Congress approved March 3, 1905. 29 pages. Paper.
28. Studies upon Leprosy.
- V. A Report upon the Treatment of Six Cases of Leprosy with Nastine (Deycke). By W. R. Brinckerhoff and J. T. Wayson. Honolulu, T. H.
- VI. Leprosy in the United States of America in 1909. By W. R. Brinckerhoff. 1909. Investigations made in accordance with the act of Congress approved March 3, 1905. 25 pages. Paper.
- \*29. The Prevalence of Rabies in the United States. By J. W. Kerr and A. M. Stimson. 1909. 16 pages. Paper. Out of print.

- \*30. **The Rat and Its Relation to the Public Health.** By various authors. 1910. 254 pages. 60 figs. 6 pl. Paper. Exhausted.
1. Introduction. By Walter Wyman.
  2. Natural History of the Rat. By D. E. Lantz.
  3. Plague Infection in Rats. By G. W. McCoy.
  4. Rat Leprosy. By W. R. Brickerhoff.
  5. Bacterial Diseases of the Rat other than Plague. By D. H. Currie.
  6. Organic Diseases of the Rat. By G. W. McCoy.
  7. Ecto Parasites of the Rat. By N. Banks.
  8. Intestinal Parasites of Rats and Mice in their Relation to Diseases of Man. By C. W. Stiles.
  9. Rodents in Relation to the Transmission of Bubonic Plague. By Rupert Blue.
  10. Rodent Extermination. Rats and Mice. By W. C. Rucker.
  11. Natural Enemies of Rats. By D. E. Lantz.
  12. Rat-Proofing as an Antiplague Measure. By R. H. Creel.
  13. Inefficiency of Bacterial Viruses in the Extermination of Rats. By M. J. Rosenau.
  14. Plague Eradication in Cities by Sectional Extermination of Rats and General Rat-Proofing. By Victor G. Heiser.
  15. The Rat in Relation to Shipping. By W. C. Hobdy.
  16. The Rat as an Economic Factor. By D. E. Lantz.
  17. The Rat in Relation to International Sanitation. By J. W. Kerr.
- \*31. **Transactions of the Seventh Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service.** June, 1909. 86 pages. Cloth. Exhausted.
32. Hookworm Disease (or Ground-Itch Anemia), its Nature, Treatment, and Prevention. By Prof. C. W. Stiles. 1910. 40 pages. Paper.
  33. Studies upon Leprosy. 1910. 25 pages. Paper.
    - VII. A Statistical Study of an Endemic Focus of Leprosy. By W. R. Brickerhoff and A. C. Reinecke.
    - VIII. A Palliative Treatment for Leprous Rhinitis. By J. T. Wayson and A. C. Reinecke.
  34. Maritime Quarantine. By L. E. Cofer. 1910. 25 figs. 64 pages. Paper. Appendix: Disinfectants Authorized by United States Quarantine Regulations and the Proper Method of Generating and Using Same.
  35. The Relation of Climate to the Treatment of Pulmonary Tuberculosis. By F. C. Smith. 1910. 17 pages. Paper.
  36. Tuberculosis: Its Nature and Prevention. By F. C. Smith. 1910. 12 pages. 1 pl. Paper.
  37. The Sanitary Privy: Its Purpose and Construction. By Prof. C. W. Stiles. 1910. 24 pages. 12 figs. Paper.
  38. General Observations on the Bionomics of the Rodent and Human Fleas. By M. B. Mitzmain. 1910. 34 pages. Paper.
  39. Studies upon Leprosy. September, 1910. 50 pages. Paper.
    - IX. Mosquitoes in Relation to the Transmission of Leprosy.
    - X. Flies in Relation to the Transmission of Leprosy. By D. H. Currie.
    - XI. Heredity Versus Environment in Leprosy. By H. T. Hollmann.
- \*40. **Transactions of the Eighth Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service.** November, 1910. 101 pages. Paper. Exhausted.

41. Studies upon Leprosy. November, 1910. 36 pages. Paper.
  - XII. Notes on the Study of Histories of Lepers from the Standpoint of Transmission. By D. H. Currie.
  - XIII. A Contribution to the Study of Rat Leprosy. By D. H. Currie and H. T. Hollmann.
42. Disinfectants: Their Use and Application in the Prevention of Communicable Diseases. By T. B. McClintic. December, 1910. 46 pages. Paper.
43. Experimental Studies of Plague and a Plague-like Disease among Rodents. By George W. McCoy. April, 1911. 71 pages. 7 pl. Paper.
44. Acute Anterior Poliomyelitis (Infantile Paralysis). By Wade H. Frost. February, 1911. 52 pages. Paper.
45. A Digest of the Laws and Regulations of the Various States relative to the Reporting of Cases of Sickness. By J. W. Trask.
46. Transactions of the Ninth Annual Conference of State and Territorial Health Officers with the Public Health and Marine-Hospital Service. September, 1911.
47. Studies upon Leprosy. By D. H. Currie, M. T. Clegg, and H. T. Hollmann. September, 1911.
  - XIV. The Artificial Cultivation of the Bacillus of Leprosy.
  - XV. Attempts at Specific Therapy in Leprosy.
48. Pellagra. A Précis. (Revised edition.) By C. H. Laviuder. September, 1911.



TREASURY DEPARTMENT  
UNITED STATES PUBLIC HEALTH SERVICE

PUBLIC HEALTH BULLETIN No. 49

(Revised Edition, April, 1923)

# OPHTHALMIA NEONATORUM

AN ANALYSIS OF THE LAWS AND REGULATIONS  
RELATING THERETO IN FORCE IN  
THE UNITED STATES

BY

J. W. KERR

Assistant Surgeon General

and

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PREPARED BY DIRECTION OF THE SURGEON GENERAL



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## FOREWORD.

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On account of the accumulated evidence of the undue prevalence of ophthalmia neonatorum and the necessity for its control, a compilation and analysis of the existing State laws and regulations was made by an officer of the service and published in 1911 as Public Health Bulletin No. 49, Ophthalmia Neonatorum. At that time laws and regulations relating to this disorder were in force in only 28 States, the District of Columbia, and in Porto Rico.

It is believed that the publication of this material served a useful and timely purpose in stimulating greater interest in the prevention of eye infections of the new born, and in supplying information with respect to the laws of other States to those in authority desiring to secure similar legislation within their respective jurisdictions.

After a lapse of 11 years it is now deemed advisable to revise this bulletin and bring it up to date, adding the new laws and regulations that have come into force. It is found on analysis that while there is yet considerable lack of uniformity in method and practice, the provisions of the more recently enacted laws are more comprehensive than those enacted at an earlier period of our knowledge of this problem. It is hoped that this publication will be as helpful as the original to those who have in mind still greater effort for the elimination of infections potentially so harmful to the visual health of the two million babies born annually in this country.

H. S. CUMMING, *Surgeon General*

(v)



# OPHTHALMIA NEONATORUM.

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## PART I.

### GENERAL DISCUSSION OF OPHTHALMIA NEONATORUM.

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There are no complete statistics showing the prevalence of ophthalmia neonatorum and only an approximate idea can be had of the number of cases by studying the admissions to the schools for the blind and the, as yet, incomplete reports from the States with statutory requirements for reporting. A committee of the British Medical Association found that more than one-third of those in the schools for the blind of Great Britain owed their affliction to this disease.<sup>1</sup>

In the various blind asylums and schools of Scotland, in 1912, the percentage of cases due to ophthalmia neonatorum varied from 27 to 75 per cent, the average being about 35 per cent.<sup>2</sup>

In 1919, 8,648 cases of ophthalmia neonatorum were reported in England and Wales. In 1920, it was estimated that in infancy the amount of blindness in Great Britain due to ophthalmia neonatorum was 50 per cent, and, further, it was shown that in the case of 1,855 blind school children 19.7 per cent was caused by this disease.<sup>3</sup>

In London, 870 cases of ophthalmia neonatorum were reported, in 1919, 1,186 in 1920, 1,076 in 1921, and 436 for the January-June half of 1922.<sup>4</sup>

It has been conservatively estimated that ophthalmia neonatorum is responsible for about 20 per cent of the blind in the United States. Of 3,733 cases of blindness in 39 schools and classes for the blind in 1920-21, ophthalmia neonatorum is reported in 22 per cent of the total pupils. Of the new admissions to these schools and classes, ophthalmia neonatorum is reported in only 13.5 per cent.<sup>5</sup>

A total of 52,617 blind persons were enumerated in the census of 1920 as compared with 57,272 in 1910, a decrease of 4,655 cases. Attention is called to this decrease as being due in part to change in the method of reporting and in large measure to the education of the laity and the medical profession regarding the "possibility and duty

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<sup>1</sup> British Medical Journal, May 8, 1900.

<sup>2</sup> Report of the Local Government Board for Scotland, 1912.

<sup>3</sup> British Medical Journal, November 5, 1921.

<sup>4</sup> Lancet, London, August 5, 1922.

<sup>5</sup> Annual Report of the National Committee for the Prevention of Blindness, 1921.



of preventing blindness." In no field of disease control is the probability of success so certain as the prevention of eye infections in the new born. Aside from the effect on the personal fortune and happiness of the individual and on his efficiency as a citizen, the case of those needlessly blinded by infection acquired during and shortly after birth is a serious economic burden to the community and to the State. It is estimated that it costs approximately \$400 a year each to educate the 10,000 or more children blinded by acute eye infections acquired in infancy, necessitating an annual expenditure of approximately \$4,000,000 for this purpose.

In 1921 the New York State Legislature appropriated, in addition to other funds for the relief of the blind, the sum of \$40,500 to the New York Institution for the Education of the Blind on the basis of \$450 each for 90 pupils; and by a special appropriation to the International Sunshine Society, the sum of \$6,570 was made available for the care of 12 blind children, at \$1.50 a day, for a period of 365 days.

Of 34,000 blind persons in the United Kingdom, one-third owed their blindness to ophthalmia neonatorum. It costs on an average £124 a year to educate and maintain each blind child as compared with £12 a year, the cost of the education of a normal public elementary school child. In addition, by special provision, blind persons are eligible for old-age pensions at 50 years of age instead of 70, reflecting a further economic loss due to this disease.<sup>6</sup>

#### LEGISLATIVE MEASURES FOR THE CONTROL OF OPHTHALMIA NEONATORUM.

Notwithstanding this great economic loss to the State on account of ophthalmia neonatorum, it was not until 1881 that Credé gave to the world a prophylactic, thereby connecting forever his name with the prevention of the disease and the subsequent saving of the sight of infants. The effective and simple way in which he checked the infection by the use of silver salts, and the statistics compiled by him and others, gave substantial support to his theories, which have been gradually incorporated in the sanitary policy of all civilized countries. Legislative bodies, both in this country and abroad, having had impressed upon them the importance of the disease, have adopted various legal measures for its control.

It is the object of this bulletin to present a comparative statement of the several measures adopted in the different States and to bring together copies of the laws in which they are contained. Brief mention is also made of measures that are required to be taken in certain countries abroad.

#### SOME OF THE EARLIER MEASURES REQUIRED TO BE OBSERVED ABROAD.

In 1865 Austria and Switzerland took the lead in devising measures for the control of ophthalmia neonatorum, requiring midwives

<sup>6</sup> National Health, July, 1922.

to call to the attention of parents the necessity of securing a physician in such cases, and to report the case on their refusal to do so. The results of this were that not a single case of blindness caused by ophthalmia neonatorum had been admitted to the blind asylum of Zurich in 20 years.<sup>7</sup>

In France ophthalmia neonatorum was classed as one of the communicable diseases to be reported and be subject to disinfection. By presidential decree, April 15, 1908, pharmacists were directed to furnish a nitrate of silver solution on prescription of licensed midwives (pourvue d'un diplome). This regulation also prescribes the preparation of the solution, the container to be used, and a special label with printed instructions for the use of the solution.

In Italy the regulations for midwives provide that the lids and conjunctivae of infants must be washed after birth with a disinfecting solution, and that if an inflammation develops a physician must be called immediately.

In Belgium a special regulation governing the practice of midwifery, promulgated August 1, 1908, required the midwife immediately to call a physician in all cases of ophthalmia neonatorum in the new born.

In Bavaria the midwife is required to carry with her a vial containing the nitrate of silver solution, with directions for its use.

The Ophthalmic Society of Great Britain and Ireland recommended that the following note be printed on all birth certificate forms: "If the eyelids are red and swollen or form the site of a secretion some days after birth, the child should be taken to the physician without delaying one day. The disease is very dangerous; if not cured in time, the sight of both eyes may be lost." A similar statement in the birth certificate is now used in a number of the States. Ophthalmia neonatorum was made compulsorily notifiable throughout England and Wales in April, 1914.

More recent foreign measures are the prophylactic treatment of the eyes of the new born and the compulsory notification of ophthalmoblennorrhoea established in Prussia in September, 1920. Since the introduction of prophylactic treatment (silver nitrate) of the new born in the obstetric clinics, it is stated that the morbidity rate for ophthalmoblennorrhoea in those clinics has dropped from 10 per cent to 0.09 per cent.<sup>8</sup>

#### LEGISLATION IN THE UNITED STATES.

So far as known, the first legal steps taken by any State to control ophthalmia neonatorum in the United States were those of New York in 1890 when its legislature enacted the first law relative to ophthalmia neonatorum in this country.

<sup>7</sup> Report of the Local Government Board of Scotland, 1912.

<sup>8</sup> Munchener medizinische Wochenschrift, Munich, Sept. 23, 1921, 68, No. 38, p. 1223.

Subsequently other States took legislative action. The dates of the first respective laws or regulations are as follows:

New York.....	Sept. 1, 1890
Maine.....	Mar. 28, 1891
Rhode Island.....	Apr. 19, 1892
Minnesota.....	<sup>9</sup> Feb. 22, 1893
Ohio.....	Mar. 16, 1894
Maryland.....	Apr. 6, 1894
New Jersey.....	Mar. 11, 1895
Michigan.....	Mar. 29, 1895
Missouri.....	Apr. 3, 1895
Connecticut.....	Apr. 18, 1895
Illinois.....	June 21, 1895
Pennsylvania.....	June 26, 1895
South Carolina.....	Feb. 25, 1896
Iowa.....	Apr. 3, 1896
Porto Rico.....	Oct. 24, 1899
Massachusetts.....	Mar. 31, 1905
Idaho.....	Mar. 12, 1907
Wisconsin.....	Apr. 21, 1909
Vermont.....	Nov. 11, 1910
Tennessee.....	Feb. 13, 1911
Indiana.....	Mar. 4, 1911
North Dakota.....	Mar. 6, 1911
Utah.....	Mar. 9, 1911
Texas.....	<sup>10</sup> Mar. 23, 1911
New Hampshire.....	Apr. 12, 1911
District of Columbia.....	Aug. 25, 1911
Washington.....	July 15, 1912
Arkansas.....	May 16, 1913
South Dakota.....	Aug. 20, 1913
Kansas.....	Dec. 13, 1913
Kentucky.....	Mar. 9, 1914
Arizona.....	Apr. 25, 1914
Louisiana.....	July 9, 1914
Oregon.....	Feb. 23, 1915
North Carolina.....	Mar. 9, 1915
Nebraska.....	Apr. 15, 1915
California.....	June 11, 1915
Alabama.....	Sept. 22, 1915
West Virginia.....	Jan. 28, 1916
Colorado.....	Feb. 7, 1916
Mississippi.....	Mar. 15, 1916
Florida.....	Feb. 13, 1917
Delaware.....	Apr. 2, 1917
Virginia.....	Mar. 27, 1918
Georgia.....	<sup>11</sup> Aug. 17, 1918
New Mexico.....	Mar. 15, 1919
Montana.....	April, 1920
Wyoming.....	Feb. 25, 1921
Oklahoma.....	Mar. 9, 1921
Nevada.....	Mar. 23, 1921

<sup>9</sup> Repealed by chap. 108, Rev. Laws, 1905, Prov., now incorporated in regulation.

<sup>10</sup> Since January 4, 1910, a provision of the Sanitary Code.

<sup>11</sup> Amended Mar. 12, 1921, to include all births.

## PART II.

### SUMMARY OF STATE LAWS AND REGULATIONS.

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#### DEFINITION.

The laws of all the States requiring notification of eye infection of the new born characterizes the conditions of the eyes requiring notification as redness, inflammation, swelling, or discharge from one or both eyes, occurring within a varying time limit after birth. Ophthalmia neonatorum is specifically defined by law in the following States:

California, Connecticut, Delaware, Idaho, Illinois, Kentucky, Louisiana, Mississippi, Nevada, North Carolina, Ohio, Oklahoma, Rhode Island, Virginia, West Virginia.

#### NOTIFICATION.

The legal status of notification of ophthalmia neonatorum is not the same in all the States. In some States notification is required by special law, in others by regulation, and in still others by the general communicable disease law, or by both the communicable disease law and a special law.

##### 1. By special law.

Alabama, California, Connecticut, Delaware, Georgia, Idaho, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Mississippi, Missouri, Nevada, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Utah, Virginia, West Virginia, Wisconsin, Wyoming.

##### 2. By regulation.

District of Columbia, Porto Rico (physician or midwife report cases of any child under the age of 30 days under treatment presenting suspicious symptoms), Minnesota (having force of law).

##### 3. As communicable disease.

Alabama, Arizona, Arkansas, Colorado, Delaware, Florida, Idaho, Kansas, Kentucky, Maine, Massachusetts, Michigan, Minnesota, Mississippi, Montana, Nebraska, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Vermont, Washington, West Virginia, Wisconsin, Wyoming.

#### SPECIAL NOTIFICATION REQUIREMENTS.

In a majority of the States cases of ophthalmia neonatorum are to be reported to the local health officers, and they in turn are required

to notify the State boards or departments of health. With regard to the persons who shall report, the laws and regulations of the States differ greatly.

### 1. Persons notified and notifying.

(a) Local health officer or, in some instances, the county physician:

(1) By physicians in all States requiring notification as a communicable disease.

(2) By physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital of any nature, relative, or any person or persons attendant upon: California, Delaware, Idaho, Illinois, Louisiana, Massachusetts, Minnesota, Nevada, North Carolina, Ohio, Oklahoma, Virginia, West Virginia.

(3) Miscellaneous: Connecticut (professional attendant or other person caring for); District of Columbia (midwife or any other person than a registered physician); Indiana (physician, midwife, or any other person engaged as professional attendant); Iowa (any person authorized by law to act as an obstetrician or any other person having care of); Kentucky and Utah (physician and midwife); Massachusetts (physician, registered hospital medical officer, nurse, relative, or attendant having charge of); Montana, Pennsylvania, Rhode Island (physician, midwife, nurse, attendant, or other person having care of); Missouri (parent or other person having charge of); South Carolina (midwife, nurse, or other person); Vermont (nurse, relative, or other person having care of).

(b) Local health officer in the absence of attending physician: Alabama, Kansas, New Hampshire, New Jersey, New Mexico (midwife, nurse, father, mother, or other person in charge); Ohio (midwife, nurse, or other person having care of); Colorado (superintendent of hospitals or other institutions, nurses, midwives, attendants, or householders); Indiana and North Dakota (parents or in their absence persons caring for); Kentucky (head of family and trained nurse in family, and trained nurse and head of any institution in which there is a baby under 30 days old); Wisconsin (nurse, parent, or other attendant).

(c) Local health officer or some legally qualified practitioner of medicine: Arkansas, New York, Oregon, South Dakota, Tennessee, Washington (midwife, nurse, or other person having care of); Georgia (any person who shall nurse or attend); Maryland (midwife, nurse, or person other than legally qualified physician).

(d) Legally qualified practitioner of medicine: Idaho (midwife); Maine, Michigan, Ohio (midwife, nurse, or other person having care of); Porto Rico (any nurse, midwife, or other person not a legally qualified practitioner of medicine).

(e) Physician in absence of local health officer: North Carolina, Virginia, West Virginia (midwife); Oklahoma (midwife, manager, or person in charge maternity home or hospital or private or public institution, parent, relative, or any person attendant on or assisting in).

(f) State board of health: Florida (physicians and midwives, parent, or other person in charge should no physician be in attendance); Pennsylvania (in absence of local health officer, physician, midwife, nurse, or other person having care of).

### 2. Notification required in cases occurring within a prescribed period after birth.

Practically all of the States designate a definite period after birth within which cases of inflammation of the eyes of infants are to be reported, but a very great lack of uniformity in this respect may be noted, as follows:

(a) Newly born: Nebraska, District of Columbia, and Utah.

(b) Infant: Arkansas.

(c) Twenty-four hours: Oklahoma.

(d) Less than 10 days: Ohio (midwife, nurse, or relative in charge).

(e) Two weeks: Alabama, California, Connecticut, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Kansas, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nevada, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, Tennessee, Vermont, Virginia, West Virginia, Wisconsin.

(f) Four weeks: Maine.

(g) Thirty days: Kentucky and Porto Rico.

(h) Two months: South Dakota.

(i) Six months: Iowa.

(j) Any age: South Carolina.

(k) Not specified: Colorado, New Mexico, Washington, and Wyoming.

### 3. Time limit for reporting:

(a) At once: South Carolina and Maine.

(b) Immediately: Alabama, Arizona, Colorado (midwife, nurse, or other person in charge), Florida, Iowa, Kansas, Maryland, Massachusetts (physician, hospital, medical officer, and midwife), Missouri, Montana, Nevada, North Dakota, (midwife, nurse, or other person in charge), North Carolina, Porto Rico, Virginia, West Virginia, Wyoming.

(c) Within two hours: Washington.

(d) Within six hours: Arkansas, Connecticut, Delaware, District of Columbia, Florida, Indiana, Illinois, Kentucky (in city), Louisiana, Massachusetts (nurse, relative, or other attendant), Michigan, Mississippi, New Jersey, New Hampshire (midwife), New Mexico, North Dakota (parents, or in their absence, whoever is caring for in absence of physician), Ohio, Oklahoma, Pennsylvania (midwife, nurse, or other person having charge), Tennessee, Utah, Vermont, Wisconsin.

(e) Eight hours: Minnesota.

(f) Twelve hours: Rhode Island and South Dakota.

(g) Twenty-four hours: California, Kentucky (cases occurring outside of city), Louisiana, Nebraska, New Hampshire (physician), Oregon, Washington.

(h) Ten days: Georgia and Idaho.

(i) Not specified: Porto Rico and New York.

### 4. Manner of reporting:

(a) In writing: Arizona, Connecticut, Delaware, District of Columbia, Florida, Idaho, Indiana (midwife or parent, when no physician attending), Louisiana, Kansas, Massachusetts, Missouri, Minnesota, Montana, Nebraska, Nevada, New Hampshire, New Jersey, North Carolina, North Dakota, Ohio (midwife, nurse, or relative in charge in absence of the attending physician, or to local health officer in absence of physician), Oregon, Pennsylvania, Vermont, West Virginia, Wisconsin, Wyoming.

(b) In writing or by telephone followed by writing: Alabama, Colorado, Illinois, New Mexico, Oklahoma, Washington.

(c) Not specified: Arkansas, California (as State board shall direct), Georgia, Iowa, Kentucky, Maine, Maryland, Michigan, Mississippi, New York, Ohio (as State board shall direct), Porto Rico, Rhode Island, South Carolina, South Dakota, Tennessee, Utah, Virginia.

### 5. Fee for reporting:

North Carolina and Ohio.

6. Penalty for failure to report cases of ophthalmia neonatorum is imposed in the following States:

Alabama, Arkansas, California, Colorado, Connecticut, Delaware, District of Columbia, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana,

Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Oregon, Porto Rico, South Carolina, Tennessee, Utah, Vermont, Virginia, Washington, West Virginia, Wyoming.

#### ADVICE AND WARNING TO PARENTS.

In a large number of the States the law directs that advice and warning be given to parents regarding the dangers of ophthalmia neonatorum and the necessity for prompt treatment. In a majority of instances the local health officer is designated to perform this duty, and, in other instances, the attending physician, nurse, or midwife. Furthermore, a number of the State laws specifically direct the State health officers to prepare and distribute educational material.

Kentucky occupies a unique position in that the law requires the county board of health of each county to arrange, in cooperation with the county medical society and the State board of health, for an annual course of instruction to teach physicians, midwives, and nurses the importance of early recognition and treatment and other facts relating to the control of ophthalmia neonatorum.

In the following States provision for advice and warning to parents is made either by law or regulation:

Arkansas, Arizona, California, District of Columbia, Idaho, Illinois, Louisiana, Michigan, Minnesota, Missouri, Nevada, New Jersey, New Mexico, North Carolina, North Dakota, Oregon, Oklahoma, Pennsylvania, Rhode Island, Tennessee, Virginia, Washington, West Virginia, Wisconsin, Wyoming.

#### TREATMENT.

In addition to the operation of the poor laws of the several States, special provision is made by law or regulation in a number of them for the treatment of cases of ophthalmia neonatorum.

Treatment is furnished by the local health officer in the following States:

Arkansas (given direction for proper treatment), Idaho, Indiana, Iowa, Kentucky, Massachusetts, Mississippi, Missouri, Nevada, New Hampshire, New Jersey, North Carolina, North Dakota, Ohio (State department of health), Oklahoma, South Dakota, Vermont, Virginia, West Virginia, Wisconsin, Wyoming.

In Illinois, Montana, Oregon, and Pennsylvania the treatment is furnished by the county physician.

In Minnesota and New Mexico treatment is given by a county physician or local health officer acting under the poor law.

In Arkansas the local health officer is not authorized to provide treatment, but simply to give directions for the proper treatment.

## PROPHYLAXIS.

1. The use of a prophylactic is required in the several States as follows:

(a) By law: Alabama, Delaware, Connecticut (only in case of persons in any state-aided institution or by midwife), Georgia, Idaho, Illinois (physician and midwife required to advise use of), Indiana (in suspected cases), Iowa, Louisiana, Maine (conscientious objectors excepted), Michigan, Mississippi (limited to maternity homes, hospitals, and midwives), Missouri, New Hampshire, Nebraska, Nevada, North Carolina, North Dakota (suspected cases), Ohio (limited to maternity homes, hospitals, public or charitable institutions, and midwives), Oklahoma, Rhode Island, Tennessee, Texas, Virginia, West Virginia, Wisconsin, Wyoming.

(b) By regulation: Arkansas, Colorado, Kentucky, Minnesota, New Mexico (conscientious objectors excepted), New York, Oregon, Pennsylvania (required by licensure bureau for midwives), Washington.

(c) Not required: Maryland, Massachusetts, Florida, Porto Rico.

2. Special provision for the use of a prophylactic:

The provisions of the laws for the use of a prophylactic are mandatory in a majority of the States and in others its use is optional or advised, as follows:

(a) Mandatory: Alabama, Arkansas (regulation), Connecticut (in the case of any person in any State-aided institution or by midwife in the case of any infant), Delaware, Florida, Georgia (to prevent gonococci infection), Idaho, Indiana (in suspected cases), Iowa (except on grounds of religious belief), Kentucky (regulation), Louisiana, Maine (conscientious objectors excepted), Michigan (physician, nurse, or midwife), Minnesota (unless parents object), Mississippi (cases in maternity homes and hospitals and by midwife), Missouri, Nebraska (for physicians), Nevada, New Hampshire, New Mexico (except in case of conscientious objection), New York (regulation), North Carolina, North Dakota (suspected cases), Ohio (maternity homes, hospitals, public or charitable institutions, and midwives), Oklahoma (unless for best interest of child not to do so), Oregon (regulation), Rhode Island (physicians), Tennessee, Texas, Utah, Virginia (maternity homes), Washington, West Virginia, Wisconsin, Wyoming (except in case of protest because of religious belief).

(b) Optional: California, Montana, New Jersey.

(c) Advised: Arizona, Illinois, District of Columbia (midwives instructed to use), Kansas, South Carolina, Utah.

3. Time requirements:

A prophylactic must be used within a prescribed time limit after birth. With this as with other requirements it may be observed that the laws of the several States vary greatly.

(a) Immediately: Arkansas, California, Connecticut, Delaware, Idaho, Iowa, Louisiana, Maine, Mississippi, District of Columbia (recommended), Missouri, Nevada, New Hampshire, North Carolina (physicians and midwives), Ohio, Oklahoma, Rhode Island, Texas, Virginia, Washington, West Virginia, Wisconsin.

(b) Within one hour: Michigan, New Mexico, and Tennessee.

(c) Within two hours: Alabama, North Carolina (maternity homes, hospital, or other public or private charitable institution).

(d) At birth: Georgia, Kansas, Kentucky, Minnesota, Nebraska, Utah, Wyoming.

(e) At time of delivery: New York and Oregon.



(f) Within six hours: Rhode Island.

(g) Time not specified: Colorado, Delaware, Illinois, Indiana, North Dakota, Maryland, New York, Massachusetts, South Carolina, South Dakota, Porto Rico, Montana, Vermont, Wyoming.

#### 4. Nature of prophylactic:

A 1 per cent solution of nitrate silver is quite generally regarded by ophthalmologists as the best available prophylactic. The requirements of several States in this respect are far from being uniform, not only with regard to the prophylactic employed but also in respect of the strength of the solution, as may be noted in the following list:

(a) One per cent solution nitrate silver: Arizona, California, Colorado, Connecticut, Florida, Georgia, Illinois, Kansas (prescribed), Kentucky, Louisiana, Maine, Minnesota, Massachusetts, Missouri, Montana (recommended and urged), New Jersey, New Hampshire (recommended), New York, North Dakota, Oklahoma, Porto Rico, Rhode Island, South Carolina, South Dakota, Texas, Vermont, Virginia, Washington, West Virginia, Wisconsin.

(b) Two per cent nitrate silver solution: Arkansas, Oregon, Michigan.

(c) New Mexico.—One per cent nitrate silver, or 25 per cent argyrol, or 5 per cent protargol, or other silver compound.

(d) Wyoming.—One per cent or 2 per cent silver nitrate, or 10 per cent argyrol; or 1 or 2 per cent protargol.

(e) Alabama—25 per cent argyrol, 1 per cent nitrate silver, or 5 per cent protargol.

(f) Delaware—2 per cent nitrate silver, 10 per cent argyrol, 1 per cent protargol.

(g) Nebraska—1 to 4 per cent nitrate silver, 40 to 50 per cent argyrol, 10 to 40 per cent protargol.

(h) Tennessee—1 per cent nitrate silver, 15 per cent argyrol.

(i) Idaho—1 per cent silver nitrate or 10 per cent argyrol.

(j) Utah—20 per cent argyrol.

(k) District of Columbia—1 per cent silver nitrate, 5 per cent sopol.

(l) Not specified: Indiana, Iowa, Maryland, Mississippi, Ohio, North Carolina, Pennsylvania, Wyoming.

#### 5. Penalty:

Failure to use a prophylactic is penalized in the following States:

Alabama (misdemeanor), Arkansas, Connecticut, Delaware, Florida, Georgia, Idaho, Illinois (failure to advise use of), Indiana, Iowa, Kentucky, Louisiana, Maine, Michigan, Minnesota (misdemeanor), Missouri, Mississippi, Nebraska, Nevada, New Hampshire, New Mexico, New York, North Carolina, North Dakota, Ohio (maternity homes, hospitals, charitable institutions, and midwives), Oklahoma, Oregon (misdemeanor), Pennsylvania (possible revocation of license), Tennessee, Texas, Utah (misdemeanor), Virginia, Washington (misdemeanor), Wisconsin, Wyoming.

#### 6. Birth certificates.

A statement of the precautions taken to prevent ophthalmia neonatorum is required in the birth certificates in the following States:

Arizona, California, Delaware, Idaho, Indiana, Michigan, Minnesota, Missouri, Montana, Nebraska, New Jersey, New Mexico, Nevada, North Carolina, North Dakota, Ohio, Oklahoma, South Dakota, Texas, Virginia, West Virginia, Wisconsin, Wyoming.

Gratuitous distribution of a prophylactic is made by the State health authorities in the following States:

Alabama (midwives required to have solution in kit which is furnished for fee of \$5 with certificate), California, Connecticut, Delaware, District of Columbia (to midwives), Idaho, Illinois, Kansas, Kentucky, Louisiana, Massachusetts, Minnesota, Mississippi, Montana, New Hampshire, New Jersey, North Carolina, Ohio, Oklahoma, Porto Rico (local health officer to indigent cases), Rhode Island, South Dakota, Texas (to poor of the State), Utah, Vermont, Virginia, West Virginia, Wisconsin.

#### 7. Special requirements in maternity homes and hospitals.

(a) To report all cases: California (within 24 hours), Colorado, Connecticut, Delaware, Idaho, Illinois, Kentucky (same as physicians), Louisiana, Minnesota (within eight hours), Mississippi, Nebraska, New Mexico (same as individuals), North Carolina, Ohio, Oklahoma, Oregon, Tennessee (same as in private practice), Texas (same as in private practice), Virginia, Washington (same as in private practice), West Virginia, Wisconsin (licensed), Wyoming.

(b) To use a prophylactic: Louisiana, Michigan, Minnesota (institutions having care of infant required to employ licensed physician in treatment of), Mississippi, North Carolina, New Mexico (same as individuals), Ohio, Virginia.

(c) To keep record of cases: California, Louisiana, Mississippi, North Carolina, Ohio, Virginia.

(d) Illinois (required to keep posted copy of the act in a conspicuous place).

### PART III.

## SOME OBSERVATIONS BASED ON A STUDY OF STATE LAWS AND REGULATIONS.

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Eye infections of new-born infants may be practically eliminated by the timely use of a reliable prophylactic, yet a very large majority of the physicians officiating at childbirth do not use a prophylactic as a routine procedure, even in the States where its use is mandatory. Owing to the popular belief that eye inflammations of the new born are caused only by venereal disease infection, it is very probable that many physicians refrain from the routine use of a prophylactic because of the implied stigma. It seems desirable to make greater use of educational measures to correct the popular impression that venereal disease infection is the only cause of eye inflammation and resulting blindness in infants and to create a more general sentiment favorable to routine prophylaxis to prevent acute conjunctivitis in infancy. It is the opinion of many that stricter observance of notification of eye inflammation of the new born, however slight, and the more general employment of smears for the detection of the causative agents will show a lower proportion of cases due to venereal disease infection than is popularly believed.

An analysis of existing State laws and examination of recent reports show that scant provision is made for securing adequate treatment of developed cases of ophthalmia in infants. The provision of the needed facilities for treatment in communities where these are lacking is of prime importance. The average home is poorly adapted to the successful treatment of this disease, and parents should be brought to full realization of the necessity for hospital treatment in the majority of these cases and of the importance of trained nursing service when hospital facilities are lacking.

The gravity of ophthalmia neonatorum and the importance of prompt and adequate treatment has received considerable legal recognition in this country, and the health officials in a number of the States are vested by law with authority to investigate all reported cases, give advice and warning to parents regarding the dangers of the disease and the necessity for prompt and skilled treatment, and provide for the treatment of indigent cases when necessary. Although they are a step in the right direction, these measures are not sufficient.

It seems desirable that the juvenile courts, wherever established, should be vested with authority to take the necessary steps to prevent blindness in cases of acute eye infections of the new-born children of obstinate parents who refuse to obtain treatment for them. Furthermore, the local health officer should be clothed with discretionary powers to require treatment, to remove cases of ophthalmia neonatorum to suitable places for treatment when in his judgment the treatment is inadequate or the surroundings such as to render effective treatment impossible, and, in order to still further safeguard and insure the rational handling of such cases, be required to report the action taken in all notified cases and the reason for the nonexercise of such discretionary powers. It is believed these measures will very largely safeguard the infants of willful parents and in great degree eliminate the personal equation of probable careless and indifferent health officers.

The instillation of a prophylactic at the time of birth, or shortly thereafter, in many instances may serve only to defer the onset of ophthalmia. The only certain means of prevention is the treatment of the expectant mother, and where this has not been done adequate measures must be taken to prevent infection at the time of birth and subsequent infection of the eyes of the infant in all cases where the mother presents suspicious symptoms.

In a study of 84 cases of ophthalmia neonatorum reported to the Philadelphia (Pa.) Department of Health in 1921<sup>1</sup> it is noted that 12 of 32 gonorrheal cases and 12 of 50 nongonorrheal cases developed after the fifth day from birth. Furthermore, of these cases a prophylactic was used in 22 gonorrheal cases and 42 of the nongonorrheal cases and was not used in 10 of the gonorrheal cases and 6 of the nongonorrheal cases. It is very evident, therefore, that although the development of the disease following the use of a prophylactic may have been due to a stale preparation in some instances, a number of these notified cases were reinfections, more particularly the gonorrheal cases, which might have been obviated by timely treatment of the expectant mother or by taking the necessary precautions in the case of mothers presenting suspicious symptoms. It is important to note in this connection that notification of developed cases or cases presenting suspicious eye symptoms is required in 33 States only when occurring within the short period of two weeks after birth, although an untreated mother is potentially infectious to her infant at any period of infancy.

In a number of the States the local health officer is authorized by law to provide treatment when necessary. Unfortunately large numbers of physicians graduate from medical schools having had but superficial instruction in the diagnosis and treatment of eye

<sup>1</sup> Monthly Bulletin, Dept. of Public Health, city of Philadelphia, April, 1922, p. 53.

conditions. The treatment of a developed case of ophthalmia neonatorum, due to gonococcus infection, is not a simple matter. Therefore, it seems desirable that the treatment of this disease should be standardized, as far as possible, and this information furnished to the medical profession in general, and to those physicians in particular who, by reason of location, are denied the advantage of hospital and clinical facilities.

There is also need of more careful instruction of midwives in the care of the babies' eyes at birth, from the point of view of bathing the eyes. The use of a moist cloth or pledget for this purpose is more likely to increase the danger of infection than to prevent it. The eyelids should be wiped with a dry sterile cloth or pledget, a measure which may be adopted with profit by physicians as well as midwives as a routine procedure, although the mother may present no suspicious symptoms.

It will be observed that practically all of the State laws and regulations are in accord with regard to the condition of the eyes demanding notification. However, in some States the condition of the eyes of the new born presenting inflammatory symptoms are designated as ophthalmia neonatorum, in others as acute contagious conjunctivitis of infants, and in still others there is no designation at all. In view of these facts, and further because of the popular impression that the use of a prophylactic connotes venereal disease infection, and further because the infection which may destroy vision may occur at any time during infancy, it were better to adopt some other generic term than ophthalmia neonatorum, such as "Acute conjunctivitis of infants" or "Inflammation of the eyes of infants."

#### EVIDENCE OF COMPLIANCE WITH THE LAW.

In an attempt to approximate the extent to which reporting is practiced in the several States, a questionnaire was addressed to the State health officers requesting a report of the number of cases of ophthalmia neonatorum reported during the calendar year 1921. The following is a summary of the replies:

Arkansas.....	20	New Hampshire.....	5
Colorado.....	1	New Jersey.....	54
Connecticut.....	12	New Mexico.....	4
Delaware.....	4	North Carolina.....	19
District of Columbia.....	5	Ohio.....	2, 429
Illinois.....	334	Oregon.....	3
Kansas.....	7	Pennsylvania.....	102
Kentucky.....	17	Rhode Island.....	11
Louisiana.....	6	West Virginia.....	21
Massachusetts.....	1, 573	Washington.....	3
Michigan.....	21	Wisconsin.....	12
Minnesota.....	8	Wyoming.....	3
Nebraska.....	3		

It will be observed that the majority of the cases enumerated were reported in Ohio and Massachusetts. It is believed by the Massachusetts health authorities that the comparatively large number of cases reported in that State were cases of redness of the conjunctivæ caused by the prophylactic, which subsided in one or two days.

It will be further observed that there are wide differences in the number of cases reported, varying from 1 in Colorado to 2,429 in Ohio. Irrespective of the varying prevalence of sources of infection in different States and communities and the presence of modifying influences, such as urban or rural residence and density of population, these reports tend to show that notification is much more complete and the operation of the law more effective in some of the States than in others.

## PART IV.

### STATE LAWS AND REGULATIONS RELATING TO OPHTHALMIA NEONATORUM.

The following laws were compiled in the bureau from the statutes of the several States and Territories, as found in the Law Library of Congress, and from copies of recent laws transmitted by special request by the respective State health authorities.

Galley proof of the analysis of the laws, and the laws themselves, were submitted to the health officials of the several States and Territories for criticism and correction, and acknowledgment is due and here made for this service and for helpful suggestions.

#### ALABAMA.

(Act Sept. 29, 1919, sec. 716.)

**SUBDIVISION 1.** The following diseases and disabilities are hereby made and declared to be notifiable diseases and the occurrence of cases shall be reported as therein provided:

Group A. \* \* \* ophthalmia neonatorum \* \* \*.

**SUBDIVISION 4.** Whenever a person is known or is suspected to be afflicted with a notifiable disease, or whenever the eyes of an infant under two weeks of age become reddened, inflamed, or swollen, or contain an unnatural discharge, and no physician is in attendance, an immediate report of the existence of the case shall be made to the county health officer by the midwife, nurse, attendant, or other person in charge of the patient.

**SUBDIVISION 29.** Any physician, midwife, nurse, or other person in attendance on a confinement case shall, within two hours after the birth of the child, use one of the following prophylactic solutions for the prevention of infantile blindness or ophthalmia neonatorum, two drops of the solution to be dropped in each eye after the eyelids have been opened: (1) A one per cent fresh solution of nitrate of silver, (2) a twenty-five per cent solution of argyrol, (3) a five per cent solution of protargol, or (4) such other solution as may be prescribed by the State board of health.

(Code of Alabama, 1907, vol. 3.)

7058. Any person who violates any of the health or quarantine laws, except those for which a special penalty is prescribed, shall be guilty of a misdemeanor, and, on conviction, shall be punished as provided for in section 7622 of the Criminal Code.

#### ARIZONA.

(Regulation State Board of Health, approved April 25, 1914.)

**SEC. 1.** The following diseases are hereby declared to be communicable and dangerous to the public health, \* \* \* Ophthalmia neonatorum \* \* \*.

SEC. 2, paragraph 1. Every physician who shall know or suspect that any person, requiring his or her services professionally, is suffering from any of the diseases named in section 1, shall forthwith make report in writing to the local board of health, upon blanks to be furnished for that purpose by the local board of health. The report shall be personally signed by the physician and shall contain such items of information as are indicated on the blanks aforesaid. Cases merely suspected shall be reported as suspicious or suspected cases, and the local board of health shall be notified promptly upon a definite decision being made as to the nature of the disease.

(Revised Statutes, Civil Code, 1913.)

SEC. 4403. \* \* \* Any physician convicted under this chapter shall have his license revoked.

(Midwife Safety Rules, April, 1920.)

RULE 11. *To prevent sore eyes and blindness*, the midwife or doctor should drop into the eyes of each child as soon as born, 2 drops of 1 per cent nitrate silver solution. The drops will not hurt the baby's eyes, but will prevent infection and possible blindness.

ARKANSAS.

Sanitary Code, October, 1922.

SEC. 80. Should one or both eyes of an infant become inflamed or swollen or reddened, or should any pus or secretion form in the eyes or upon the edge of the lids at any time, it shall be the duty of the midwife, nurse, or other person having charge of such infant, to report, within six hours, to the local health officer, or to some legally qualified practitioner of medicine in the community in which such case shall occur the fact that such inflammation, swelling, or redness or accumulation in the eyes exists.

SEC. 81. It shall be the duty of every physician or midwife to instill 1 or 2 drops of a 2 per cent solution of silver nitrate into each eye of every infant immediately after birth.

SEC. 82. It shall be the duty of said health officer or physician, immediately upon receipt of the report, to notify the parents or person having charge of said infant of the danger to the eyes of said infant by reason of any neglect or proper treatment, and he shall give directions for the proper treatment thereof.

Recommendation: It is recommended that the obstetrical silver nitrate ampules be used as they are convenient and reliable.

CALIFORNIA.

(Act of June 11, 1915, chap. 724.)

SEC. 1. Any condition of the eye, or eyes, of any infant in which there is any inflammation, swelling, or redness in either one or both of eyes of any such infant, either apart from or together with any unnatural discharge from the eye, or eyes, of any such infant, at any time within two weeks after its birth, shall, independent of the nature of the infection, for the purpose of this act, be called ophthalmia neonatorum.

SEC. 2. It shall be the duty of any physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital of any nature, parent, relative, and any person or persons attendant upon, or assisting in any way whatsoever, either the mother or child, or both, at childbirth, in all cases where such child shall develop within two weeks after its birth ophthalmia neonatorum, and such person shall know the same to exist, to report the case within twenty-four hours after knowledge of the same, in such form as the State board of health shall direct, to the local health officer of the county or municipality within which the mother of any such infant may reside.

SEC. 3. It shall be the duty of the local health officer:

1. To investigate each case as shall be filed with him in pursuance with this act, and all other such cases as may come to his attention.



2. To report all cases of ophthalmia neonatorum coming to his knowledge, and the result of all such investigations as he shall make to the State board of health, in such form as said board shall direct.

3. To conform to such rules and regulations as the State board of health shall promulgate for the purpose of carrying out the provisions of this act.

**SEC. 4.** It shall be the duty of the State board of health:

1. To enforce the provisions of this act.

2. To promulgate such rules and regulations as the State board of health may deem necessary to properly carry out the provisions hereof.

3. To provide for the gratuitous distribution of a scientific prophylactic for ophthalmia neonatorum, together with proper directions for the use and administration thereof, to all physicians, midwives, and such other persons as may be lawfully engaged in the practice of obstetrics or assisting at child birth.

4. To print and publish such further advice and information concerning the dangers of ophthalmia neonatorum and the necessity for prompt and effective treatment thereof, as said board may deem necessary.

5. To furnish without cost copies of this law to all physicians, midwives, and such other persons as may be lawfully engaged in the practice of obstetrics or assisting at childbirths.

6. To keep a proper record of any and all cases of ophthalmia neonatorum as shall be filed in their office in pursuance with this law, and as may come to their attention in any way, and to constitute such records a part of the biennial report to the governor and the legislature.

7. To report any and all violations of this act as may come to their attention to the district attorney of the district wherein any violation of any provision of this act may have been committed, for the purpose of prosecution.

**SEC. 5.** It shall be the duty of all maternity homes, hospitals, and similar institutions wherein childbirths shall occur, to keep a record of all cases of ophthalmia neonatorum occurring or discovered therein. Such records shall be in the form and contain the matters which the State board of health shall prescribe.

**SEC. 6.** The failure of any person mentioned in section 2 hereof to report, or the failure of any maternity home, hospital, or similar institution, to record any and all cases of ophthalmia neonatorum, as herein directed, or the failure or refusal of any person or institution, herein mentioned, to obey any rule or regulation adopted by the State board of health under this act, shall constitute a misdemeanor, and upon conviction thereof shall be fined for the first offense not to exceed fifty dollars, for a second offense not to exceed one hundred dollars, and for a third offense and thereafter not to exceed two hundred dollars for each violation; and after the third conviction, if the person be a physician, midwife, or other person professionally employed, such conviction shall be a sufficient cause for the revocation of the license of such person by the board which granted the same. One-half of all fines collected hereunder shall go to the county wherein the prosecution was had, and the remaining one-half thereof shall go into the State treasury and constitute a special fund to be expended by the State board of health for the purposes of carrying out the provisions of this act. Any case of ophthalmia neonatorum, or the resultant blindness therefrom, upon which the accused may have been in attendance as hereinbefore set forth, shall be prima facie evidence of knowledge of such case by the accused.

COLORADO.

(Rev. regulation State board of health, November 8, 1920.)

**REGULATION 1.** (a) The term "reportable disease" shall mean any disease named in regulation 2 of this code.

**REG. 2.** Reportable disease designated.

Group 1. \* \* \* ophthalmia neonatorum \* \* \*

REG. 3. *Statutory declaration.*—Pursuant to law and for the purpose of this code, all diseases named in regulation 2 are hereby declared to be dangerous to the public health, and must be reported at once to the local health officer. Each disease named in group 1 of regulation 2 is hereby declared to be a "communicable disease dangerous to the public health."

REG. 4. *Reporting cases.*—It shall be the duty of every physician in attendance upon a case of reportable disease, to report the same immediately to the local health officer, within whose jurisdiction such case occurs, giving the full name, address, age, sex, color, nationality, occupation, school attended, if any, place of employment, name of employer, number of adults and children in the household, number of persons exposed, source of infection or probable origin and name of attending physician, provided that in cases of venereal disease, the name and address of patients shall be omitted, then the special form required by statute for this class of diseases must be used in reporting.

Reports shall be made by telephone or telegram when practicable and shall also always be made in writing.

REG. 5. *Reporting when no physician is in attendance.*—Superintendents or persons in charge of hospitals, sanatoria, dispensaries, or other institutions, nurses, midwives, teachers, dairy managers, heads of private households and proprietors and keepers of hotels, boarding houses or lodging houses, or other persons either treating or having knowledge of a reportable disease shall be required to report such disease coming under their observation, when no physician is in attendance.

REG. 27. *Ophthalmia neonatorum specific and nonspecific*—

1. Infective agent: The gonococcus or some member of a group of pyogenic organisms, including the hemoglobinophilic bacilli.

2. Source of infection: Discharge from conjunctiva, or adnexia, or genital mucous membranes of infected persons.

3. Mode of transmission: Contact with an infected person or with articles freshly soiled with discharges of such person. The most common cause is the presence of gonorrhoeal infection in the mother at the time of childbirth.

4. Incubation period: Irregular, but usually 36 to 48 hours.

5. Period of communicability: During the course of the disease and until the discharges from the infected mucous membranes have ceased.

6. Methods of control: (A) The infected individual and his environment—

(1) Recognition of the disease—Clinical symptoms, confirmed where possible by bacteriological examination.

(2) Isolation—None, provided the patient is under adequate medical supervision.

(3) Immunization.—None.

(4) Quarantine.—None.

(5) Concurrent disinfection.—Disinfection of conjunctival discharges and articles soiled therewith.

(6) Terminal disinfection.—Through cleansing.

(B) General measures:

(1) Enforcement of regulations forbidding the use of common towels and toilet articles. Education as to personal cleanliness and instructions to mother and nurse, concerning methods of avoidance of transmission of disease, with warning of grave danger of resultant blindness.

(2) Use of silver nitrate or some similar solution in the eyes of the new born; one drop of a 1 per cent solution of silver nitrate.

CONNECTICUT.

(Public acts, 1921, chap. 242.)

SECTION 1. *Cases of inflammation of the eyes of new born to be reported to health officers.*—Any inflammation, swelling, or unusual redness in the eyes of any infant,

either apart from or with any unnatural discharge from the eyes of such infant, occurring at any time within two weeks after the birth of such infant, shall, for the purpose of this act, be designated as "inflammation of the eyes of the new born." The professional attendant or other person caring for a new born infant shall report any such inflammation of the eyes of the new born to the local health officer within six hours after such condition is observed.

SEC. 2. *Duty of midwife or attendant in State institution as to care of infant's eyes.*— Any person in any State-aided institution or midwife in attendance at the birth of any infant shall instill into the eyes of such infant, immediately after birth, one or two drops of a prophylactic solution. The State department of health shall furnish in a convenient form for such use a prophylactic solution for gratuitous distribution to midwives and institutions.

SEC. 3. Section 2417 of the general statutes is repealed.

SEC. 4. Any person violating any of the provisions of this act shall be fined not less than ten nor more than fifty dollars.

DELAWARE.

(General Laws, chap. 51, act approved April 2, 1917, secs. 1, 2, 3, and 4.)

SECTION 1. Any inflammation, swelling, or redness in either one or both eyes of any infant, either apart from or together with any unnatural discharge from the eye or eyes of such infant, independent of the nature of the infection, if any, occurring any time within two weeks after the birth of such infant, shall be known as "inflammation of the eyes of the new born."

SEC. 2. It shall be the duty of any physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital of any nature, parent, relative, and any persons attendant on or assisting in any way whatsoever any infant or the mother of an infant at childbirth, or any time within two weeks after childbirth, knowing the condition hereinabove defined to exist, within 6 hours thereafter to report such fact to the local health officer of the city, town, village, or whatever other political division there may be, within which the infant or the mother of any such infant may reside, and it shall be the duty of the local health officer to investigate or to have investigated, each case as filed with him in pursuance with the law, and any other such case as may come to his attention.

SEC. 3. It shall be the duty of physicians, midwives, or other persons in attendance upon cases of childbirth to use some prophylactic against inflammation of the eyes of the new born and to make record of the prophylactic used, and to endorse the details thereof on every birth certificate.<sup>1</sup>

SEC. 4. Whoever, being a physician, surgeon, midwife, obstetrician, nurse, parent, relative, or person attendant upon or assisting at the birth of any infant, shall violate any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in a sum not less than five dollars nor more than one hundred dollars.

(General Laws, chap. 42, act approved March 28, 1921, sec. 3.)

SEC. 3. It shall be the duty of physicians, midwives, or other persons in attendance upon cases of childbirth to use either a 2 per cent solution of silver nitrate, or a 10 per cent solution of argyrol, or a 1 per cent solution of protargol as a prophylactic against inflammation of the eyes of the new born, and to make record of the prophylactic used and to endorse the details thereof on every birth certificate.

<sup>1</sup> Repealing laws of Delaware, chap. 42, act approved March 28, 1921, sec. 3.

## DISTRICT OF COLUMBIA.

(Regulations for the prevention of infant blindness, regulations of commissioners, August 25, 1911.)

**SECTION 1.** Whenever any midwife, or any person other than a registered physician, is in attendance upon any case of childbirth and the newly born child has inflammation of the eyes, attended by a discharge therefrom, said midwife or other person shall report that fact in writing to the health officer, so that said report shall be received by the health officer within the six hours after the existence of said discharge becomes known to said midwife.

**SEC. 2.** No midwife or person other than a registered physician shall treat any case of inflammation of the eyes of a newly born child attended by a discharge therefrom for any period longer than may be absolutely necessary to obtain the services of a registered physician.

**SEC. 3.** Any person who violates any of the provisions of these regulations shall, upon conviction thereof in the police court, be punished by a fine not exceeding \$40. Prosecution for violations of the provisions of these regulations shall be on information filed in the police court by the corporation counsel of the District of Columbia or by any of his assistants.

## FLORIDA.

(Regulations State board of health, September 12, 1919.)

**SEC. 2.** The following-named diseases and disabilities are hereby declared to be dangerous to the public health and made notifiable, and the occurrence of cases shall be reported as herein provided:

Group 1. \* \* \* ophthalmia neonatorum \* \* \*

**SEC. 3.** Every person who, in the State of Florida, treats or examines for the purpose of diagnosis or treatment any person suffering from or afflicted with, or who suspects that any person treated or examined by him is suffering from or afflicted with, any of the diseases made notifiable by the preceding section shall report such case to the State board of health, bureau of vital statistics, within six hours after making a diagnosis or suspecting the disease to be one required to be reported:

**SEC. 7.** Whenever a person is known, or suspected, to be afflicted with a notifiable disease, or whenever the eyes of any infant two weeks of age become reddened, inflamed, swollen, or contain an unnatural discharge, and no physician is in attendance, an immediate report of the existence of the case shall be made to the State board of health, bureau of vital statistics, by the midwife; if no midwife is in attendance, said report shall be made by the father, mother, or other person in charge of the patient, each in the order named.

\* \* \* \* \*

**SEC. 19.** Any person who shall fail, neglect, or refuse to comply with or who shall violate any of the provisions of these rules and regulations shall be deemed guilty of a misdemeanor and upon conviction thereof, shall be punished by a fine of not less than \$5 nor more than \$100, as provided in section 22 of chapter 6892 (No. 86) laws of 1915, under which authority all rules and regulations governing morbidity reports were adopted.

## GEORGIA.

(Chap. 354, act of August 17, 1918.)

**SECTION 1.** That it shall be the duty of any person who shall be in attendance on any childbirth to apply to the child such prophylactic treatment as may be prescribed by the State board of health \* \* \* to prevent blindness from gonococcus infection.

SEC. 2. That any person who shall nurse or attend any infant shall report any inflammation of the eyes of said child that shall develop within two weeks after birth to the local health officer or to a licensed physician.

SEC. 3. That any person who shall violate any of the provisions of this act or any rule made by the State board of health hereunder shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished as provided in section 1065 of the Code of Georgia of 1910.

SEC. 4. That all laws and parts of laws inconsistent with the provisions of this act be and the same are hereby repealed.

IDAHO.

(Act of March 14, 1921, chap. 233.)

SECTION 1. That any inflammation, swelling, or unusual redness in either one or both eyes of any infant, either apart from, or together with any unnatural discharge from the eye or eyes of such infant, independent of the nature of the infection, if any, occurring at any time within two weeks after the birth of such infant, shall be known as "inflammation of the eyes of the new born" (ophthalmia neonatorum).

SEC. 2. It shall be the duty of any physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital of any nature, parent, relative, and persons attendant on or assisting in any way whatsoever any infant, or the mother of any infant at childbirth, or any time within two weeks after childbirth, knowing the condition hereinabove defined to exist, immediately to report such fact in writing, to the local health officer of the county, city, town, magisterial district or whatever other political division there may be within which the infant or the mother of any infant may reside. Midwives shall immediately report conditions to some qualified practitioner of medicine and thereupon withdraw from the case except as they may act under the physician's instructions. On receipt of such report, the health officer, or the physician notified by a midwife, shall immediately give to the parents or persons having charge of such infant a warning of the dangers to the eye or eyes of said infant, and shall for indigent cases provide the necessary treatment at the expense of said county, city, or town.

SEC. 3. It shall be unlawful for any physician or midwife practicing midwifery to neglect, or otherwise fail to instill or have instilled immediately upon its birth, in the eyes of the new-born babe, some germicide of proven efficiency in preventing the development of ophthalmia neonatorum.

SEC. 4. Every physician or midwife shall, in making a report of a birth, state whether or not the above germicide was instilled into the eyes of said infant.

SEC. 5. It shall be the duty of the local health officer:

- (1) To investigate, or have investigated, each case as filed with him in pursuance of the law, and any other cases as may come to his attention.
- (2) To report all cases of inflammation of the eyes of the new born, and the result of all such investigations as the department of public welfare shall direct.
- (3) To conform to such other rules and regulations as the department of public welfare shall promulgate for his further guidance.

SEC. 6. It shall be the duty of the department of public welfare:

- (1) To enforce the provisions of this act.
- (2) To promulgate such rules and regulations as shall under this act, be necessary for the purpose of this act, and such as the department of public welfare may deem necessary for the further and proper guidance of local health officers.
- (3) To publish and promulgate such further advice and information concerning the dangers of inflammation of the eyes of the new born as is necessary for prompt and effective treatment.
- (4) To furnish copies of this law to all physicians and midwives as may be engaged in the practice of obstetrics or assisting at childbirth.

(5) To keep a proper record of any and all cases of inflammation of the eyes of the new born as shall be filed in the office of the department of public welfare in pursuance of this law, and as may come to their attention in any way, and to constitute such records a part of the annual report to the governor.

(6) To report any and all violations of this act as may come to their attention to the prosecuting attorney of the county wherein said misdemeanor may have been committed, and to assist said official in any way possible, as by securing necessary evidence, et cetera.

(7) To furnish birth certificates which shall include the question "Did you comply with section 6 of this act? If so, state what solution used."

SEC. 7. It shall be the duty of the clerk of the county court of each county on or before the fifteenth day of each month to certify to the prosecuting attorney of his county all reports of births filed during the preceding calendar month which fail to show that the solution hereinbefore provided for was instilled.

SEC. 8. Whoever being a physician, surgeon, midwife, obstetrician, nurse, manager, or person in charge of a maternity home or hospital, parent, relative, or person attending upon or assisting at the birth of an infant, violates any of the provisions of this act, shall be deemed guilty of misdemeanor, and upon conviction thereof shall be fined a sum of not less than ten nor more than one hundred dollars.

SEC. 9. All acts and parts of acts in conflict herewith are hereby repealed.

ILLINOIS.

(Act of June 24, 1915.)

SECTION 1.—*Be it enacted by the People of the State of Illinois, represented in the General Assembly, That any diseased condition of the eye or eyes of any infant in which there is any inflammation, swelling, or redness in either one or both eyes of any such infant, either apart from or together, with any unnatural discharge from the eye, or eyes of such infant, at any time within two weeks after the birth of such infant, shall, independent of the nature of the infection, be known as ophthalmia neonatorum.*

SEC. 2. It shall be the duty of any physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital of any nature, or parent, assisting in any way whatsoever any woman at childbirth, or assisting in any way whatsoever any infant, or the mother of any infant, at any time within two weeks after childbirth, observing or having a reasonable opportunity to observe the condition herein defined, and within six hours thereafter, to report in writing or by telephone, followed by a written report, such fact to the local health authorities of the city, town, village, or other political division, as the case may be, in which the mother of any such infant may reside: *Provided*, That such reports and the records thereof shall be deemed privileged information and shall not be open to the public.

SEC. 3. It shall be the duty of all maternity homes and any and all hospitals or places where women resort for purposes of childbirth to post and keep posted in conspicuous places in their institutions copies of this act, and to instruct persons professionally employed in such homes, hospitals, and places regarding their duties under this act, and to maintain such records of cases of ophthalmia neonatorum in the manner and form prescribed by the State board of health.

It shall be the duty of any and all physicians and midwives to advise, for the prevention of ophthalmia neonatorum, such prophylactic as shall be prescribed by the State board of health, and to inform the parents or guardians of a child as to the dangers and dire consequences of this disease, for the purpose of preventing the development of ophthalmia neonatorum in cases of childbirth attended by midwives. Midwives may employ the prophylactic prescribed by the State board of health, provided the consent of the parent or parents or guardian shall first be obtained for the use of such preventive treatment.

SEC. 4. It shall be the duty of the local health officer:

(1) To investigate, in so far as that can be done without entering into the home or interfering with the child in any way without first securing the consent of the parents or guardian of such child, each case of ophthalmia neonatorum reported to him in compliance with this law, and any other such case as may come to his attention.

(2) To report all cases of ophthalmia neonatorum and the results of all such investigations as he may make to the State board of health in the manner and form prescribed by said board.

SEC. 5. It shall be the duty of the State board of health:

(1) To enforce the provisions of this act;

(2) To provide for the gratuitous distribution of a scientific prophylactic for ophthalmia neonatorum, together with proper directions for the use and administration thereof, to all physicians and midwives authorized by law to attend at the birth of any child;

(3) To have printed and published for distribution throughout the State advice and information concerning the dangers of ophthalmia neonatorum and the necessity for the prompt and effective treatment thereof;

(4) To furnish similar advice and information, together with copies of this law to all physicians, midwives, and others authorized by law to attend at the birth of any child;

(5) To prepare appropriate report blanks and to furnish same to all local health officers for distribution to physicians and midwives free of charge;

(6) To report any and all violations of this act to the prosecuting attorney of the district wherein said violation may have been committed.

SEC. 6. Any collusion between any official and any person, or between any others herein named, to misstate or conceal any facts which under this act are essential to report correctly any case of ophthalmia neonatorum shall likewise constitute a misdemeanor, and any person upon conviction thereof shall suffer a penalty such as is hereinafter provided.

SEC. 7. It shall be the duty of the State's attorney for the proper district to prosecute for all misdemeanors as herein prescribed.

SEC. 8. Any person violating any of the provisions of this act shall be guilty of a misdemeanor and shall, upon conviction thereof, be fined not less than ten (\$10) dollars nor more than one hundred (\$100) dollars, in the discretion of the court.

SEC. 9. An act for the prevention of blindness, approved June 21, 1895, in force July 1, 1895, is hereby repealed.

INDIANA.

(Acts of 1911, chap. 129.)

SECTION 1. Whenever a child is born the physician, midwife, or any other person who is present and engaged as professional attendant shall report said birth on a blank supplied by the State board of health to the health officer having jurisdiction within 36 hours after such birth occurs. Said birth certificate in addition to other data ordered by the State board of health shall have upon it this question: Were precautions taken against ophthalmia neonatorum? And it shall be a violation of this act for any physician or midwife in professional attendance at a birth to fail to report same as herein commanded or to omit answering the said question: Were precautions taken against ophthalmia neonatorum? All bills or charges for professional services rendered at a birth shall be unlawful if report is not made as herein commanded.

SEC. 2. It shall be the duty of all physicians or midwives in professional attendance upon a birth to always carefully examine the eyes of the infant, and if there is the least reason for suspecting infection of one or both eyes then said physician or midwife in professional attendance shall apply such prophylactic treatment as may be recognized as efficient in medical science.

SEC. 3. Should one or both eyes of an infant become inflamed, swollen, or reddened, or show any unnatural discharge or secretion at any time within two weeks after the birth, and no legally qualified physician is in attendance upon the infant at that time, it shall be the duty of its parents, or, in their absence, whoever is caring for said infant, to report the fact in writing within six hours after discovery to the health officer having jurisdiction: *Provided*, Said report to said health officer need not be made from recognized hospitals.

SEC. 4. Upon receipt of a report as set forth in section 3 of this act health officers shall direct the parents, or whoever has charge of such infant suffering from such inflammation, swelling, redness, or unnatural secretion or discharge of the eyes, to immediately place it in charge of a legally qualified physician or in charge of the city or township physician if unable to pay for medical service.

SEC. 5. Any violation of the provisions of this act shall be punished by a fine of not less than ten dollars nor more than fifty dollars.

IOWA.

(S. F. 307, 39th G. A., March 18, 1921.)

SECTION 1. *Treatment of eyes of babies.*—Any physician or any person authorized by law to act as an obstetrician shall immediately upon the birth of an infant instill into the eyes of such newly born infant a prophylactic solution approved by the State board of health: *Provided, however*, That nothing in this act shall be construed to require medical treatment for the minor child of any person who is a member of a well-recognized church or religious denomination and whose religious convictions in accordance with the tenets or principles of his church or religious denomination are against medical treatment for disease.

SEC. 2. *Later report on condition of eyes.*—That any physician or any person authorized by law to act as an obstetrician in this State or any other person having the care of an infant, within six (6) months after its birth who shall detect any inflammation, swelling, or redness in the eyes of any such infant or any unnatural discharge therefrom, shall, if he be a physician, treat such child with the necessary prophylactic or, if he be other than a physician, shall immediately report the condition and the location of such infant to the local board of health.

SEC. 3. *Board of health regulations.*—It shall be the duty of the State board of health to make the necessary regulations for the enforcement of this act.

SEC. 4. *Penalties.*—Any person who shall willfully violate any of the provisions of this act shall be guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not more than five hundred dollars (\$500) or by confinement in the county jail for six (6) months.

KANSAS.

(Regulation State board of health, Session Laws of 1917.)

(a) Ophthalmia neonatorum (conjunctivitis of new-born infants) \* \* \* declared to be infectious, contagious, and communicable \* \* \*.

(b) \* \* \* declared to be a notifiable disease, and the occurrence of cases \* \* \* shall be reported as herein provided. Hereafter each and every physician, or other practitioner of the healing art practicing in the State of Kansas, who treats or examines any persons suffering from or afflicted with, or suspected to be suffering from or afflicted with \* \* \* ophthalmia neonatorum \* \* \* shall immediately report such case \* \* \* in writing to the local health authority having jurisdiction.

\* \* \* \* \*

(d) Whenever the eyes of an infant under two weeks of age become reddened, inflamed, or swollen, or contain an unnatural discharge, and no physician is in attendance, an immediate report of the existence of the case shall be made to the local



health officer by the midwife, nurse, attendant, householder, or other person in charge of the patient.

For the prevention of ophthalmia neonatorum after the well-known method of Credé, the department is prepared to distribute free of charge a standard solution of one per cent silver nitrate in an amber-colored glass dropper. Distribution is limited to physicians, obstetricians, midwives, and trained nurses. \* \* \*

KENTUCKY.

(Act March 9, 1914.)

SECTION 1. That it shall be the duty of the county board of health of each county, acting in cooperation with the county medical society and the State board of health, to arrange for an annual course of instruction or school for the physicians, midwives, and nurses of such county to teach the importance of and the latest and best methods for the early recognition and treatment of, the dangers from, the precautions to be used against, the infection and contagion to all who come in contact with, cases of trachoma and of ophthalmia or any other disease of the eyes of the new born, or with any towel, utensil, or other thing used by or for them; and the importance and imperative duty of at once reporting all cases of such diseases to the county or city health authorities, as may be, and of keeping a true record of all such cases.

SEC. 2. That it shall be the duty of the State board of health to secure the cooperation and assistance of the national health authorities in dealing with these diseases, and to prepare and issue bulletins and other literature containing professional and popular information as to the prevalence and infectious character of such eye diseases, and the precautions to be used against such infections; and to furnish formulas and other information for the use of physicians and midwives in the management and treatment of such diseases. It shall be the duty of the county boards of health to furnish to physicians and midwives the simple drugs to be used for the indigent in preventing and in treating such diseases.

SEC. 3. That it shall be the duty of every physician and of every midwife who, while in attendance upon a baby under 30 days old or upon its mother, has observed ophthalmia in the new-born baby, and the duty of the head of a family and of trained nurse in a family in which there is a baby under 30 days old and no physician or midwife in attendance, and the duty of trained nurse and of head of any institution in which there is a baby under 30 days old and no physician or midwife in attendance upon it or its mother, to report the case of ophthalmia in the new born within six hours after observing it to the city board of health, if the case shall have occurred in a city; or if the case shall have occurred outside a city, to the county board of health, within 24 hours after observation. And it shall be the duty of every physician to report each case of trachoma so diagnosed by him as attending or examining physician within five days after such diagnosis. And any physician, midwife, nurse, or head of family who fails to make the report required by this act, shall upon conviction be fined not more than \$100; and persistent failure or refusal on the part of a physician, midwife, or nurse to make such report or to take the necessary precaution to prevent the spread of such diseases shall be a proper ground for the revocation of the right to practice, after due notice and hearing, as now provided by law for the revocation of certificates to practice medicine in this Commonwealth.

SEC. 4. That "ophthalmia in the new born" shall be understood to be "any inflammation, swelling, and redness of either eye, or of both eyes, either apart from or together with any unnatural discharge from the eye or eyes of a baby."

(Rules and regulations of State board of health.)

RULE No. 9 (a). The attending physician, accoucher, midwife, or other person in charge who shall attend, assist, or advise at the birth of any living child within the

limits of a county of this State shall, in order to prevent infection resulting in sore eye<sup>s</sup> and possible blindness, after washing the lids and adjacent tissues immediately following birth, drop into each eye of such new-born child 2 drops of a 1 per cent solution of nitrate of silver.

## LOUISIANA.

(Act 174, July 17, 1914.)

SECTION 1. *Be it enacted by the General Assembly of the State of Louisiana, That any condition of the eye, or eyes, of any infant shall, independent of the nature of the infection, be known as ophthalmia neonatorum, in which there is any inflammation, swelling, or redness in either one or both eyes of any such infant, either apart from or together with, any unnatural discharge from the eye, or eyes, of any such infant at any time within two weeks after the birth of such infant.*

SEC. 2. *Be it further enacted, etc., That it shall be the duty of any physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital of any nature, parent, relative, and any person, or persons, attendant upon, or assisting in any way whatsoever any woman at childbirth, or attendant upon, or assisting in any way whatsoever any infant, or the mother of any infant, at any time within two weeks after childbirth, knowing the condition defined and described in section 1 of this act to exist, and within six hours thereafter, to report such fact, as the State board of health shall direct, to the local health officer of the parish, city, town, village, or whatever other political division there may be, within which the mother of any such infant may reside.*

SEC. 3. *Be it further enacted, etc., That it shall be the duty of the local health officer:*

1. To investigate each case as filed with him in pursuance with this law, and any other such case as may come to his attention.
2. To report all cases of ophthalmia neonatorum and the result of all such investigation as he shall make, as the State board of health shall direct.
3. To conform to such other rules and regulations as the State board of health shall promulgate for his further guidance.

SEC. 4. *Be it further enacted, etc., That it shall be the duty of the Louisiana State Board of Health:*

1. To enforce the provisions of this act.
2. To promulgate such rules and regulations as shall under this act, be necessary for the purpose of this act, and such as the State board of health may deem necessary for the further and proper guidance of local health officers, etc.
3. To provide for the gratuitous distribution of a scientific prophylactic for ophthalmia neonatorum, together with proper directions for the use and administration thereof, to all physicians, midwives and like, as may be engaged in the practice of obstetrics or assisting at childbirth.
4. To print and publish such further advice and information concerning the danger of ophthalmia neonatorum and the necessity for prompt and effective treatment thereof, as may be deemed fit.
5. To furnish copies of this law to all physicians, midwives and the like, as may be engaged in the practice of obstetrics, or assisting at childbirth.
6. To keep a proper record of any and all cases of ophthalmia neonatorum as shall be filed in their office in pursuance with this law, and as may come to their attention in any way, and to constitute such records a part of the annual report to the Governor and the legislature.
7. To report any and all violations of this act as may come to their attention to the prosecuting attorney for the district wherein said misdemeanor may have been committed, and to assist said official in any way possible, such as by securing necessary evidence, etc.

SEC. 5. *Be it further enacted, etc.*, That it shall be the duty of all maternity homes and any and all hospitals, etc., to maintain such records of cases of ophthalmia neonatorum as the State board of health shall direct. It shall be the duty of any and all physicians, midwives, and the like, in addition to reporting as hereinbefore enacted, to advise, prescribe and employ, in the treatment of all cases of ophthalmia neonatorum, such prophylactics as the State board of health shall direct.

SEC. 6. *Be it further enacted, etc.*, That the failure of any and all physicians, midwives, etc., as hereinabove set forth, to report as herein prescribed, or the failure of any hospital to report as herein enacted, or the failure of any licensed physician to apply a proper scientific prophylactic, or the neglect or failure of any midwife, or the like, to apply a proper prophylactic directed and prescribed by the orders of the State board of health, or the Sanitary Code, in all cases of ophthalmia neonatorum, as herein prescribed, and under such circumstances as are herein set forth, or any or all of such violations, as the case may be, shall constitute a misdemeanor under this act. Any person accused of a misdemeanor under this act shall, upon conviction thereof, be fined, for the first offense, not to exceed \$50; for a second offense not to exceed \$100; and for a third offense and thereafter not to exceed \$200 for each violation; and if the accused be a physician, midwife or the like, such person, shall in the discretion of the court, suffer a revocation of license, or both fine and revocation, as the court may see fit; and if the accused be a maternity home or the like, duly incorporated under the laws of the State, the court may in its discretion order a revocation of its charter, and any collusion between any official and any person, or between any others herein named, to misstate or conceal any facts which, under this act, are essential to report correctly, shall likewise constitute a misdemeanor, and the accused shall, upon conviction, suffer a penalty such as hereinbefore enumerated and enacted. The act of the agent in the scope of his employment shall be deemed the act of the principal. Any and all cases of ophthalmia neonatorum, or the resultant blindness therefrom, on which the accused may have been in attendance, as hereinbefore set forth, shall be taken as prima facie evidence of knowledge on the part of the accused. It shall be the duty of the State's attorney, for the proper district, to prosecute for all misdemeanors as herein prescribed.

SEC. 7. *Be it further enacted, etc.*, That the sum of five hundred dollars annually or as much thereof as may be necessary, be, and the same is hereby, set aside from, and payable out of, the general fund, upon the warrant of the president and secretary of the Louisiana State Board of Health for the use of the State board of health in enforcing and carrying out the provisions of this act. Any and all necessary and legitimate expenses that may be incurred in prosecuting a case under this act shall, upon a proper showing, be met by the State board of health out of this appropriation. In addition thereto all fines and penalties recovered hereunder shall be paid into the State treasury and shall constitute a special fund for the uses and purposes of the State board of health as herein enacted.

SEC. 8. *Be it further enacted, etc.*, That all laws, or parts of laws, in conflict herewith are hereby repealed.

MAINE.

(Sec. 121, as amended in Laws of 1919.)

If one or both eyes of an infant become reddened or inflamed at any time within four weeks after birth, the midwife, nurse, or person having charge of said infant shall report the condition of the eyes at once to some legally qualified practitioner of medicine of the town in which the parents of the infant reside. Every physician, midwife, or nurse in charge shall instill or cause to be instilled into the eyes of the infant immediately upon its birth, one or two drops of a prophylactic solution prescribed by the State department of health, unless either parent or the guardian of the infant shall offer conscientious objections thereto. Any failure to comply with the provi-

sions of this section shall be punishable by a fine not to exceed one hundred dollars, or imprisonment not to exceed six months.

In complying with the above law a 1 per cent solution of silver nitrate shall be used, as put up in individual wax capsules by various commercial houses.

MARYLAND.

(Art. 43, sec. 79, chap. 94, act of April 4, 1912.)

SEC. 55-K. If at any time within two weeks after the birth of any infant, one or both of its eyes or the eyelids be reddened, inflamed, swollen, or discharging pus, the midwife, nurse, or person other than a legally qualified physician, in charge of such infant, shall refrain from the application of any remedy for the same, and shall immediately report such condition to the health commissioner, or to some legally qualified physician in the city, town, or county wherein the infant is cared for. Any person or persons violating the provisions of this section shall, on conviction, be punished by a fine not to exceed five dollars. (See art. 27, sec. 245.)

SEC. 55-L. Any person who shall violate any of the other provisions of section 69-83A shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be subject to a fine of not less than five dollars, nor more than ten dollars, and for a third conviction shall, in addition to the other penalties herein provided, forfeit his or her license to practice midwifery.

MASSACHUSETTS.

(General Laws, chap. 111.)

SEC. 110. If either eye of an infant becomes inflamed, swollen and red, or shows an unnatural discharge within two weeks after birth, the nurse, relative or other attendant having charge of such infant shall report in writing, within six hours thereafter, to the board of health of the town where the infant is, the fact that such inflammation, swelling and redness of the eyes or unnatural discharge exist. On receipt of such report, or of notice of the same symptoms given by a physician as provided by the following section, the board of health shall take such immediate action as it may deem necessary, including, so far as may be possible, consultation with an oculist and the employment of a trained nurse, in order that blindness may be prevented. Whoever violates this section shall be punished by a fine of not more than one hundred dollars.

SEC. 111. If either eye of an infant whom or whose mother a physician, or a hospital medical officer registered under section nine of chapter one hundred and twelve, visits becomes inflamed, swollen, and red, or shows an unnatural discharge within two weeks after birth, he shall immediately give written notice thereof, over his own signature, to the board of health of the town; and if he refuses or neglects to give such notice he shall forfeit not less than fifty nor more than two hundred dollars.

SEC. 14. It shall furnish, free of cost, to registered physicians such prophylactic remedies as it may deem best for the prevention of ophthalmia neonatorum.

MICHIGAN.

(Act 123, P. A. 1913, secs. 1, 2, 3, and 4.)

SECTION 1. It shall be the duty of the State board of health to officially name and approve a prophylaxis to be used in treating the eyes of newly born infants, and it shall be the duty of the board to publish instructions for using the same.

SEC. 2. It shall be the duty of any physician, nurse, or midwife who shall assist and be in charge of the birth of any infant, or have care of the same after birth, to treat the eyes of the infant with a prophylaxis approved by the State board of health; and such treatment shall be given as soon as practicable after the birth of the infant and always within one hour; and if any redness, swelling, inflammation, or gathering of

pus shall appear in the eyes of such infant or upon the lids or about the eyes, within two weeks after birth, then any nurse, midwife, or other person having care of the infant shall report the same to some competent practicing physician within six hours of its discovery.

SEC. 3. Any failure to comply with the provisions of section two of this act shall be punishable by a fine not to exceed one hundred dollars or imprisonment in the county jail not to exceed six months, or both such fine and imprisonment in the discretion of the court.

SEC. 4. Repeals act 43, P. A. 1895.

(Act 330, P. A. 1905, sec. 2.)

SEC. 2. The certificate of birth shall contain the following items:

\* \* \* \* \*

Twentieth. Certificate of attending physician, or in the absence of an attending physician of any other person who shall either gratuitously or for hire deliver a woman of child or attend a woman in childbirth, as to attendance at birth, including statement of year, month, day, and hour of birth, also certifying that he or she treated the eyes of the child with a prophylaxis approved by the State board of health within one hour after birth. This certificate shall be signed by attending physician or in the absence of an attending physician by such other person above described, with date of signature and address. If there was no physician or such other person in attendance, then the father, householder, manager, or superintendent of a public or private institution, or other competent person whose duty it shall become to file such certificate of birth as provided in section one of this act, shall draw a line through the words "I hereby certify that I attended the birth of the above child" and shall write in lieu thereof the words "No physician or other person in attendance," filling out the remainder of the certificate in regard to the year, month, day, and hour of birth, and signing the certificate as father, householder, owner of premises, manager or superintendent of institution, as the case may be, with his address.

(Rules and Regulations of the Michigan Department of Health.)

#### XVII. Ophthalmia neonatorum.

1. Cases must be reported.

2. Act 123, Public Acts of 1913, requires every physician, nurse, or midwife in attendance at birth to administer a prophylaxis approved by the Michigan Department of Health to the eyes of every infant within one hour after birth. This department has named and approved as such prophylaxis 1 drop of 2 per cent silver nitrate solution.

#### MINNESOTA.

(General Statutes, Minnesota, 1913, section 4640. General and special rules.)

7-A. The prevention of infant blindness and infection of the eyes of newly born by the designation of a prophylactic to be used in such cases and in such manner as the board may direct, unless specifically objected to by the parents or a parent of such infant.

(Regulation State board of health, approved November 23, 1916.)

REG. 1000. *Definition.*—Any condition of the eye or eyes of an infant, independent of the nature of the infection, in which there is any inflammation, swelling, or redness in either one or both eyes of any such infant, either apart from, or together with, any unnatural discharge from the eye or eyes of any such infant within two weeks of the birth of such infant, shall be known as ophthalmia neonatorum.

REG. 1001. *Duties of physicians, midwives, and others.*—It shall be the duty of any physician or midwife in attendance on, or in charge of, a confinement case to treat the eyes of every newborn babe with a 1 per cent solution of silver nitrate.

REG. 1002. It shall be the duty of any midwife immediately to call a legally licensed physician in every case in which symptoms of inflammation develop in one or both eyes of infants under her care.

REG. 1003. It shall be the duty of any physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital of any nature, parent, relative, and any person or persons attending on, or assisting in any way whatsoever, any woman at childbirth, or attendant on, or assisting in any way whatsoever, any infant, or the mother or any infant, at any time within two weeks after childbirth, knowing the condition hereinabove defined to exist, and within eight hours thereafter, to report such fact, as the State board of health shall direct, to the local health officer of the city, village, or township within which the infant is cared for.

REG. 1004. *Duties of maternity homes, physicians, etc.*—It shall be the duty of all maternity homes and of hospitals, public and charitable institutions to maintain such records of cases of ophthalmia neonatorum as the State board of health shall direct. It shall be the duty of any and all maternity homes, hospitals, public and charitable institutions, and all other institutions having the case of any infant, in addition to reporting as hereinbefore provided, to employ a licensed physician in the treatment of the conditions described in regulation 1000.

REG. 1005. *Duties of the local health officer.*—It shall be the duty of the local health officer:

(a) To investigate each case as filed with him in pursuance with the law, and any other such case as may come to his attention.

(b) To report all cases of ophthalmia neonatorum, and the result of all such investigations as he shall make, as the State board of health shall direct.

(c) To conform to such other rules and regulations as the State board of health shall promulgate for his further guidance.

MISSISSIPPI.

(Chap. 115, act of March 15, 1916.)

SECTION 1.—*Inflammation of the eyes of the new born defined.*—That any inflammation, swelling, or redness in either or both eyes of any infant, either apart from or together with any unnatural discharge from the eye or eyes of any such infant, independent of the nature of the infection, if any occurring, any time within two weeks after birth of such infant, shall be known as “inflammation of the eyes of the new born.”

SEC. 2. *Duties of physicians, midwives, etc.*—It shall be the duty of any physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital of any nature, parent, relative, and any person attendant on or assisting in any way whatsoever any infant, or the mother of any infant, at childbirth, or at any time within two weeks after childbirth, knowing the condition hereinabove defined to exist, within six hours thereafter, to report such fact as the State board of health shall direct, to the local health officer of the city, town, village, or whatever other political division there may be, within which the infant or the mother of the infant may reside.

SEC. 3.—*Duties of the local health officer.*—It shall be the duty of the local health officer: (1) To investigate or to have investigated each case as filed with him, in pursuance of the law, and any other such case as may come to his attention; (2) to report all cases of inflammation of the eyes of the new born and the result of all such investigations as the State board of health shall direct; (3) to conform to such other rules and regulations as the State board of health shall promulgate for his further guidance.

SEC. 4. *Duties of the State board of health.*—It shall be the duty of the State board of health: (1) To enforce the provisions of this act; (2) to promulgate such rules and regulations as shall, under this act, be necessary for the purpose of this act, and such as the State board of health may deem necessary for the further and proper guidance

of local health officers, etc.; (3) to provide for the gratuitous distribution of a scientific prophylactic for inflammation of the eyes of the new born, together with proper directions for the use and administration thereof, to all physicians and midwives as may be engaged in the practice of obstetrics or assisting at childbirth; (4) to provide, if necessary, daily inspection and prompt and gratuitous treatment to any infant whose eyes are infected with inflammation of the eyes: *Provided further*. That the State board of health, if necessary, shall defray the expenses of such treatment from such sums as may be appropriated for its use; (5) to publish and promulgate such further advice and information concerning the dangers of inflammation of the eyes of the new born and the necessity for prompt and effective treatment; (6) to furnish copies of this law to all physicians and midwives as may be engaged in the practice of obstetrics or assisting at childbirth; (7) to keep a proper record of any and all such cases of inflammation of the eyes of the new born as shall be filed in the office of the State board of health, in pursuance with this law, and as may come to their attention in any way, and to constitute such record a part of the annual report to the governor and legislature; (8) to report any and all violations of this act as may come to its attention to the local police, county prosecutor, or district attorney in the county wherein such misdemeanor may have been committed and to assist such official in every way possible, such as securing necessary evidence, etc.

SEC. 5.—*Requirements in maternity homes, hospitals, etc.*—It shall be the duty of the physicians, midwives, or other persons in attendance upon a case of childbirth in a maternity home, hospital, public or charitable institution, in every infant immediately after birth, to use some prophylactic against inflammation of the eyes of the new born and to make record of the prophylactic used. It shall be the duty of such institution to maintain such records of cases of inflammation of the eyes of the new born as the State board of health shall direct.

SEC. 6. *Duty of midwives.*—It shall be the duty of every midwife in every case of childbirth under her care, immediately after birth, to use such prophylactic against inflammation of the eyes of the new born as the State board of health requires.

SEC. 7. *Violation of this act a misdemeanor.*—The failure of any physician, midwife, etc., as hereinbefore set forth, to comply with any of the provisions of this act shall constitute a misdemeanor under this act, and the offender shall, on conviction thereof, be fined for the first offense not to exceed \$50, for the second offense not to exceed \$100, and for the third offense and thereafter not to exceed \$200 for each violation. It shall be the duty of the local police, county prosecutor, or the district attorney to prosecute for all misdemeanors as herein prescribed.

(Regulations State board of health, February 21, 1918.)

SEC. 2. The State board of health provides that the following diseases shall be notifiable.

\* \* \* ophthalmia neonatorum \* \* \*

SEC. 11. The county health officer shall be responsible for the enforcement of the rules and regulations governing morbidity reports in his respective county. Failure, neglect, or refusal on the part of the county health officer to enforce the said rules and regulations shall be grounds for removal from office and shall render him liable to penalty as provided in section 2511 of the Mississippi Code of 1906, or both.

#### MISSOURI.

(Missouri Laws, 1921.)

SEC. 7340. *Duties of persons in attendance upon new-born infants, or its mother.*—Every physician, midwife, or nurse who shall be in attendance upon a new-born infant or its mother, shall drop in to the eyes of such infant immediately after delivery, a prophylactic solution approved by the State board of health, and shall within forty-

eight hours thereafter, report in writing to the board of health or county physician of the city, town, or county where such birth occurs, his or her compliance with this section, stating the solution used by him or her.

SEC. 7340a. *Parents or other persons shall report.*—Should one or both eyes of an infant become inflamed, swollen, or red, and show an unnatural discharge at any time within two weeks after its birth, it shall be the duty of the parent or other persons having charge of such infant, to immediately report in writing to the board of health or county physician of the city, town, or county in which such birth occurs, the fact that such inflammation, swelling, and redness of the eyes and unnatural discharge exists. On receipt of such report, the board of health or county physician shall take such immediate action as it may deem necessary in order that blindness may be prevented.

SEC. 7342. *Violation of law a misdemeanor when.*—Any failure to comply with the provisions of sections 7340, 7340a, and 7342, shall be a misdemeanor, and shall be punishable by fine of not less than ten and not more than one hundred dollars, or by imprisonment not to exceed six months, or by both such fine and imprisonment.

## MONTANA.

(Regulations State board of health, April, 1920.)

(e) Whenever the eyes of an infant under two weeks of age become reddened, inflamed, or swollen, or contain an unnatural discharge, and no physician is in attendance, an immediate report of the existence of the case shall be made to the local or county health officer having jurisdiction by the midwife, nurse, attendant, householder or other person in charge of the patient; responsibility for reporting to rest upon each in the order named. The local or county health officer to whom report is made shall then file a report in the manner prescribed in paragraph (b).

## NEBRASKA.

(Session Laws of Nebraska, April 15, 1915, chap. 196.)

SECTION 1. *Physicians to use nitrate of silver on eyes of new-born babies.*—It shall be the duty of every physician in attendance upon any lying-in woman, either in hospital or the general practice, upon the delivery of any newly born child, to use in the eyes of said child one of the following preparations: Nitrate of silver, 1% to 4% solution; protargol, 10% to 40% solution; argyrol, 40% to 50% solution.

No additional fee shall be charged by any physician for the furnishing or use of the preparations herein prescribed.

SEC. 2. *Penalty for failure to use.*—Any physician violating the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than ten dollars nor more than fifty dollars, and his physician's license shall be subject to revocation by the State board of health.

(Regulations State department of public welfare, adopted Sept. 20, 1921.)

*Contagious communicable diseases.*—The following diseases are hereby declared to be contagious, communicable, or infectious:

\* \* \* ophthalmia neonatorum \* \* \*

*Reporting contagious, communicable, or infectious disease.*—It shall be the duty of every physician attending a case of any contagious, communicable, or infectious disease to report the same within twenty-four hours to the secretary of the county, city, or village board of health in whose jurisdiction the case may be, except cases of chancroid, gonorrhœa, or syphilis, which shall be reported direct to the division of venereal diseases of the State bureau of health within ten days giving a case number in lieu of the name of the patient.



(Chap. 230, act approved March 23, 1921.)

SECTION 1. That any inflammation, swelling, or unusual redness in either one or both eyes of an infant, either apart from or together with any unnatural discharge from the eye or eyes of such infant, independent of the nature of the infection, if any, occurring at any time within two weeks after the birth of such infant, shall be known as "inflammation of the eyes of the new born" (ophthalmia neonatorum).

SEC. 2. It shall be the duty of any physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital of any nature, parent, relative, and persons attendant on or assisting in any way whatsoever any infant, or the mother of any infant at childbirth, or any time within two weeks after childbirth, knowing the condition hereinabove defined to exist, immediately to report such fact, in writing, to the local health officer of the county, city, town, magisterial district or whatever other political division there may be within which the infant or the mother of any infant may reside. Midwives shall immediately report conditions to some qualified practitioner of medicine and thereupon withdraw from the case except as they may act under the physician's instructions. On receipt of such report, the health officer, or the physician notified by a midwife, shall immediately give to the parents or persons having charge of such infant a warning of the dangers to the eye or eyes of said infant, and shall for indigent cases provide the necessary treatment at the expense of said county, city, or town.

SEC. 3. It shall be unlawful for any physician or midwife practicing midwifery to neglect, or otherwise fail to instill or have instilled immediately upon its birth, in the eyes of the new-born babe, some germicide of proven efficiency in preventing the development of ophthalmia neonatorum.

SEC. 4. Every physician or midwife shall, in making a report of a birth, state whether or not the above germicide was instilled into the eyes of said infant.

SEC. 5. It shall be the duty of the local health officer:

1. To investigate, or have investigated, each case as filed with him in pursuance of the law, and any other cases as may come to his attention.
2. To report all cases of inflammation of the eyes of the new born, and the result of all such investigations as the State board of health may direct.
3. To conform to such other rules and regulations as the State board of health shall promulgate for his further guidance.

SEC. 6. It shall be the duty of the State board of health:

1. To enforce the provisions of this act.
2. To promulgate such rules and regulations as shall, under this act, be necessary for the purpose of this act, and such as the State board of health may deem necessary for the further and proper guidance of local health officers.
3. To publish and promulgate such further advice and information concerning the dangers of inflammation of the eyes of the new born as is necessary for prompt and effective treatment.
4. To furnish copies of this law to all physicians and midwives as may be engaged in the practice of obstetrics or assisting at childbirth.
5. To keep the proper record of any and all cases of inflammation of the eyes of the new born as shall be filed in the office of the State board of health in pursuance of the law and as may come to their attention in any way, and to constitute such records a part of the annual report to the governor.
6. To report any and all violations of this act as may come to their attention to the prosecuting attorney of the county wherein said misdemeanor may have been committed and to assist said official in any way possible, as by securing necessary evidence, et cetera.

7. To furnish birth certificates, which shall include the question, "Did you comply with section 6 of this act? If so, state what solution used."

SEC. 7. It shall be the duty of the clerk of the district court of each county on or before the fifteenth day of each month to certify to the prosecuting attorney of his county all reports of births filed during the preceding calendar month which fail to show that the solution hereinbefore provided for was instilled.

SEC. 8. Whoever, being a physician, surgeon, midwife, obstetrician, nurse, manager or person in charge of a maternity home or hospital, parent, relative, or person attending upon or assisting at the birth of an infant, violates any of the provisions of this act, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined a sum of not less than \$10 or more than \$100.

SEC. 9. All acts and parts of acts in conflict herewith are hereby repealed.

SEC. 10. None of the provisions of this act or the laws of this State regulating the practice of medicine or healing shall be construed to interfere with the treatment by prayer, or with any person who administers to or treats the sick or suffering by mental or spiritual means, nor shall any person who selects such treatment for the cure of disease be compelled to submit to any form of medical treatment.

NEW HAMPSHIRE.

(Chap. 9, Act Feb. 10, 1919, amending Chap. 85, Laws of 1915.)

SECTION 1. The attending physician, accoucher, midwife, or other person in charge who shall attend, assist, or advise at the birth of any living child within the limits of a town or city of this State shall, in order to prevent infection resulting in sore eyes and possible blindness, after washing the lids and adjacent tissues immediately following birth, drop into each eye of every child a single drop of a one per cent solution of nitrate of silver or some other equally efficient solution.

SEC. 2. Should one or both eyes of an infant become inflamed, swollen, and red, and show an unusual discharge at any time within two weeks after its birth, it shall be the duty of the attending midwife, nurse, relative, or other attendant treating or having charge of such infant to report in writing, within six hours thereafter, to the board of health of the city or town in which the parents of the infant reside, the fact that such inflammation, swelling, and redness of the eyes and unnatural discharge exist, except that if a legally qualified physician is in attendance, he shall report as required by this section within twenty-four hours.

SEC. 3. Upon receipt of a report as set forth in section 1 of this act, the board of health, if no physician is in attendance, shall at once direct the parents, or whoever has charge of such infant having such inflammation, swelling, redness, or unnatural discharge of the eyes, immediately to place it in charge of a legally qualified physician, or in charge of the city or town physician if unable to pay for medical services.

SEC. 4. The board of health of every city and town in the State shall make a weekly report to the State board of health upon blanks furnished for that purpose, of all cases reported under the provisions of section 1 of this act, and the State board of health is authorized to adopt such rules, regulations, and instructions as it may deem necessary to carry out the provisions of this act.

SEC. 5. Any person violating the provisions of this act shall be deemed guilty of a misdemeanor, and shall be fined not exceeding twenty-five dollars for each offense.

(Regulations relating to Midwifery, and Infants, January 27, 1916.)

REG. 6. Should one or both eyes of an infant become inflamed, swollen, and red, and show an unusual discharge at any time within two weeks after its birth, it shall be the duty of the attending midwife, nurse, relative, or other attendant treating or having charge of such infant, to report in writing, within six hours thereafter, to the Board of health of the city or town in which the parents of the infant reside, the fact

that such inflammation, swelling, and redness of the eyes and unnatural discharge exist, except that if a legally qualified physician is in attendance, he shall report as required by this section within twenty-four hours.

REG. 7. Upon receipt of a report as set forth in the above, the board of health, if no physician is in attendance, shall at once direct the parents, or whoever has charge of such infant having such inflammation, swelling, redness, or unnatural discharge of the eyes, immediately to place it in charge of a legally qualified physician, or in charge of the city or town physician, if unable to pay for medical services.

REG. 8. The board of health of every city and town in the State shall make a weekly report to the State board of health, upon blanks furnished for that purpose, of all cases reported under the provisions of paragraph No. 6 of these regulations, and any person violating its provisions is liable to a fine of twenty-five dollars for each offense.

NEW JERSEY.

(General Statutes, 1895, p. 1676.)

SECTION 1. Should one or both eyes of an infant become inflamed, swollen, or reddened, or show any unnatural discharge at any time within two weeks after its birth, and no legally qualified practitioner of medicine be in attendance upon the infant at the time, it shall be the duty of the midwife, nurse, attendant, or relative having charge of such infant to report the fact in writing, within six hours, to the local board of health of the city, township, or other municipality in which the parents of the infant reside.

SEC. 2. The said local board of health shall direct the parents, or person having charge of such infant suffering from such inflammation, swelling, redness, or unnatural discharge of the eyes to immediately place it in charge of a legally qualified practitioner of medicine, or in charge of the physician of the city, township, or other municipality if unable to pay for medical services.

SEC. 3. (As amended by chap. 147, acts of 1910.) Every local board of health in the State of New Jersey shall furnish a copy of this act to every legally qualified practitioner of medicine, and to each person who is known to act as a midwife or nurse in the city, township, or other municipality for which such board of health is appointed; and the board of health of the State of New Jersey shall cause a sufficient number of copies of this act to be printed and supply the same to each local board of health of this State for distribution.

SEC. 4. (As amended by chap. 147, acts of 1910.) Any person violating any of the provisions of this act shall be liable to a penalty of \$50, to be recovered in an action of debt by the local board of health of the municipality in which the violation occurs.

(Acts of 1911, chap. 96.)

SECTION 1. The State board of health shall furnish, free of cost, to physicians and midwives, registered under the laws of this State, such prophylactic remedies as it may deem best for the prevention of ophthalmia neonatorum, together with such instructions as it may deem necessary for the proper administration of the same.

SEC. 2. The sum of \$2,000 is hereby appropriated for the purpose of carrying out the provisions of this act when included in the annual or supplemental appropriation bill.

(Regulation State board of health, August 6, 1912.)

*Resolved*, That in accordance with the provisions of chapter 381 of the Laws of 1911, which empower the State board of health to require, in addition to the diseases named in the act, the reporting of "any other contagious or communicable disease which may hereafter be publicly declared by the State board of health to be preventable and especially dangerous to the public health"; the State board of health does hereby declare ophthalmia neonatorum to be preventable and specially dangerous to the public health, and physicians shall report cases of the disease coming under their

professional supervision to local boards of health in accordance with the requirements of chapter 381 of the laws of 1911.

Physicians in attendance upon cases of ophthalmia neonatorum will now be required to report such cases to the local boards of health and local boards to forward duplicates of the physicians' reports to the State board of health.

NEW MEXICO.

(Session Laws, 1921, chap. 145.)

**SEC. 3. Powers.**—The State department of public welfare shall have supervision over the health of the people of the State \* \* \* It shall be the superior health authority of the State and have power to \* \* \* prescribe prophylactic treatment for the prevention of infant blindness.

(Regulation governing the reporting of notifiable diseases.)

**SECTION 1.** The following-named diseases and disabilities are hereby declared to be dangerous to the public health and made notifiable, and the occurrence of such cases shall be reported as herein provided:

Group 1. Communicable diseases.

\* \* \* \* \*

Conjunctivitis (acute infectious).

\* \* \* \* \*

**SEC. 2.** Every person who in the State of New Mexico treats or examines for the purpose of diagnosis or treatment any person suffering from or afflicted with or who suspects that any person treated or examined by him is suffering from or afflicted with, any one of the diseases made notifiable by the preceding section, shall report such case to the local health officer or his agent, within whose jurisdiction the case occurs, within six hours after making a diagnosis or suspecting the disease to be one required to be reported. Said report shall be transmitted either by telephone or in writing. If made in writing, the report shall be on the blank form required by section 6 of these regulations and may be forwarded by mail or special messenger or delivered in person at the office of the local health officer. If transmitted by telephone, the report shall be recorded by said local health officer, or his agent, at the time of receipt, on one of the blank forms provided by section 6 of these regulations: said report, whether in writing or by telephone, shall give the following information which is necessary for the protection of the public health and welfare.

\* \* \* \* \*

**SEC. 3.** The requirements of the preceding section shall be applicable to persons attending patients ill with any of the notifiable diseases in hospital, asylums, or other institutions, public or private: *Provided*, That any local health officer may designate in writing an officer of any such hospital, asylum, or other institution within his jurisdiction to report, in the place of the attending physicians or other person treating or examining the patient, the cases of notifiable diseases and disabilities occurring in or admitted to said hospital, asylum, or other institution. When designation has been made as above provided, it shall be the duty of said designated officer to report all cases of notifiable diseases and injuries occurring in or admitted to such hospital, asylum, or other institution in the same manner as that prescribed for persons treating or examining patients.

**SEC. 4.** Whenever a person is known, or is suspected, to be afflicted with a notifiable disease, and no physician is in attendance, an immediate report of the existence of the case shall be made to the local health officer within whose jurisdiction the case

occurs, by the midwife, nurse, father, mother, or other person in charge of the patient, each in the order named.

\* \* \* \* \*  
 SEC. 6. The written reports of cases of notifiable diseases required by these regulations, of persons treating or examining persons afflicted with such disease, shall be made upon blanks supplied for the purpose by the State director of public health through the local health officers.

SEC. 7. Each local health officer shall forward by mail, within 24 hours, to the State Bureau of Public Health, copies of all reports of notifiable diseases to made him, and commissioner of health, copies of all reports of notifiable diseases made to him, and shall retain the original reports as the permanent record of his office. On each copy of a report thus forwarded the local health officer shall state (1) the date the report was received by him, (2) the date the report was forwarded, (3) whether the case to which the report pertains was visited, or otherwise investigated by him or his agent, and (4) what measures were taken to prevent the spread of the disease or the occurrence of additional cases.

(Regulation Bureau of Public Health, November, 1922.)

SEC. 1. It shall be the duty of any physician, nurse, midwife, or other person, in attendance upon a case of childbirth, to introduce into each eye of the newborn infant, within one hour of its birth, a one per centum (1%) solution of silver nitrate, or an antiseptic of equal potency and harmlessness, except as hereinafter provided.

SEC. 2. It shall be the further duty of the attendant mentioned in section 1 above to certify on the certificate of birth that the prophylactic treatment mentioned in section 1 was actually applied as directed and to state what preparation was used for this purpose, except as hereinafter provided.

SEC. 3. If the parent or guardian of a newborn infant has a bona fide conscientious objection to the use of any drug, it shall be the duty of the person in attendance upon the birth to present to said parent or guardian a certificate, substantially in the form hereinafter set forth, for signature by him, and it shall be the duty of said parent or guardian to sign said certificate, which shall be attached to and become a part of the certificate of birth of said newborn infant. Upon the signing of such certificate of objection by such parent or guardian and the attachment thereof to the birth certificate duly prepared and delivered to a lawful subregistrar or health officer, the attendant mentioned herein shall be deemed to have complied with the provisions of sections 1 and 2 of these regulations.

SEC. 4. The certificate mentioned in section 3 hereof shall be substantially in the following form:

FORM OF CERTIFICATE TO BE SIGNED BY PARENT OR GUARDIAN REFUSING THE USE OF A PROPHYLACTIC AGENT IN THE EYES OF HIS NEWBORN INFANT.

I hereby certify that I am opposed to the use of any prophylactic in the eyes of my infant, who was born this ..... day of ....., 19.., and that I assume full responsibility for any consequences that may result from my refusal to allow the use of said prophylactic.

Date ..... Signed .....  
 (\*Parent or guardian.)

Witness ..... Address .....  
 (\*Physician, nurse, midwife, other attendant.)

SEC. 5. Antiseptics of potency and harmlessness equivalent to a one per centum (1%) solution of silver nitrate, as provided in section 1 hereof, shall be understood to be the following and no others:

Twenty-five per centum (25%) solution of argyrol, or five per centum (5%) solution of protargol, or solutions of other silver compounds of equivalent strength and harmlessness to the eyes of the newborn.

(Chap. 85, Laws of 1919.)

**SEC. 18. Violation of laws and regulations.**—Any person, firm, or corporation violating any State health law, or order, rule or regulation of the State board of health \* \* \* where the punishment is not specifically prescribed by law, shall be punished by a fine of not less than five (\$5.00) dollars, nor more than one hundred (\$100.00) dollars, or imprisonment in the county jail for not less than five (5) nor more than ninety (90) days, or by both such fine and imprisonment in the discretion of the court.

NEW YORK.

(Consolidated Laws, 1909, chap. 40.)

**SEC. 482. A person who:** \* \* \* 3. Being a midwife, nurse, or other person having the care of an infant within the age of two weeks neglects or omits to report immediately to the health officer or to a legally qualified practitioner of medicine of the city, town, or place where such child is being cared for, the fact that one or both eyes of such infant are inflamed or reddened, whenever such shall be the case, or who applies any remedy therefor without the advice, or except by the direction of such officer or physician; \* \* \* is guilty of a misdemeanor.

(Acts of 1910, chap. 513.)

**SEC. 1.** The treasurer shall pay \* \* \* to the person, and for the purposes indicated in this act, the amount named or so much thereof as shall be sufficient to accomplish, in full, the purposes designated by the appropriations (p. 1141).

(Health department.)

For the control and prevention of ophthalmia neonatorum and the prevention of blindness, five thousand dollars (\$5,000), or as much thereof as may be necessary.

(State department of health, Public Health Manual, p. 129.)

Every physician is required by law to report at once all cases of communicable disease in his care to the health officer, and if no physician is in attendance, the duty is imposed on the householder where the case occurs.

The diseases to be so reported have, under the law, been designated by the State commissioner of health as \* \* \* ophthalmia neonatorum \* \* \*.

The occurrence of these diseases should be reported immediately to the State department of health by the health officer \* \* \* .

(Regulation of public health council, February 7, 1922, adopted amendment to the New York State Sanitary Code.)

Chap. II of the Sanitary Code is hereby amended by adding thereto a new regulation to be known as regulation 10, to read as follows:

**REG. 10.** Precautions to be observed for the prevention of ophthalmia neonatorum. It shall be the duty of the attending physician, midwife, nurse, or other person in attendance on a confinement case to use at the time of the delivery prophylactic measures such as the instillation into both eyes of one per cent solution of nitrate of silver, or an equally efficient agent to prevent ophthalmia neonatorum or the development of sore eyes in the infant due to infection at birth.

This regulation takes effect April 1, 1922.

NORTH CAROLINA.

(Chap. 257, act March 7, 1917.)

**SECTION 1.** Any inflammation, swelling, or unusual redness in either one or both eyes of any infant, either apart from or together with any unnatural discharge from

the eye or eyes of such infant, independent of the nature of the infection, if any, occurring any time within two weeks after the birth of such infant shall be known as "inflammation of the eyes of the new-born" (ophthalmia neonatorum).

SEC. 2. It shall be the duty of any physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital of any nature, parent, relative, and any person attendant on or assisting in any way whatsoever any infant, or the mother of any infant at childbirth or at any time within two weeks after childbirth, knowing the condition, hereinabove defined, to exist, immediately to report such fact, as the State board of health shall direct, to the local health officer of the county, city, town, village, or whatever other political division there may be within which the infant or the mother of any such infant may reside. For such services the attending physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital shall receive from the State treasurer a fee of 50 cents. In the event of there being no health officer in the city, village, or town, in which the infant resides, midwives shall immediately report the condition to some qualified practitioner of medicine, and thereupon withdraw from the case, except as she may act under a physician's instructions. On receipt of such report, the health officer, or the physician notified by a midwife where no health officer exists, shall immediately give to the parents or person having charge of such infant a warning of the dangers to the eye or eyes of said infant, and shall for indigent cases provide the necessary treatment at the expense of the said county, city, village, or town.

SEC. 3. It shall be unlawful for any physician or midwife practicing midwifery in the State of North Carolina to neglect or otherwise fail to instill or have instilled, immediately upon its birth, in the eyes of the new-born babe two drops of a solution prescribed or furnished by the North Carolina State Board of Health.

SEC. 4. It shall be the duty of the local health officer:

1. To investigate or to have investigated each case as filed with him in pursuance with the law, and any other such case as may come to his attention.
2. To report all cases of inflammation of the eyes of the new born and the result of all such investigations as the State board of health shall direct.
3. To conform to such other rules and regulations as the State board of health shall promulgate for his further guidance.

SEC. 5. It shall be the duty of the North Carolina State Board of Health:

1. To enforce the provisions of this act.
2. To promulgate such rules and regulations as shall, under this act, be necessary for the purpose of this act, and such as the State board of health may deem necessary for the further and proper guidance of local health officers.
3. To provide for the gratuitous distribution of the scientific prophylactic for inflammation of the eyes of the new born, as designated in section 3, together with proper directions for the use and administration thereof, to all physicians and midwives as may be engaged in the practice of obstetrics or assisting at childbirth.
4. To publish and promulgate such further advice and information concerning the dangers of inflammation of the eyes of the new born, and the necessity for prompt and effective treatment.
5. To furnish copies of this law to all physicians and midwives as may be engaged in the practice of obstetrics or assisting at childbirth.
6. To keep a proper record of any and all cases of inflammation of the eyes of the new born as shall be filed in the office of the State board of health in pursuance with this law and as may come to their attention in any way, and to constitute such records a part of the biennial report to the governor and the legislature.

SEC. 6. It shall be the duty of physicians, midwives, or other persons in attendance upon a case of childbirth in a maternity home, hospital, public or charitable institution, in every infant's eyes within two hours after birth, to use the prophylactic against inflammation of the eyes of the new born specified in section 3, and to make

record of the prophylactic used. It shall also be the duty of such institution to maintain such records of cases of inflammation of the eyes of the new born as the State board of health shall direct.

SEC. 7. Whoever being a physician, surgeon, midwife, obstetrician, nurse, manager, or person in charge of a maternity home or hospital, parent, relative, or person attendant upon or assisting at the birth of any infant, violates any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof be fined in a sum not less than \$10 nor more than \$50; and, if possessed of the required amount of property, subject to suit by the parent or guardian of the child for damages resulting to the child; and if such a suit shall be brought the establishment of the fact that the physician or midwife did not place the drops in the child's eyes within two hours of its birth shall be accepted as prima facie evidence of the physician's or midwife's responsibility for the injury of the disease to the eye or eyes of the child. It shall be the duty of the prosecuting attorney to prosecute all violations of this act.

SEC. 8. All midwives who now practice midwifery in North Carolina, other than regularly registered physicians, shall register, without fee, their names and addresses with the secretary of the North Carolina State Board of Health on or before the 1st day of July, 1917, in order that the prophylactic solution and necessary instructions may be furnished them. After the aforesaid date no person, physician, or midwife, shall practice midwifery in North Carolina until at least 10 days have elapsed following the registration of the name and address of the person who intends to engage in the practice of midwifery, and in this period of 10 days elapsing between the registration and beginning of the practice of midwifery by the registered person the State board of health shall furnish the necessary directions and solution to the physician or midwife for compliance with this act.

SEC. 9. Any physician or midwife failing to register their names and addresses with the North Carolina State Board of Health, as required in section 8 of this act, shall be guilty of a misdemeanor and subject to a fine of from \$10 to \$50.

SEC. 10. The sum of \$3,000 shall be annually appropriated for the use of the State board of health in enforcing and carrying out the provisions of this act. Any and all necessary and legitimate expenses that may be incurred in prosecuting a case under this act shall, on proper showing, be met by the State board of health out of this appropriation. In addition thereto, all fines and penalties recovered hereunder shall be paid into the State treasury and shall constitute a special fund for the use and purposes of the State board of health as herein enacted.

SEC. 11. Every health officer shall furnish copy of this act to each person who is known to him to act as midwife or nurse in the county, city, or town for which such health officer is appointed, and the secretary of state shall cause a sufficient number of copies of this act to be printed and supply the same to the health officer of the county, city, or town, and the State board of health, on application.

(Regulation State board of health, 1917.)

The North Carolina State Board of Health, under chapter 263, sections 7, 8, and 9, public laws of 1917, hereby declares ophthalmia neonatorum to be infectious and contagious, and therefore reportable.

NORTH DAKOTA.

(Compiled Laws of North Dakota, 1913, art. 81.)

SEC. 3168. Whenever a child is born, the physician, midwife, or any other person who is present and engaged as professional attendant, shall report said birth on a blank supplied by the State board of health to the health officer having jurisdiction within 36 hours after such birth occurs. Said birth certificate in addition to other data ordered by the State board of health shall have upon it this question: "Were



precautions taken against ophthalmia neonatorum?" And it shall be a violation of this act for any physician or midwife in professional attendance at a birth to fail to report same as herein commanded or to omit answering the said question, "Were precautions taken against ophthalmia neonatorum?" All bills or charges for professional services rendered at a birth shall be unlawful if report is not made as herein commanded.

SEC. 3169. It shall be the duty of all physicians or midwives in professional attendance upon a birth to always carefully examine the eyes of the infant, and if there is the least reason for suspecting of disease of the eyes then said physician or midwife in professional attendance shall apply such prophylactic treatment as may be recognized as efficient in medical science.

SEC. 3170. Should one or both eyes of an infant become inflamed, swollen, or reddened, or show any unnatural discharge or secretion at any time within two weeks after its birth, and no legally qualified physician is in attendance upon the infant at that time, it shall be the duty of its parents, or, in their absence, whoever is caring for said infant, to report the fact in writing within six hours after discovery, to the health officer having jurisdiction: *Provided*, Said report to said health officer need not be made from recognized hospitals.

SEC. 3171. Upon receipt of a report as set forth in section 3170, health officers shall direct the parents or whoever has charge of such infant suffering from such inflammation, swelling, redness, or unnatural secretion or discharge of the eyes, to immediately place it in charge of a legally qualified physician, or in charge of the city or township physician if unable to pay for medical services.

SEC. 3172. Any violation of the provisions of this act shall be punished by a fine of not less than ten dollars nor more than fifty dollars.

(Reg. 21 (a) and (b), State board of health, adopted January 7, 1921.)

REG. 21 (a). Since it has been clearly demonstrated that a considerable per cent of cases of ophthalmia neonatorum are due to pyogenic organisms, other than the gonococcus, and since the prophylactic value of silver nitrate is fully proven in all cases, therefore all physicians and midwives are urged to use a 1 per cent solution of silver nitrate in the eyes of all new-born infants.

(b) All midwives, nurses, or other persons having charge of a newborn infant, shall report immediately to the health officer, or a legally qualified physician, if any pus or secretion forms on the eyes or on the eyelids, or if one or both eyes become reddened or swollen within two weeks of birth.

OHIO.

(General Code, act of May 19, 1915, secs. 1248-1 to 1248-7.)

SEC. 1248-1. *Inflammation of the eyes of the new born defined.*—Any inflammation, swelling, or redness in either one or both eyes of any infant, either apart from or together with any unnatural discharge from the eye or eyes of such infant, independent of the nature of the infection, if any, occurring any time within two weeks after the birth of such infant, shall be known as "inflammation of the eyes of the new born." (106 v. 321.)

SEC. 1248-2. *Report to State board of health by physician or attendant; fee.*—It shall be the duty of any physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital of any nature, parent, relative, and any persons attendant on or assisting in any way whatsoever, any infant or the mother of any infant at childbirth or any time, within two weeks after childbirth, knowing the condition, hereinabove defined, to exist, within six hours thereafter, to report such fact, as the State board of health shall direct, to the local health officer of the city, town, village, or whatever other political division there may be, within which the infant or the mother of any such infant may

reside. For such services the attending physician, surgeon, obstetrician, midwife, nurse, maternity home, or hospital shall receive from the State treasurer a fee of fifty cents. (106 v. 321.)

**Sec. 1248-3. Duties of local health officer.**—It shall be the duty of the local health officer:

1. To investigate or to have investigated, each case as filed with him in pursuance with the law, and any other such case as may come to his attention.
2. To report all cases of inflammation of the eyes of the new born and the result of all such investigation as the State board of health shall direct.
3. To conform to such other rules and regulations as the State board of health shall promulgate for his further guidance. (106 v. 321.)

**Sec. 1248-4. Duties of State board of health.**—It shall be the duty of the State board of health:—

1. To enforce the provisions of this act.
2. To promulgate such rules and regulations as shall, under this act, be necessary for the purpose of this act, and such as the State board of health may deem necessary for the further and proper guidance of local health officers.
3. To provide for the gratuitous distribution of a scientific prophylactic for inflammation of the eyes of the new born, together with proper directions for the use and administration thereof to all physicians and midwives as may be engaged in the practice of obstetrics or assisting at childbirth.
4. To provide, if necessary, daily inspection and prompt and gratuitous treatment to any infant whose eyes are infected with inflammation of the eyes, provided further that the State board of health, if necessary, shall defray the expense of such treatment from such sum as may be appropriated for its use.
5. To publish and promulgate such further advice and information concerning the dangers of inflammation of the eyes of the new born, and the necessity for prompt and effective treatment.
6. To furnish copies of this law to all physicians and midwives as may be engaged in the practice of obstetrics or assisting at childbirth.
7. To keep a proper record of any and all cases of inflammation of the eyes of the new born, as shall be filed in the office of the State board of health, in pursuance with this law and as may come to their attention in any way, and to constitute such records a part of the annual report to the governor and the legislature.
8. To report any and all violations of this act as may come to its attention to the State board of medical registration and examination and also to the local police or county prosecutor in the county wherein said misdemeanor may have been committed, and to assist said officials in every way possible, such as by securing necessary evidence. (106 v. 321.)

**Sec. 1248-5. Duty of physician or attendant upon case of childbirth in home, hospital, etc., to use prophylactic.**—It shall be the duty of the physicians, midwives, or other persons in attendance upon a case of childbirth in a maternity home, hospital, public or charitable institution, in every infant immediately after birth, to use some prophylactic against inflammation of the eyes of the new born and to make record of the prophylactic used. It shall also be the duty of such institution to maintain such records of cases of inflammation of the eyes of the new born as the State board of health shall direct. (106 v. 322.)

**Sec. 1248-6. Penalty for violations of provision of this act.**—It shall be the duty of a midwife in every case of childbirth under her care, immediately after birth, to use such prophylactic against inflammation of the eyes of the new born as the State board of health requires. Whoever being a physician, surgeon, midwife, obstetrician, nurse, manager or person in charge of a maternity home or hospital, parent, relative, or person

attendant upon or assisting at the birth of any infant violates any of the provisions of this act, shall be deemed guilty of a misdemeanor and upon conviction thereof, be fined in a sum not less than fifty dollars nor more than one hundred dollars and for each second or subsequent offense shall be fined not less than one hundred dollars nor more than three hundred dollars. It shall be the duty of the prosecuting attorney to prosecute all violations of this act. (106 v. 322).

SEC. 1248-7. *Annual appropriations.*—The sum of \$5,000 shall be annually appropriated for the use of the State board of health in enforcing and carrying out the provisions of this act. Any and all necessary and legitimate expenses that may be incurred in prosecuting a case under this act, shall, on proper showing, be met by the State board of health out of this appropriation. In addition thereto, all fines and penalties recovered hereunder, shall be paid into the State treasury and shall constitute a special fund for the use and purposes of the State board of health as herein enacted. (106 v. 322.)

SEC. 12787. *Failure to report infant with diseased eyes.*—Whoever, being a midwife, nurse, or relative in charge of an infant less than ten days old, fails within six hours after the appearance thereof, to report in writing to the physician in attendance upon the family, or if there be no such physician, to a health officer of the city, village, or township in which such infant is living, or, in case there be no such officer, to a practitioner of medicine legally qualified to practice, that such infant's eye is inflamed or swollen or shows an unnatural discharge, if that be the fact, shall be fined not less than five dollars nor more than one hundred dollars or imprisoned not less than thirty days nor more than six months, or both. (91 v. 75.)

(This section may have been repealed by section 1248-1 to 1248-7 General Code.)

(Regulations State board of health, July 1, 1920.)

REG. 2. *Diseases and disabilities to be reported.*—The diseases and disabilities herein named and classified are declared dangerous to the public health, are made notifiable, and the occurrence of cases or suspected cases in Ohio shall be reported as provided in the following regulations.

\* \* \* \* \*

Class D.—Ophthalmia neonatorum, any inflammation of the eyes of the new born.

(Regulation State board of health.)

*Inflammation of the eyes of the new born.*

REG. 31. *Reports.*—Every physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital required to report to the health commissioner the condition defined as inflammation of the eyes of the new born, in section 1248-1, General Code of Ohio, shall make such report in writing within six hours. Said written report shall give the name and address of the reporting physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital, the name, sex, age in days, and address of the infant afflicted with inflammation of the eyes of the new born: *Provided*, That in the case of any unnamed infant, so afflicted, the designation "Unnamed" shall be written in lieu of a given name.

REG. 32. *Immediate notice in emergency.*—If, in the opinion of the reporting physician, surgeon, obstetrician, midwife, nurse, maternity home, or hospital, the condition of the case so requires, in addition to the written report, an immediate notice of such case shall be given to the health commissioner in the most rapid manner available.

REG. 33. *Reports by parents, etc.*—Parents, relatives, and other persons required to report a case of inflammation of the eyes of the new born shall make such report to the health commissioner in the most rapid manner available. Each case so reported to the health commissioner, and any other case coming to his attention otherwise than by the written reports as provided above, shall be reported in writing to the State

department of health by the health commissioner. Such report from the health commissioner shall give the name and address of the person who first notified the health commissioner of the case, or a statement as to the health commissioner's source of information concerning the case, together with the name, sex, age in days, and address of the infant afflicted with inflammation of the eyes of the newborn, provided that in the case of any unnamed infant so afflicted the designation "Unnamed" shall be written in lieu of a given name.

REG. 34. *Disposition of reports.*—Upon receipt of a written report of a case of inflammation of the eyes of the new born, the health commissioner shall immediately write on the report the date and hour of the receipt of the report together with his own signature, and shall make a permanent record of the case for the use of the local health department. The original written report shall be thereafter forwarded at once by mail to the State department of health.

REG. 35. *Investigation by health commissioner.*—The health commissioner, upon receipt of report of a case of inflammation of the eyes of the new born, shall immediately investigate the case to determine if proper care and treatment to prevent blindness have been provided. If the health commissioner is of the opinion that the case is not receiving proper treatment or care, he shall immediately notify the State department of health of the facts.

REG. 36. *Investigation reports.*—The health commissioner shall forward by mail to the State department of health on blanks provided for the purpose a report of the investigation and history of each and every case of inflammation of the eyes of the new born reported to him or coming to his attention, said report to be submitted as soon as practicable.

REG. 37. *Fees.*—Fees for reporting cases of inflammation of the eyes of the new born shall be paid semiannually on the first day of July and January.

REG. 79. *Maternity or lying-in hospitals or homes.*—Immediately upon the beginning of labor, a legally qualified physician shall be notified and shall be present and in attendance at the time of birth. An efficient prophylactic solution shall be used in the eyes of each new born child.

OKLAHOMA.

(Act approved March 9, 1921.)

SECTION 1. That any inflammation, swelling, or unusual redness in either one or both eyes of any infant, together with any unnatural discharge from the eye or eyes of such infant, independent of the nature of the infection, if any, occurring at any time within four weeks after the birth of such infant, shall be known as "Inflammation of the eyes of the new born" (ophthalmia neonatorum).

SEC. 2. *Physicians, etc., duty to report—treatment.*—It shall be the duty of any physician, surgeon, obstetrician, midwife, manager, or person in charge of a maternity home or hospital or other public or private institution in the State of Oklahoma, parent, relative, and persons attendant on or assisting in any way whatsoever any infant, or the mother of any infant, at childbirth or any time within twenty-four hours after childbirth, knowing the conditions hereinabove defined to exist, to report within six hours and confirm such fact in writing within three days to the local health officer of the county, city, town, magisterial district, or whatever other political division there may be within which the infant or the mother of any infant may reside.

In the event of there being no health officers in the county, city, or town, in which the infant resides, midwives, and other persons as hereinabove defined, excepting physicians, surgeons, and obstetricians, shall immediately report such conditions to some qualified practitioner of medicine. On receipt of such report, the health officer or the physician notified, where no health officer exists, shall immediately give to the parents or persons having charge of such infant, a warning of the dangers to the eye or eyes of such infant, and shall for indigent cases provide the necessary treat-

ment at the expense of said county, city, or town. (Treatment—penalty for failure to administer antiseptic.)

SEC. 3. It shall be unlawful for any physician or midwife, osteopaths, and chiropractics practicing midwifery, to neglect, or otherwise fail to instill immediately upon its birth, in both eyes of the new-born child a one per cent solution of nitrate of silver or other proven antiseptic, which shall be furnished by the State board of health in individual ampules containing the proper solution and quantity for one treatment in both eyes. Should a physician or the parents of the child prefer to use a form of prophylaxis other than the one prescribed by above, he may do so, provided that he states in writing his reasons for doing so to the local health officer of the county, city, or town, magisterial district, or whatever political division there may be within which the infant or the mother of any infant may reside, within three days from the date of administering same. Should a physician or the parents of said child deem it best for the interests of his patient not to use any prophylactic, he shall not be required to do so provided he states fully in writing to the local health officer of the county, city, town, magisterial district, or whatever other political division there may be within which the infant or the mother of any infant may reside, within three days from the birth of said child, his reason for not doing so.

SEC. 4. *Report, use of nitrate of silver.*—Every physician or midwife shall, in making a report of a birth, state whether or not the above solution was instilled into the eyes of said infant.

SEC. 5. *Health officer—duties.*—It shall be the duty of the local health officer:

1. To investigate or have investigated each case of reported ophthalmia neonatorum as shall have been filed with him in pursuance of the law, and such other cases as may be brought to his attention.

2. To report to the State board of health all cases of inflammation of the eyes of the new born and the result of all such investigations in such form as the State board of health may prescribe and direct.

3. To conform to such other rules and regulations as the State board of health shall designate and promulgate for its further guidance.

SEC. 6. *State board of health—duties.*—It shall be the duty of the State board of health:

1. To enforce the provisions of this act.

2. To promulgate such rules and regulations as shall under this act be necessary to secure the purposes of this act, and which the board may deem necessary for the further and proper guidance of local health officer.

3. To provide for the gratuitous distribution of silver nitrate outfits, in individual ampules, containing a 1 per cent solution with proper directions for the use and administration thereof, to all physicians and midwives as may be engaged in the practice of obstetrics, or assisting at child-birth. Such directions may also be printed in foreign languages in the discretion of the State board of health.

4. To publish and promulgate such further advice and information concerning the dangers of inflammation of the eyes of the new born as is necessary for the prompt and effective treatment.

5. To furnish copies of this law to all physicians and midwives as may be engaged in the practice of obstetrics, or assisting at child-birth.

6. To report any and all violations of this act as may come to their attention to prosecuting attorney of the county wherein a misdemeanor as defined in section 7 of this act shall have been committed, and to assist said official in any way possible by securing necessary evidence, and otherwise.

7. To furnish birth certificates which shall include the question, "Did you instill in each eye of the infant a 1 per cent solution of nitrate of silver immediately after birth?" and to require a written answer to this question.

SEC. 7. *Violation of act—punishment.*—Whoever, being a physician, surgeon, obstetrician, midwife, manager or person in charge of a maternity home or hospital, or public or private institution in the State of Oklahoma, violates any of the provisions of this act, shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined a sum of not less than \$50.00 nor more than \$1,000.00 for the first offense and not less than \$100.00, nor more than \$2,000.00 for subsequent offenses.

SEC. 8. *Religious beliefs, persons having, when excepted.*—Nothing in this act shall be construed to compel persons or parents to conform to same who have religious beliefs contrary to the use of medicines.

OREGON.

(Chap. 264, Laws of 1919.)

SEC. 63. Should one or both eyes of an infant become inflamed or swollen or reddened at any time within two weeks after birth, it shall be the duty of the attending physician, midwife, or nurse, or other person having the care of such infant, to report in writing within twenty-four hours after the discovery thereof to the health officer or to a legally qualified practitioner of the city, town, or district in which the mother of the child resides the fact that such inflammation or swelling or redness exists.

SEC. 64. That it shall be the duty of said health officer, immediately upon receipt of said written report, to notify the parents or the person having charge of said infant of the danger to the eye or eyes of said infant by reason of said condition from neglect of proper treatment of the same, and he shall also inclose to them directions for the proper treatment thereof.

SEC. 65. Every health officer shall furnish a copy of this act to each person who is known to him to act as midwife or nurse in the city or town from which such health officer is appointed, and the State board of health shall cause a sufficient number of copies of this act to be printed and supply the same to such health officer on application.

(Rules and Regulations, State board of health, 1919.)

Reportable disease:

SEC. 9. Group 1. \* \* \* ophthalmia neonatorum \* \* \*.

SEC. 20. Special restrictive precautions: \* \* \* The corrective treatment or restrictive measures vary with the nature of the disease and are subject to the judgment of the physician or health officer in charge. \* \* \*

SEC. 21. The following diseases require special restrictive measures as specified in section 20:

\* \* \* ophthalmia neonatorum \* \* \*.

SEC. 36. (a) An infection of the eyes of infants by gonococci communicated during or shortly after birth.

Incubation period a few hours to several days.

(b) Isolation of mother and child recommended.

(c) Reportable by law on special blank according to chapter 264, Session Laws of 1919.

(d) Physicians should instruct members of the family on extreme cleanliness. All contaminated dressings should be burned.

(e) After the baby is born and has been cleansed in the usual manner, wash the eyes with the following solution of boracic acid: One pint of cold boiled water to which is added two teaspoonfuls of boracic acid. Open the lids carefully and drop in the eyes two or three drops of freshly prepared two per cent solution of silver nitrate (silver nitrate, nine grains; distilled water, one ounce).

If an infant's eyes have not been cared for and inflammation occurs in them before treated as outlined above, a smear on a glass slide should be made of the discharge

from the eye and an examination made for gonococci. The laboratory of the State board of health will examine such specimens free of charge.

PENNSYLVANIA.

(Digest of Laws, 1916, Chap. XXIX, 4 to 9; act of June 5, 1913, P. L. 443, secs. 1 to 6.)

4. *Be it enacted, &c.*, That every physician practicing in any portion of this Commonwealth who shall treat or examine any infant suffering from ophthalmia neonatorum (inflammation of the eyes of infants) shall, if the said case be located in a township of the first class, a borough, or a city, forthwith make a report in writing to the health authorities of said township, city, or borough; and if said case shall be located in a township of the second class, or a city, borough, or township of the first class, not having a board of health, or body acting as such, to the State department of health, upon blanks supplied for that purpose, in which report he shall, under his or her own signature, state the name of the disease, and the name, age, sex, color, and nativity of the infant suffering therefrom, together with the street and house number of the premises in which said infant may be located, or otherwise sufficiently designate the same, the date of the onset of the disease, the name and occupation of the householder in whose family the disease may have occurred, together with such other information relating to said case as may be required by said health authorities and the State department of health. (Sec. 1, act of June 5, 1913, P. L. 443.)

5. That any midwife or nurse or other person having the care of an infant whose eyes have become inflamed or swollen or reddened at any time within two weeks after birth shall report the same, in writing, to the health authorities of the city, borough, or township of the first class in which the case may be located; or if it be located in a township of the second class, or a city, borough, or township of the first class, not having a board of health, or body acting as such, the State department of health, within six hours after the discovery thereof, giving the name of the infant, the names of the parents or guardians, and the street and number of their residence, or otherwise sufficiently designate the same, together with the fact that such inflammation or swelling or redness exists, and shall make a similar report in writing to some regularly qualified practicing physician of the district. (Sec. 2, act of June 5, 1913, P. L. 443.)

6. That it shall be the duty of the said health authorities or the State department of health, immediately upon receipt of a written report from a midwife or a nurse, or person other than a practicing physician, to notify the parents or guardian, or other person having charge of the infant, of the danger to the eyes or eye of said infant by reason of any neglect or proper treatment of the same. (Sec. 3, act of June 5, 1913, P. L. 443.)

7. Every physician in this Commonwealth who shall treat any infant's eyes for ophthalmia neonatorum (inflammation of the eyes of an infant) shall, within forty-eight hours after said physician ceases treatment of or attendance upon such case of ophthalmia neonatorum, report to the Commissioner of Health of the Commonwealth of Pennsylvania that said physician has treated a certain case of ophthalmia neonatorum, giving full information as required in section one of this act, stating that he has ceased treatment of or attendance upon said case, and what was condition of infant's eyes when physician ceased treatment of or attendance upon said case of ophthalmia neonatorum. (Sec. 4, act of June 5, 1913, P. L. 443.)

8. Every health officer shall furnish a copy of this act to every person who is known to him to act as a midwife or nurse in the city, borough, or township for which he is health officer, and the commissioner of health of this Commonwealth of Pennsylvania shall cause a sufficient number of copies of this act to be printed and supplied to the health officers. (Sec. 5, act of June 5, 1913, P. L. 443.)

9. Any physician, midwife, nurse, or other person who shall violate any of the provisions of this act, shall, upon conviction thereof in a summary proceeding before any

justice of the peace or alderman of the county wherein such offense was committed, be sentenced to pay a fine of not less than twenty or more than one hundred (\$100) dollars, to be paid to the use of the said county, and the costs of prosecution, or to be imprisoned in the county jail for a period of not less than ten (10) or more than thirty (30) days, or both, at the discretion of the court. (Sec. 6, act of June 5, 1913, P. L. 443.)

PORTO RICO.

(Regulation Insular Board of Health, approved October 21, 1919.)

SEC. 51. Thirty per cent or more of existing blindness has been shown to be due to infection of the eyes at or shortly after birth. This infection being readily amenable to treatment, it is ordered that, whenever in any city, district, or place in this island any nurse, midwife, or other person, not a legally qualified practitioner of medicine, shall notice any inflammation of the eyes or redness of the lids in a new-born child under his or her care, it shall be the duty of such person to report the same to some legally qualified practitioner of medicine within twelve hours of the time the disease is first noticed.

SEC. 52. It shall be the duty of every legally qualified practitioner of medicine to treat all cases of "ophthalmia neonatorum" by the Crede method, which is as follows:

SEC. 53. Gently open the lids and wash out the eyes with pure lukewarm water, which has been boiled, using a clean soft piece of old linen or muslin or a pledget of absorbent cotton, but do not use a sponge.

SEC. 54. Then immediately drop in each eye one or two drops of a 1 per cent solution of nitrate of silver, and continue its use so long as it may be necessary.

SEC. 55. Half an hour after each application of the silver solution wash the eyes with warm salt and water (a teaspoonful of table salt to a pint of boiled water) or with a solution of boric acid (10 grains to 2 tablespoonfuls of boiled water) and continue this last application every hour or two until the eyes are well, gradually lengthening the time.

SEC. 56. This disease is very contagious, even to grown persons; therefore burn or boil all cloths that have touched the eyes, avoid kissing the child, wash the hands after bathing the child's eyes, and allow no one else to use the same basin in which the child is bathed.

SEC. 57. Any person guilty of violation of any of the provisions of this order shall, upon conviction thereof, be punished by a fine of not less than ten dollars (\$10) nor more than two hundred dollars (\$200), or imprisonment for not less than ten (10) nor more than ninety (90) days, or by both such fine and imprisonment, at the discretion of the court.

(The following rules and regulations, having been approved by the insular board of health on October 21, 1919, and by the executive council on October 27, 1919, in accordance with the provisions of Act No. 81, approved March 14, 1912, are hereby promulgated for the information and guidance of all concerned:)

(Sanitary Regulations No. 64, insular board of health, October 21, 1919.)

SEC. 2. It shall be the duty of physicians and surgeons and midwives to preserve the newly born infant from infantile tetanus and blindness due to ophthalmia neonatorum by obligatorily and efficiently carrying out the hygienic recommendations hereinafter set forth.

SEC. 3. Every physician or midwife shall report to the commissioner of health of his or her municipality any case under treatment of any child under the age of thirty days who shall present suspicious symptoms of infantile tetanus or conjunctivitis.

SEC. 4. As soon as the municipal commissioner of health receives the report of any suspicious case of conjunctivitis in any newly born child, he shall proceed to take specimens of the conjunctival secretions, which specimens he shall forward to the Insular Biological Laboratory for investigation of the gonococcus.

\* \* \* \* \*



SEC. 8. In cases of childbirth of indigent poor women the municipality shall provide, at the request of interested parties, a package containing the following medical supplies for the prevention of infantile tetanus and blindness due to ophthalmia neonatorum:

\* \* \* five grams of 1 per cent solution of silver nitrate, put up in a proper container, together with a dropping tube.

SEC. 9. Any person who shall violate any of the provisions of this regulation shall be punished by fine, which shall not be less than \$1 nor more than \$100, or by imprisonment from one day to thirty days, or by both penalties, at the discretion of the court.

RHODE ISLAND.

(General Laws, chap. 1757, act approved April 23, 1919.)

SECTION 1. Section 25 of chapter 343 of the General Laws, entitled "Of offenses against the person," as amended by chapter 1081 of the Public Laws, passed at the January session, A. D. 1914, and further amended by chapter 1641 of the Public Laws, passed at the January session, A. D. 1918, is hereby amended so as to read as follows:

"SEC. 25. That any diseased condition of the eye or eyes of any infant in which there is inflammation, redness, swelling, or any unnatural discharge at any time within two weeks after birth shall for the purposes of this act be deemed to be ophthalmia neonatorum.

"It shall be the duty of the physician, nurse, or midwife attending the birth of an infant immediately after such birth to treat the eyes of such infant with a prophylactic remedy as may be recommended and furnished by the State board of health.

"It shall be the duty of any physician, midwife, nurse, parent, or other person or persons assisting any woman in childbirth or assisting in the care of any infant to report within twelve hours after noting the same, any such case of ophthalmia neonatorum coming to his or her attention, to the local health officer of the city or town within which the mother of such infant shall have been at the time of confinement.

"It shall be the duty of physicians, midwives, and such other persons as may be lawfully engaged in the practice of obstetrics or assisting at childbirths to inform parents or guardians of the serious nature and consequences of this disease and to advise the use of prophylactic measures designated by the State board of health.

"For the purpose of this act, midwives, who previously have not been permitted to use medical agents under any conditions, may employ the approved prophylactic of the State board of health with the consent of the parent or guardian."

SEC. 2. This act shall take effect upon its passage, and all acts and parts of acts inconsistent herewith are hereby repealed.

SOUTH CAROLINA.

(Sanitary Code for South Carolina, 1919.)

SEC. 443. *Infant with diseased eyes to be reported.*—Should one or both eyes of an infant become reddened or inflamed at any time after birth, it shall be the duty of the midwife or nurse or person having charge of said infant to report the condition of the eyes at once to the local board of health of the city or town in which the parents of the infant reside. Any failure to comply with the provisions of this section shall be punishable by a fine not to exceed twenty-five dollars, or imprisonment not to exceed one month, or both. This section shall not apply to towns or cities of less than one thousand inhabitants. (Crim. Code, 1902, 331; 1896, XXII, 225.)

(Regulations, State board of health, governing midwifery.)

REG. 10. Every midwife in the country must report the births she attends within ten days on the blanks furnished her. There is a fine for failing to report births. Use unfading black ink (writing fluid).

**REG. 11.** As soon as the child is born, two drops of a 1 per cent solution of nitrate of silver should be dropped into each eye. This solution to be previously obtained from a reputable druggist.

**REG. 12.** Every case of "baby's sore eyes" or reddening of the eyelids must be reported at once to a physician.

Ophthalmia neonatorum made reportable disease by State board of health. (Reg. State board of health, July 18, 1913.)

SOUTH DAKOTA.

(Regulations, State board of health, August 20, 1913.)

**REG. 59. Observation.**—Whenever one or both eyes of an infant become inflamed at any time within two months after its birth, it shall be the duty of any midwife, nurse, parent, or other person having charge of such infant, to report the facts of such affection to the attending physician or health officer of the county in which the person having charge of such infant resides, within twelve hours after ascertaining the fact.

**REG. 60.** Any health officer to whom may have been reported a case of eye disease in a child under two months of age shall forthwith visit such child and provide immediate medical treatment unless said child is already under the treatment of a competent medical practitioner.

TENNESSEE.

(Chap. 52, act of April 3, 1915.)

**SECTION 1.** It shall be the duty of the State board of health to officially name and approve a prophylaxis (or preventive) to be used in treating the eyes of newly born children for preventing ophthalmia neonatorum (or for preventing blindness); and it shall be the duty of the board of health to publish instructions for using the same.

**SEC. 2.** That it shall be the duty of any physician, nurse, or midwife, who shall assist and be in charge at the birth of any infant, or have the care of the same after birth, to treat the eyes of the infant with a prophylaxis approved by the State board of health; and such a treatment shall be given as soon as practicable after the birth of the infant and always within one hour; and if any redness, swelling, inflammation, or gathering of pus shall appear in the eyes of such infant or upon the lid or about the eyes within two weeks after birth, then any nurse, midwife, or other person having care of the infant shall report the same to the local health officer or some competent practicing physician within six hours after its discovery.

**SEC. 3.** That any failure to comply with the provisions of section 2 of this act shall be a misdemeanor, punishable, upon indictment and conviction, by a fine of not less than \$5 nor more than \$100 or imprisonment in the county jail not to exceed six months, or both, in the discretion of the court.

(Regulations, board of health, May 3, 1915.)

In accordance with the provisions of chapter 52, Public Acts 1915, the State board of health of Tennessee hereby designates and approves either of the following solutions as standard prophylactic against ophthalmia neonatorum:

Silver nitrate, 1 per cent solution.

Argyrol, 15 per cent solution.

TEXAS.

(Act, approved March 24, 1921.)

**SECTION 1.** All doctors, physicians, midwives, nurses, or those in attendance at childbirth, shall use prophylactic drops in the child's eyes of a 1 per cent solution of silver nitrate, or other prophylactic solution approved by the State Board of Health to prevent ophthalmia neonatorum in the new born.

SEC. 2. The State board of health shall be required to furnish such silver nitrate solution or other prophylactic drops free of cost to the poor of the State, namely, those upon whom it would work a hardship to buy such solution.

SEC. 3. All doctors, physicians, midwives, nurses, or those in attendance at childbirth who shall be found guilty of violating this act shall be fined in the sum of not less than ten (\$10.00) dollars nor more than one hundred (\$100) dollars for each separate offense.

SEC. 4. The fact that there is at present no adequate law which provides for the protection of the eyesight of the new born, creates an emergency and an imperative public necessity that the constitutional rule that bills be read in each house on three several days be suspended, and said rule is so suspended, and that this act shall take effect and be in force from and after its passage, and it is so enacted.

#### UTAH.

(Compiled Laws of Utah, 1917.)

SEC. 2754. It shall be the duty of every physician and every midwife attending a case of childbirth to report to the local board of health every case where the newly born child has inflammation of the eyes attended by a discharge therefrom. Such report to be made within six hours after the appearance of such disease. It shall be the duty of such physician or midwife to treat the eyes of the child so afflicted in accordance with the rules of the State Board of Health. Every physician and midwife failing to comply with the provisions of this act shall be guilty of a misdemeanor.

(Rules of the State Board of Health adopted in conformity with the foregoing enactment.)

RULE 1. No midwife shall treat any case of ophthalmia neonatorum or inflammation of the eyes of a newly born infant unless it is impossible to secure the services of a physician: *Provided*, That in case the services of a physician shall be secured, a midwife may begin and carry out treatment until his arrival.

RULE 2. In the event that the services of a physician can not be secured, midwives are authorized to use and apply the following treatment:

Immediately upon the discovery in a newly born infant of an inflammation of the eyes, attended by a mattery discharge therefrom, five (5) drops of a twenty per cent (20%) solution of argyrol shall be dropped into the eyes with an eye dropper, after having separated the lids with the thumb and finger; and this treatment shall be repeated every hour for four (4) days and longer if a discharge is still present. After four (4) days if the discharge has ceased, the treatment may be reduced in frequency to intervals of four (4) times daily for several days, until it is shown that the discharge is not liable to return.

Before each application of the argyrol solution, the eyes should be thoroughly irrigated and cleaned by dropping or pouring into them a one per cent (1%) solution of chloride of sodium (common salt) or a saturated solution of boric acid. For practical purposes, the salt solution may be prepared by dissolving one teaspoonful of salt in a pint of water.

NOTE.—The person treating the eyes should exercise the utmost care to avoid touching the cornea (eyeball), as there is great danger of causing serious injury thereby. In applying the treatment the child should be placed flat upon its back and the head so held that the solution will not quickly escape from the eyes.

Inasmuch as the secretions from the eyes are very infectious, care should be taken to destroy all articles contaminated by them, and to sterilize the hands after each treatment.

The treatment above described is considered by eminent authorities to be entirely effective and safer than solution of nitrate of silver; and it is recommended to all physicians in general practice.

Solutions of argyrol quickly deteriorate and should be freshly prepared for every case. Upon request the State Board of Health will furnish materials for preparing fresh solutions.

It is recommended that physicians and midwives shall make one application of the argyrol solution at the birth of every child as a prophylactic or preventative treatment after having first thoroughly wiped the eyes with absorbent cotton or soft clean linen and bathed them with a saturated solution of boric acid.

**RULE 3.** On receipt of notification under this act, it shall be the duty of the local health officer to immediately investigate the case and satisfy himself that the rules of the State Board of Health are properly complied with. He shall also immediately report the case to the State Board of Health by telephone or telegraph.

VERMONT.

(Chap. 267, act of 1917.)

**G. L. Sec. 6206.** *Ophthalmia neonatorum, penalty.*—Said board may make such rules and regulations as it deems necessary for the prevention of blindness caused by the disease known as ophthalmia neonatorum, and it may furnish, at the expense of the State, such prophylactic outfits as are necessary for the use of physicians. A physician who fails to comply with such a rule or regulation shall be fined ten dollars for each offense.

(Rules and Regulations State Board of Health, relating to communicable diseases, May 1, 1918.)

**RULE 30.** *Ophthalmia neonatorum, report and treatment.*—All cases of ophthalmia neonatorum must be reported by the health officer to the secretary of the State Board of Health.

Should one or both eyes of an infant become inflamed, swollen and red, and have an unnatural discharge at any time within two weeks after its birth, the nurse, relative, or other person having charge of such infant shall report in writing, within six hours thereafter, to the local health officer of the town or city in which the parents of the infant reside, the fact that such inflammation, swelling and redness exists. Such health officer shall take such immediate action as may be necessary in order that blindness may be prevented, and shall see that all physicians in his territory are supplied with nitrate of silver solution, furnished by the State Board of Health.

VIRGINIA.

(Chap. 423, act of March 27, 1918.)

1. *Be it enacted by the General Assembly of Virginia,* That any inflammation, swelling, or unusual redness in either one or both eyes of any infant, either apart from or together with any unnatural discharge from the eye or eyes of such infant, independent of the nature of the infection, if any, occurring at any time within two weeks after the birth of such infant, shall be known as "inflammation of the eyes of the new born" (ophthalmia neonatorum).

2. It shall be the duty of any physician, surgeon, obstetrician, midwife, nurse, maternity home or hospital of any nature, parent, relative, and persons attendant on or assisting in any way whatsoever any infant, or the mother of any infant at childbirth, or any time within two weeks after childbirth, knowing the condition hereinabove defined to exist, immediately to report such fact, as the State Board of Health shall direct, to the local health officer of the county, city, town, magisterial district, or whatever other political division there may be within which the infant or the mother of any such infant may reside. In the event of there being no health officer in the county, city or town in which the infant resides, midwives shall immediately

report the conditions to some qualified practitioner of medicine, and thereupon withdraw from the case, except as she may act under a physician's instructions. On receipt of such report, the health officer, or the physician notified by a midwife where no health officer exists, shall immediately give to the parents or persons having charge of such infant, a warning of the dangers to the eye or eyes of said infant, and shall, for indigent cases, provide the necessary treatment at the expense of the said county, city, or town.

3. It shall be unlawful for any physician or midwife practicing midwifery in the State of Virginia to neglect or otherwise fail to instill or have instilled, immediately upon its birth, in the eyes of the new-born babe, one or two drops of a solution prescribed or furnished by the Virginia State Board of Health.

4. It shall be the duty of the local health officer:

(1) To investigate or to have investigated each case as filed with him in pursuance of the law, and any other such cases as may come to his attention.

(2) To report all cases of inflammation of the eyes of the new born and the results of all such investigations as the State Board of Health shall direct.

(3) To conform to such other rules and regulations as the State Board of Health shall promulgate for his further guidance.

5. It shall be the duty of the Virginia State Board of Health:

(1) To enforce the provisions of this act.

(2) To promulgate such rules and regulations as shall under this act be necessary for the purpose of this act, and such as the State Board of Health may deem necessary for the further and proper guidance of local health officers.

(3) To provide for the gratuitous distribution of the scientific prophylactic for inflammation of the eyes of the new born, as designated in section three, together with proper directions for the use and administration thereof, to all physicians and midwives as may be engaged in the practice of obstetrics or assisting at childbirth.

(4) To publish and promulgate such further advice and information concerning the dangers of inflammation of the eyes of the new-born, and the necessity for prompt and effective treatment.

(5) To furnish copies of this law to all physicians and midwives as may be engaged in the practice of obstetrics or assisting at childbirth.

(6) To keep a proper record of any and all cases of inflammation of the eyes of the new born as shall be filed in the office of the State board of health in pursuance of this law, and as may come to their attention in any way, and to constitute such records a part of the biennial report to the governor and the legislature.

6. It shall be the duty of physicians, midwives, or other persons in attendance upon a case of childbirth in a maternity home, hospital, public, or charitable institution, in every infant's eyes, within two hours after birth, to use the prophylactic against inflammation of the eyes of the new born, specified in section three, and to make record of the prophylactic used. It shall also be the duty of such institution to maintain such records of cases of inflammation of the eyes of the new born as the State board of health shall direct.

7. Whoever, being a physician, surgeon, midwife, obstetrician, nurse, manager, or person in charge of a maternity home or hospital, parent, relative, or person attending upon or assisting at the birth of an infant, violates any of the provisions of this act shall be deemed guilty of a misdemeanor, and, upon conviction thereof, be fined in a sum not less than ten dollars nor more than fifty dollars.

8. The sum of twenty-five hundred dollars shall be annually appropriated for the use of the State board of health in enforcing and carrying out the provisions of this act. Any and all necessary and legitimate expenses that may be incurred in prosecuting a case under this act shall, on proper showing, be met by the State board of health out of this appropriation. In addition thereto all fines and penalties recovered hereunder shall be paid into the State treasury, and shall constitute a special fund for the use and purposes of the State board of health, as herein enacted.

(Rules and regulations State board of health, July 27, 1921.)

SEC. 14. The State board of health hereby declares the following diseases dangerous to public health and they are hereby, according to law, strictly reportable within twenty-four (24) hours on proper blanks to county and city health officers:

SEC. 15. Group 1. \* \* \* ophthalmia neonatorum \* \* \*

SEC. 36. (a) An infection of the eyes of infants by gonococci communicated during or shortly after birth.

Incubation period a few hours to several days.

(b) Isolation of mother and child recommended.

(c) Physicians should instruct members of the family on extreme cleanliness. All contaminated dressings should be burned.

(d) After the baby is born and has been cleansed in the usual manner, wash the eyes with the following solution of boracic acid: One pint of cold boiled water to which is added two teaspoonfuls of boracic acid. Open the lids carefully and drop in the eyes two or three drops of freshly prepared two per cent solution of silver nitrate (silver nitrate, nine grains; distilled water, one ounce).

If an infant's eyes have not been cared for and inflammation occurs in them before treated as outlined above, a smear in a glass slide should be made of the discharge from the eye and an examination made for gonococci. The laboratory of the State department of health will examine such specimens free of charge.

WEST VIRGINIA.

(Act 1919, secs. 1 to 8.)

SECTION 1. That any inflammation, swelling, or unusual redness in either one or both eyes of any infant, either apart from, or together with any unnatural discharge from the eye or eyes of such infant, independent of the nature of the infection, if any, occurring at any time within two weeks after the birth of such infant, shall be known as "inflammation of the eyes of the new born" (ophthalmia neonatorum).

SEC. 2. It shall be the duty of any physician, surgeon, obstetrician, midwife, nurse, maternity home, or hospital of any nature, parent, relative, and persons attending on or assisting in any way whatsoever any infant, or the mother of any infant, at childbirth, or any time within two weeks after childbirth, knowing the condition hereinabove defined to exist, immediately to report such fact in writing, to the local health officer of the county, city, town, magisterial district, or whatever other political division there may be within which the infant or the mother of any infant may reside. In the event of there being no health officer in the county, city, or town in which the infant resides, midwives shall immediately report conditions to some qualified practitioner of medicine and thereupon withdraw from the case except as they may act under the physician's instructions. On receipt of such report the health officer or the physician notified by a midwife where no health officer exists shall immediately give to the parents or person having charge of such infant a warning of the dangers to the eye or eyes of said infant and shall for indigent cases provide the necessary treatment at the expense of said county, city, or town.

SEC. 3. It shall be unlawful for any physician or midwife practicing midwifery to neglect or otherwise fail to instill or have instilled immediately upon its birth, in the eyes of the new-born babe, one or two drops of a 1 per cent solution of silver nitrate, furnished by the public health council.

SEC. 4. Every physician or midwife shall, in making a report of a birth, state whether or not the above solution was instilled into the eyes of said infant.

SEC. 5. It shall be the duty of the local health officer:

(1) To investigate, or have investigated, each case as filed with him in pursuance of the law and any other cases as may come to his attention.

(2) To report all cases of inflammation of the eyes of the new born and the result of all such investigations as the public health council shall direct.

(3) To conform to such other rules and regulations as the public health council shall promulgate for his further guidance.

SEC. 6. It shall be the duty of the public health council:

(1) To enforce the provisions of this act.

(2) To promulgate such rules and regulations as shall, under this act, be necessary for the purpose of this act and such as the public health council may deem necessary for the further and proper guidance of local health officers.

(3) To provide for the gratuitous distribution of 1 per cent solution of silver nitrate outfits together with proper directions for the use and administration thereof, to all physicians and midwives as may be engaged in the practice of obstetrics or assisting at childbirth.

(4) To publish and promulgate such further advice and information concerning the dangers of inflammation of the eyes of the new born as is necessary for prompt and effective treatment.

(5) To furnish copies of this law to all physicians and midwives as may be engaged in the practice of obstetrics or assisting at childbirth.

(6) To keep a proper record of any and all cases of inflammation of the eyes of the new born as shall be filed in the office of the public health council in pursuance of this law, and as may come to their attention in any way, and to constitute such records a part of the annual report to the governor.

(7) To report any and all violations of this act as may come to their attention to the prosecuting attorney of the county wherein said misdemeanor may have been committed and to assist said official in any way possible as by securing necessary evidence, et cetera.

(8) To furnish birth certificates which shall include the question: "Did you instill in each eye of the infant a one per cent solution of nitrate of silver immediately after birth?"

SEC. 7. It shall be the duty of the clerk of the county court of each county on or before the fifteenth day of each month to certify to the prosecuting attorney of his county all reports of births filed during the preceding calendar month which fail to show that the solution hereinbefore provided for was instilled.

SEC. 8. Whoever being a physician, surgeon, midwife, obstetrician, nurse, manager, or person in charge of a maternity home or hospital, parent, relative, or person attending upon or assisting at the birth of an infant, violates any of the provisions of this act, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined a sum of not less than ten nor more than fifty dollars.

WISCONSIN.

(Chap. 344, Laws of 1913.)

SEC. 1409a-1. *Infants, inflammation of the eyes, prevention.*—For the prevention of ophthalmia neonatorum, or blindness in the new-born babe, the State board of health and vital statistics shall annually cause to be prepared and put up in proper containers a one per cent solution of nitrate of silver, and shall prepare instructions for its use. Said containers and instructions shall be distributed by said board, free of all charges, to all local health officers within the State in quantities sufficient to enable them to, and they shall, deliver to each physician and midwife one container, and one copy of the instructions. It shall be the duty of the attending physician or midwife in each confinement case to use the said solution as directed in said instructions.

SEC. 1409a-2. 1. *Infants, blindness, prevention, report.*—In any confinement case not attended by a physician or midwife, if one or both eyes of an infant become inflamed, swollen and red, and show an unnatural discharge at any time within two weeks after its birth, the nurse, parents, or other attendant having charge of such infant shall report in writing, within six hours thereafter, to the health officer of the city, village, or town in which the parents of the infant reside, the fact that such inflammation, swelling, redness, or unnatural discharge exists.

2. *Health officer, duty.*—On receipt of such report the health officer shall immediately give to the parents or person having charge of said infant a warning of the dangers to the eye or eyes of said infant, and a copy of the instructions prepared pursuant to section 1409a-1 of the statutes; and shall employ at the expense of the said city, village, or town, a competent physician to examine the case reported and to provide such treatment as may be prescribed by the State board of health and vital statistics in its instructions.

SEC. 1409a-3. *Midwife.*—Any woman accustomed to attend confinement cases shall be subject to the same penalty for violation as physicians or nurses.

SEC. 1409a-4. *Penalty for violation.*—Any person who violates, neglects, or refuses to observe the provisions of sections 1409a-1, 1409a-2, or 1409a-3 shall be punished by a fine of not more than one hundred dollars for each offense.

SEC. 20.43-4 of the statutes. *Appropriation.*—On July 1st of each year there is appropriated to the State board of health for the prevention of ophthalmia neonatorum, and the preparation and distribution of silver nitrate therefor, the sum of fifteen hundred dollars.

WYOMING.

(Chap. 160, senate file No. 67, approved February 25, 1921.)

SEC. 14, page 264. It shall be the duty of every practicing or licensed physician in the State of Wyoming, when attending the birth of a child to introduce or cause to be introduced into the eyes of the newborn infant a solution of a one or two per cent silver nitrate, or ten per cent argyrol, or one or two per cent protargol: *Provided, That this section shall not apply in cases where the parents are religiously opposed to the use of drugs and so state to the attending physician.*







TREASURY DEPARTMENT  
Public Health and Marine-Hospital Service of the United States

PUBLIC HEALTH BULLETIN No. 50

OCTOBER, 1911

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BY

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PASSED ASSISTANT SURGEON, DIRECTOR

AND

MOSES T. CLEGG

ASSISTANT DIRECTOR, LEPROSY INVESTIGATION STATION

## XVII. FURTHER OBSERVATIONS IN RAT LEPROSY

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## XVIII. A STATISTICAL STUDY OF THE NASAL LESIONS IN LEPROSY

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# IMMUNITY.

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By DONALD H. CURRIE, *Passed Assistant Surgeon, Director,*  
and

MOSES T. CLEGG, *Assistant Director, Leprosy Investigation Station.*

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Since Bordet and Gengou (1) published their work on the complement fixation as one method of identifying *Bacillus typhosus*, it was hoped that this means of differentiating microorganisms would be specific, especially for those which would produce antibodies when inoculated into suitable animals. It has been found, however, that only certain bacteria contained the properties of binding the alexine or complement with their specific antibodies and then only when suitable extracts were prepared. It has also been shown that very small amounts of extracts of certain microorganisms will absorb the complement. We found this particularly true with the extracts of various acid fast bacilli, such as *Margarin bacillus*, *Smegma bacillus*, Möller's *Grass bacillus*, and *B. lepræ*.

The preparation of the extracts with special regard to the biochemistry of the microorganisms is essential and the method of their preparation should be given in detail.

Since the cultivation of the leprosy bacillus we have attempted by means of complement deflection to prove the acid fast bacillus cultivated by us was *B. lepræ*. It has been shown that the blood serum of lepers contained antibodies when combined with a suitable antigen, fixed the complement, and that, further, the antigenic substances used were closely allied to those producing the well-known Wassermann reaction.

Wechselmann and Meier (2) state they were able to fix the complement by using syphilitic antigen and serum from leprosy patients.

Eitner, Ernst, (3) used watery extracts of lepers' tissue as antigen. He states, however, that alcoholic extracts of guinea pigs' heart muscle produced the same positive results.

Bauer, Richard, and George Meier (4) state they found in the blood serum of 28 cases of leprosy antibodies which would fix complements with tuberculin and syphilitic antigen. They also state

that syphilitics (nonlepers), while giving a positive Wassermann reaction, did not fix the complement when tuberculin was used as the antigen.

Yundell, Almquist, and Sandman (5) were able to get a positive Wassermann reaction in 4 cases and a partial reaction in 4 cases of 24 lepers examined.

Slatineanu, A. and Danielopolu (6), however, claim that lepers' sera binding with tuberculin is convincing evidence that the patients are suffering with tuberculosis.

Slatineanu, A. and Danielopolu (7) found in the blood serum of 95 per cent of cases tested for Wassermann reaction antibodies fixing complement. They state that the degree of reaction varied in limited proportions.

Frugoni, Cesare (8), tested the sera from four nonsyphilitic lepers and was able to get a positive reaction in two cases.

Ehlers and Bourret (9) used the alcoholic extract of normal guinea pig's heart as antigen. They noted antibodies in the serum of lepers, and the degree of reaction varied from time to time in the same patient. They conclude the degree of reaction is no index to the severity of the disease.

Eliasberg, J. (10), states that leper's serum fixes complement in the presence of syphilitic antigen in 80 per cent of the number of cases he examined.

Frugoni, Cesare, and Pirani, S. (11), used the following as antigens, combined with leper's serum: Syphilitic, leproma, sarcoma, carcinoma, tuberculin and Koch's bacilli emulsion. Of the antigens used, they state that syphilitic antigen and tuberculin fixed the complement in a large percentage of cases, while the extract of lepromata fixed the complement in only a small percentage.

Bruck and Gessner (12) tested the blood serum of 10 lepers for the Wassermann reaction, 5 of which they claim gave positive results.

Kleinschmidt (13) claims to have produced complement binding antibodies in lepers by the subcutaneous injection of "Nastin," and that "Tuberculo-Nastin" will bind the complement with the serum of certain tubercular patients. This reaction he thinks may be due to the presence of the lipoids. Kleinschmidt also states that when lepers were injected with Chaulmoogra oil, complement binding antibodies were found in the serum, and that specific reaction exists, according to his experiments with the antibodies against the fats. "Nastin" and Chaulmoogra oil.

Serra (14) used the following antigens: Syphilitic liver extract, extract of leper nodules, extract of nonulcerating syphilitic nodes, lecithin and extracts of normal organs. In his conclusions he emphasizes what he considers to be the fact, that the serum of lepers possesses a greater affinity to the leprosy nodule extract than to the other

antigens. This, in his opinion, speaks for a relative specificity of the Wassermann reaction in leprosy.

Fox (15) using the syphilitic antigen, tested the serum of 38 cases of nodular leprosy for Wassermann reaction. Of this number, 31 gave positive results. None of the patients gave a history of lues.

In reviewing the above literature there is little doubt as to the presence of antibodies in the serum of patients suffering with leprosy; and these antibodies may be analogous to the antibodies in luetic patients, which latter bind the complement when certain lipoids are used as antigens.

Working with several of the acid fast bacilli, the fatty substances of the microorganisms were found to be anticomplementary when a relative small amount was used; and where true complement deflection occurred this phenomenon not only applied to extracts of the lepra bacillus, but to extracts of certain other bacilli belonging to the acid fast group.

Extracts of the following microorganisms were made and tested for their anticomplementary properties, and for their complement binding substances with serum from patients suffering with various types of leprosy, as well as with serum from animals, which had received several injections of the cultivated leprosy bacilli.

*Lepra Bacillus* "G."—This microorganism was cultivated from a nodule of an advanced case of tubercular leprosy, and had been growing on artificial media two years.

*Lepra Bacillus* "F."—Cultivated from the spleen of an advanced case of leprosy. This microorganism had been growing on artificial media two years.

*Lepra Bacillus* "B."—Cultivated from a nodule in the ear of a leprosy patient and growing on artificial media one year.

*Lepra Bacillus* "H."—Cultivated from a nodule of a leprosy patient and growing on artificial media three months.

*Margarin Bacillus*.—A nonpathogenic acid fast microorganism.<sup>1</sup>

*Smegma Bacillus*.—A nonpathogenic acid fast microorganism.

*Grass Bacillus* Möller.—A nonpathogenic acid fast microorganism.

*Urine Bacillus*.—A nonpathogenic acid fast microorganism.

*Butter Bacillus*.—A nonpathogenic acid fast microorganism.

#### PREPARATION OF EXTRACTS.

*Extract A*.—Acetone insoluble product. A quantity of a 10-day-old culture was dissolved in equal parts of chloroform, alcohol, and ether, and placed in a water bath at near 70° centigrade until all the ether and most of the chloroform had evaporated. The flask was then set aside for one hour, and afterwards filtered through porce-

<sup>1</sup>The nonpathogenic acid fast microorganisms used in these experiments were received from the Harvard Medical School.



lain; the filtrate was then evaporated to dryness, in vacuo, at a low temperature. A bright orange-yellow substance was deposited at the bottom of the flask. This deposit was covered with acetone, and the above-mentioned substance allowed to extract for two hours; the acetone (which had become yellow) was then decanted off. The acetone insoluble residue was dried to remove all traces of the acetone. A mixture of equal parts of alcohol, chloroform, and ether was added to the residue, which caused the latter to readily dissolve.

*Extract B.*—Bodies of the bacilli, which had been previously extracted with alcohol, chloroform, and ether, were dried and ground in agate mortar without the addition of glass or other foreign material, after the method of Koch in his preparation of "Bacillary Emulsion." The dried extracted bodies of the bacilli were taken up with a few cubic centimeters of normal salt solution and allowed to extract 24 hours.

*Extract C.*—From 20 agar slant cultures, which had been growing for one month, the microorganisms were removed and placed in 100 cubic centimeters of a mixture of equal parts of chloroform and ether, and kept at a temperature of 37° centigrade for 48 hours. The bacilli at first floated and then later settled to the bottom of the fluid. The alcohol and chloroform was separated from the bacilli by filtering through porcelain. The residue was then further extracted for a short time with ether and again filtered. The alcohol-chloroform and the ether extracts were mixed, and to the mixture was added 10 cubic centimeters each of distilled water and glycerin. The alcohol-chloroform and ether were removed by a current of unheated air, reducing the bulk to 20 cubic centimeters.

*Extract D.*—Ten-day-old cultures were partially dissolved in alkalinized hydrogen peroxide and a substance precipitated from solution with 60 per cent alcohol. The precipitate, a white flocculent substance, was collected and washed with the following: Cold absolute alcohol, hot absolute alcohol, alcohol and ether, alcohol and chloroform, and lastly chloroform. The chloroform was evaporated and the precipitate was dissolved in glycerin. Before using, an equal part of water was added.

*Extract E.*—Ten-day-old cultures were ground in normal salt solution with glass, and allowed to extract 48 hours.

The titer of each of the above extracts was made, and the amount used was one-half of the maximum amount that would not absorb the complement necessary to completely hemolyse a 5 per cent suspension of sensitized erythrocytes.

In titering the various extracts, it was found that several, notably extracts A and B, absorbed the complement in exceedingly small amounts, and the point below this amount failed to bind the complement when brought in contact with their specific antibodies.

Of the above extracts only those substances extracted by the methods D and E fixed the complement with the sera tested.

Glycerin extract of the acid fast bacilli and preparations made similar to Koch's old tuberculin failed to bind the complement with lepers' serum or with the serum of animals which had received several injections of the acid fast bacilli.

TABLE NO. I.

Serum.	Amount of extract.	Bacillus Lepra H.	Bacillus Lepra B.	Bacillus Lepra F.	Bacillus Margarin.	Bacillus Smegma.
Extract "D":						
Monkey—	c. c.					
No. 82.....	0.05	Hemolysis	Hemolysis	Hemolysis	Hemolysis	Hemolysis.
No. 84.....	.05					
No. 84.....	.05					
Leper patient—						
No. 28.....	.05	Blocking..	.....	Blocking..	Blocking..	.....
No. 29.....	.05					
No. 30.....	.05					
No. 8.....	.05					
Horse, No. 44.....	.05	Partial....	.....	Partial....	.....do.....	.....
Normal.....	(1)	Hemolysis	Hemolysis	Hemolysis	Hemolysis	Partial. Hemolysis.
Extract "E":						
Leper patient—						
No. 28.....	.1	Partial....	Partial....	Partial....	Partial....	Do.
No. 29.....	.1	do.....	Hemolysis	.....do.....	.....do.....	Do.
No. 30.....	.1	do.....	do.....	do.....	do.....	Do.
No. 8.....	.1	Blocking..	Partial....	do.....	Blocking..	Do.
Monkey—						
No. 82.....	.1	Hemolysis	Hemolysis	Hemolysis	Hemolysis	Do.
No. 84.....	.1					
Horse, No. 44.....	.1	Partial....	.....	Partial....	Partial....	Do.
Normal.....	.1	Hemolysis	Hemolysis	Hemolysis	Hemolysis	Do.
Extract "A":						
Leper patient—						
No. 28.....	.02	do.....	do.....	do.....	do.....	Do.
No. 29.....	.02					
No. 30.....	.02					
Extract "C":						
Leper patient—						
No. 28.....	.02	do.....	do.....	do.....	do.....	Do.
No. 29.....	.02					
No. 30.....	.02					

(1) Hemolysis.

Animals Nos. 82 and 84: Monkeys which had been previously injected several times with increasing amount of a suspension of leprosy bacillus "H."

Leper patients Nos. 28, 29, and 30: Advanced tubercular leprosy.

Leper patient No. 8: Very little evidence of leprosy at present. Patient has had the disease three years.

Animal No. 44: This horse had been injected several times with increasing amounts of a suspension of leprosy bacilli "H," "B," "F," and "G."

The hemolytic system used in the above experiments was inactivated antishoop rabbit serum, guinea-pig serum, as complement, and a 5 per cent suspension of sheep erythrocytes. Sets of control tubes were made as follows: Sera tested for their complement-absorbing properties and for their hemolytic properties to sheep erythrocytes. The same controls were made with the several extracts.

Our results showed no difference in the degree of complement deflection when using extracts of the leprosy bacillus than with a similar extract of the Margarin bacillus. That certain extracts of the artificially grown leprosy bacilli and extracts made from lepra nodules will deflect complement when combined with lepra serum is evident.

Eitner (16) used as antigen a salt solution extract of leproma, and states he found in the serum of lepers antibodies which were capable of binding the complement.

Sugai (17), working with a similar extract, was able to procure the same results.

Babes and Busila (18) state they were able to fix the complement with lepers' sera when combined with an extract of a leproma which had been preserved in alcohol 10 years.

Steffenhagen, Karl (19), used as antigen the following extracts: Extract of leprosy nodules, extract of tubercle bacilli, old tuberculin, syphilitic antigen, extract of the typhoid bacilli, and extract of meningococcus. He prepared his leprosy-nodule extract by macerating the nodules or lymph glands of lepers and occasionally adding 10 per cent antiformin solution. The undissolved portion of the organ was separated by filtering. The solution was centrifuged and the sediment once more washed with antiformin solution and afterwards repeatedly washed with normal salt solution and again centrifuged. The sediment was dried and weighed to determine the amount of antigen. His extract of the sediment was prepared by rubbing and adding gradually drops of physiological salt solution. This experiment he claims showed that 1 milligram fixed the complement completely, without the addition of immune serum, and hemolysis only sets in when amounts of 0.6 milligram and less were employed. He therefore used in all of his experiments 0.5 milligram, and was able to deflect the complement when combined with leper serum in the majority of cases.

Babes and Busila (20) report that ethereal extract of bacillus of timothy hay will bind the complement in the presence of lepers' serum, but not with normal serum.

Since our work was begun Duval (21), in a recent article on the immunity of *B. lepræ*, states that he was able to deflect the complement by using the blood serum of lepers and a salt-solution extract of the lepra bacillus cultivated by him as antigen.

#### AGGLUTINATION.

In the following experiments we employed (a) serum from a horse which had received several injections of a suspension of live leprosy bacilli; (b) serum from lepra patients in various stages of the disease.

The horse was prepared by injecting intravenously, at intervals of 10 days, increasing amounts of the suspension of leprosy bacillus "H," as follows: The growth from four agar slant tubes—8 agar slant tubes and 16 agar slant tubes, respectively. These injections were followed by two subcutaneous inoculations of a suspension prepared from 10 agar slant cultures each of lepra bacilli "H," "G," "F," and "B."

Following the first two intravenous injections, the animal's temperature registered 40° centigrade and remained above 38° centigrade for five days. The subcutaneous inoculation produced an indurated area at the site of the inoculation, which went on to supuration; the contents of this abscess being later absorbed. One month after the last subcutaneous injection the animal was bled, and its serum was used for the complement deflection test (the results of which are given in the first part of this paper) and for the following agglutination experiments:

Suspensions of the growth of 10-day-old cultures of each strain of the acid-fast bacilli were made in small test tubes containing 5 cubic centimeters of normal salt solution. Approximately one loop of the culture was used to each tube. The different sera were added to the various suspensions in amounts sufficient to make the required dilutions. The experiment was controlled with similar suspensions without the addition of blood serum. All tubes were then placed at 37° centigrade, and the results read after a period of eight hours.

TABLE No. II.—Agglutination.

Serum.	Dilution.	Lepra bacillus "H."	Lepra bacillus "G."	Lepra bacillus "F."	Lepra bacillus "B."	Lepra bacillus "S."	Margarin bacillus.	Sinegma bacillus.	Urine bacillus.	Grass bacillus.	Butter bacillus.
Horse, No. 44.....	1:100	+	+	+	+	+	0	0	0	0	0
	1:200	++	++	++	++	++	0	0	0	0	0
	1:500	++	++	++	++	++	0	0	0	0	0
	1:1,000	++	++	++	++	++	0	0	0	0	0
	1:50	+	+	+	+	+	0	0	0	0	0
Leper patient, No. 8.....	1:100	0	0	0	0	0	0	0	0	0	0
	1:50	0	0	0	0	0	0	0	0	0	0
Leper patient, No. 29.....	1:50	0	0	0	0	0	0	0	0	0	
Leper patient, No. 30.....	1:50	0	0	0	0	0	0	0	0	0	

Duval (loc. cit.) was able to produce agglutinins in the serum of a horse by repeated injections of artificially grown leprosy bacillus. Clumping occurred, according to Duval, in dilution of 1 to 200.

## CONCLUSIONS.

I. We were unable to differentiate by the method of Bordet and Gengou the leprosy bacillus from certain other acid-fast microorganisms.

II. Extracts of certain acid-fast bacilli, other than *B. lepræ*, will deflect the complement when combined with lepers' serum.

III. We were able to produce specific agglutinins for *B. lepræ* by injecting a horse with the cultivated lepra bacilli.

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## FURTHER OBSERVATIONS IN RAT LEPROSY.

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In a previous bulletin<sup>1</sup> we recorded certain observations bearing on the pathology of rat leprosy, and from the data we had then secured we drew the following conclusions:

"1. In some cases of artificially acquired rat leprosy the onset is with broncho-pneumonia, accompanied by a septicemia and without other demonstrable lesions.

"2. In other cases of this disease pneumonia is a very early lesion, but we can not positively state that it is always the first lesion.

"3. That the animal may die in the pneumonic stage before other lesions present themselves, or it may develop pneumonic symptoms and recover from the same only to later develop the well-known lesions of chronic rat leprosy; or again, the pneumonia may persist until after the development of the lesions of the skin and abdominal ulcers.

"4. That during the stage of the disease in which the animal is very ill, certain mites (*Laelaps echidninus*) were found to be very numerous on the animals' bodies.

"5. That during the stage of the disease in which septicemia is marked, these mites' digestive tracts contain the bacilli of rat leprosy in considerable numbers, and therefore these parasites may be one means of transmitting the disease. This latter probability, however, of course, not proven."

Upon the completion of the above-mentioned work, our infected animals having all succumbed to this disease, we inoculated 13 other white rats from the tissues of the animals that we had necropsied and found to be suffering from rat leprosy. We also set aside for observation 12 other rats that had been intimately exposed to this disease by living in the same cage with the animals suffering from leprosy.

<sup>1</sup> *Contribution to the Study of Rat Leprosy*, by Passed Asst. Surg. Donald H. Currie, Director, and Harry T. Hollmann, Acting Asst. Surg., U. S. Leprosy Investigation Station, Honolulu, T. H., Public Health Bulletin No. 41, Public Health and Marine-Hospital Service of the United States, November, 1910.

The below-given data were secured from necropsying these apparently normal (so far as symptoms and appearance showed during the life of the animals) inoculated or exposed rats. Our findings therefore represent a very early stage of rat leprosy—so early as to not cause any appreciable symptoms. We therefore consider that these findings, coupled with the data we published in the previous bulletin, probably fairly represent the usual pathology of the early stage of this disease.

NECROPSY FINDINGS OF THE 13 RATS THAT WERE INOCULATED ON AUGUST 11, 1910, BY PLACING A SMALL PORTION OF THE TISSUE OF A RAT INFECTED WITH RAT LEPROSY UNDER THEIR SKINS.

*Rat No. 1.*—Chloroformed and necropsied on June 2, 1911. A hard nodule was found under the skin at the point of inoculation. This had become caseous and extended down to the underlying fascia. Small whitish nodules extended from this mass apparently along the lymphatics for the distance of about half an inch from the primary nodule. The near-by lymphatic gland was not enlarged. Smears from the primary nodule showed many acid-fast bacilli.

Spleen normal in size and appearance, but smears made from its cut surface showed numerous acid-fast bacilli.

Right lung: Emphysematous, except the lower part of the upper lobe, which was resistant to pressure and sank when thrown into water. This portion of the organ, cut with increased resistance, was entirely devoid of air, cut surface and pleura studded with white nodules. Purulent material exuded from its cut surface.

Left lung was completely consolidated; sank when thrown into water; pleura studded with white nodules; cut with increased resistance; cut surface exuded purulent material. Smears made from the purulent material of these organs, when stained in the usual manner, showed a few acid-fast bacilli, morphologically resembling the bacillus of rat leprosy.

We noted no lesions of skin or viscera other than those mentioned above.

*Rat No. 2.*—No local lesion found at point of inoculation. Layer of fatty material over abdomen, between abdominal muscles and skin, which material was rich in acid-fast bacilli. Both lungs were normal in appearance and contained no acid-fast bacilli.

Skin and viscera, other than above noted, were apparently normal.

*Rat No. 3.*—No alopecia or other lesions of skin except the healed wound at the point of inoculation. Incision was made through this cicatrix and revealed a small circumscribed cavity in the center, filled with pus of a cheesy nature. Examination of smears made from this material showed a large number of acid-fast bacilli.

Spleen slightly enlarged and smears made from it showed a considerable number of acid-fast bacilli per microscopical field.

**Lungs:** Both organs dark red in color, with small whitish nodules scattered throughout their substance. Portions of organs removed and found to sink when thrown into water. Both organs cut with resistance; cut surfaces exuded yellowish material. Smears made from this material showed a moderate number of acid-fast bacilli.

*Rat No. 4.*—Except for a slight scar at the point of inoculation, smears from which showed no acid-fast bacilli, the animal appeared to be entirely normal.

*Rat No. 5.*—A hard nodule, scar-like in character, situated at the site of inoculation. This was incised through and found to contain purulent material in its center. Smears made from this, when stained in the ordinary manner, showed many acid-fast bacilli.

With the exception of this, the skin and viscera of this animal appeared to be perfectly normal, and no acid-fast bacilli were found in smears from the other organs.

*Rat No. 6.*—Slight scar at the site of inoculation; a small ulcer of skin near by. A smear made from the secretions of this ulcer showed numerous acid-fast bacilli.

The spleen was normal in macroscopical appearance, but smears made from it showed acid-fast bacilli.

The inguinal and axillary glands were slightly enlarged; smears made from them, when stained in the ordinary manner, showed acid-fast bacilli.

**Right lung:** Upper lobe completely consolidated, dark red in color, with here and there yellowish nodules scattered throughout its substance. When cut, a small cavity was shown, containing cheesy material. Smear made from organ, stained in the ordinary manner, showed the presence of acid-fast bacilli.

Left lung presented a similar condition to that of its fellow.

The other viscera were normal in appearance.

*Rat No. 7.*—The site of inoculation showed a scarlike nodule, which was found to contain a pus-filled cavity in its center, which material was rich in acid-fast bacilli.

Spleen normal in appearance, no acid-fast bacilli could be demonstrated in the smears made from it.

Peribronchial glands greatly enlarged; yellowish brown in color and rich in acid-fast bacilli.

Lungs normal in appearance; smears made from them showed no acid-fast bacilli.

*Rat No. 8.*—A scarlike nodule at the site of inoculation, which, when incised through showed a cavity in the center containing a cheesylke material; this material was rich in acid-fast bacilli. The



lymphatic glands nearest this nodule were enlarged and showed acid-fast bacilli in smears made from them.

The lungs and other viscera were entirely normal in appearance and contained no acid-fast organisms.

*Rat No. 9.*—No pathological conditions met with in this animal, except a scarlike nodule at the site of inoculation, the center of which showed a cavity containing caseous material, rich in acid-fast bacilli.

*Rat No. 10.*—A small ulcer was found at the site of inoculation; the secretions from this ulcer contained acid-fast bacilli. The neighboring glands were not enlarged.

The spleen was studded with small, white nodules, and smears made from the organ showed many acid-fast bacilli present.

Lungs normal in appearance and showed no acid-fast bacilli present in smears made from them.

*Rat No. 11.*—No local lesions other than a slight scar at the site of inoculation. No ulceration, alopecia or other changes of the skin, no enlargement of the inguinal glands.

Spleen appeared to be normal, but smears made from it showed acid-fast bacilli to be present.

Right lung: Upper lobe consolidated, dark red in color, studded with yellowish nodules, cut with increased resistance, purulent material exuded from it. Smears made from this cheesy matter, stained in the ordinary manner, showed the presence of acid-fast bacilli.

Left lung: Much of the organ emphysematous, but one of the lobes showed a rather large yellowish nodule containing a cheesy material, which latter, when stained, showed the presence of acid-fast bacilli.

Heart blood showed a very few acid-fast bacilli.

*Rat No. 12.*—Skin normal, except for a scar at the site of inoculation.

Right lung: Upper and middle lobes of dark-red color, with yellowish nodules scattered throughout its substance. Organ sank when thrown into water. Yellowish creamy material exuded from cut surface, which material contained acid-fast bacilli. The lower lobe of the organ was normal.

The left lung was normal, except for what was apparently a compensatory emphysema.

*Rat No. 13.*—Animal appeared to be perfectly normal.

The following are the necropsy notes on 11 rats that were exposed to rat leprosy by placing them in a cage containing some well-advanced cases of that disease in animals of the same species. After being in contact for a period of several months these 11 animals were removed and placed by themselves. Nearly a year later the animals that had been exposed to the disease were necropsied, with the following results:

*Contact rat No. 1.*<sup>1</sup>—Skin, subcutaneous tissue, and liver normal.

**Lungs:** Apices of both lungs dark red in color, consolidated, with yellowish nodules scattered throughout its substance; 10 such distinct nodules were noted in the two organs. Portion of the lungs when thrown into water, sank, and appeared to be entirely free from air. Smears made from it showed a few acid-fast bacilli. The remaining portion of the lungs was normal.

*Contact rat No. 2.*—Necropsy showed animal to be entirely normal.

*Contact rat No. 3.*—Poorly nourished animal. Abdomen contained a layer of fattylike material between skin and abdominal muscles, which material was rich in acid-fast bacilli.

**Lungs:** Upper lobe of right lung dark red in color, with yellowish nodules scattered through its substance. The consolidated portion of the organ sank when thrown into water. Left lung showed consolidation of one of its lobes; was of dark red color, containing yellowish nodules scattered through its substance. This portion of the organ sank when thrown into water. Smear made from the consolidated portion of the lungs and stained in the ordinary manner showed the presence of acid-fast bacilli.

The spleen was normal in appearance, but showed a few acid-fast bacilli in the smears made from it.

*Contact rat No. 4.*—Skin, glands, and viscera of this animal appeared to be normal, with the exception of the upper half of the upper lobe of the right lung, which was completely consolidated, and smear made from it and stained in the ordinary manner showed the presence of a few acid-fast bacilli.

*Contact rat No. 5.*—Body of animal appeared to be normal.

*Contact rat No. 6.*—Body of animal appeared to be normal.

*Contact rat No. 7.*—An area of alopecia on back, of irregular shape, 1 to 1½ centimeters in diameter. No fattylike deposits found in subcutaneous tissues. Liver and spleen were normal; inguinal glands appeared to be slightly enlarged, but no acid-fast bacilli were present in them.

**Right lung:** The greater portion of that organ was completely consolidated, of yellowish color, sank when thrown into water, cut with resistance. Cut surface exuded a cheesy material, containing acid-fast bacilli.

**Left lung:** Most of the organ was emphysematous, but its lower border presented a mass of closely placed yellowish nodules, which, when incised through, exuded a cheesy material. While this portion of the lung, in its gross anatomical appearance, resembled its fellow, no acid-fast bacilli could be demonstrated in this organ, but it was

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<sup>1</sup> To distinguish these animals from the first series we have placed the word "contact" before each of the numerals designating the various animals.

quite evident that the condition was the same as that affecting its fellow of the opposite side.

*Contact rat No. 8.*—Patch of alopecia on abdomen, two centimeters in diameter. A small, scar-like nodule over skin of abdomen, containing a cavity, filled with cheesy material, rich in acid-fast bacilli. (This lesion is interesting as the animal was never inoculated by us, hence the wound that caused the infected scar may have been the result of fighting amongst themselves.)

Spleen normal in appearance, contained no acid-fast bacilli.

Lungs showed small scattered areas of a deep red color throughout the organ, which areas, when dissected out and placed into water, sank, and otherwise showed all the signs of complete consolidation. Smears made from these consolidated areas showed acid-fast bacilli.

Smears made from heart blood showed a few acid-fast bacilli.

Two mites (*Laelaps echidninus*) were taken from this animal, smeared and stained, and each of these mites were found to contain acid-fast bacilli.

*Contact rat No. 9.*—Showed a slight thinning of the hair over the abdomen and the back, which may, however, have not been due to this disease, as the condition was not well marked. Otherwise the body of the animal appeared to be entirely normal.

*Contact rat No. 10.*—Large ulcer on abdomen, extending across entire left side, involving skin and subcutaneous tissue. This ulcer was 7 by 9 centimeters in extent.

Spleen studded with small white nodules, containing many acid-fast bacilli.

Liver enlarged, and smears made from its cut surface showed a few acid-fast bacilli.

Right lung: Whole organ markedly congested, some small areas probably consolidated. Smear made from the cut surface of organ showed acid-fast bacilli.

Left lung: The same as right lung, except in addition to these conditions there was a wedge-shaped area of a very dark color, evidently representing a red infarct. Cut surface of the organ showed acid-fast bacilli. The infarct was dissected out and incised separately, but smears made from its cut surface contained no acid-fast bacilli.

The heart blood showed a few acid-fast bacilli in the many fields examined.

The axillary glands were enlarged and contained a great number of acid-fast bacilli.

*Contact rat No. 11.*—There was an ulcer of the skin over the anterior aspect of the abdomen. This ulcer had made its way through the subcutaneous tissue and abdominal muscles to the peritoneum, but had not perforated the latter. Smears made from its discharges

showed a number of acid-fast bacilli. Peritoneum was deeply congested, but still retained its luster.

Spleen showed evidence of a perisplenitis and contained many acid-fast bacilli.

Liver studded with numerous small abscess cavities, scattered throughout the substance of the organ, the contents of which were rich in acid-fast bacilli.

Lungs: Upper lobes of both organs were consolidated, of a dark red color, showing no nodule formation. Smears made from cut surface showed large numbers of acid-fast bacilli.

Heart blood showed the presence of a considerable number of acid-fast bacilli.

There was an area of alopecia over the back of the animal.

Four mites (*Laelaps echidninus*) were removed from the animal's skin, smeared and stained in the usual manner, and all of them were found to contain acid-fast bacilli.

This rat evidently represented a more advanced stage of the disease than most of those that we have examined.

In the previous report referred to, under "Rat II," on page 20, we stated that 32, probably infected, mites were placed on 3 specimens of rats (*Mus alexandrinus*), and that 100 house flies were fed with the leprous subcutaneous tissue of a leprous rat and placed in a cage with two healthy rats (*Mus alexandrinus*), after the tails of these rodents had been abraded by scraping, so as to make them attractive to the flies, and also to afford a lesion for the possible entrance of the bacilli. We stated further, on the same page, that we would report at a later time on the results of these attempts to inoculate these animals by the use of the infected ecto-parasites or insects.

In this connection we can state, however, that after waiting for nearly one year, we chloroformed these five animals and necropsied them, but their bodies showed no evidence of infection with rat leprosy.

From the data secured in these animals, considered with the data given in our previous article on this subject, we are apparently justified in concluding that:

First. In the disease that we are dealing with, whether the animal is inoculated by a laboratory method or simply allowed to develop the disease from coming into contact with infected rats—i. e., the natural mode of infection—the lesions met with are practically the same.

Second. With the exception of the local lesion, occasionally produced at the site of artificial inoculation, infection of the viscera seems to usually precede the lesions of the skin.

Third. Of the visceral lesions, a broncho-pneumonia is often the earliest and the most constant. Infection of the spleen is also often an early event.

Fourth. The heart blood of infected rats often contains the bacilli of rat leprosy, and no difficulty is experienced in demonstrating the presence of acid-fast bacilli in the mites contained on the bodies of these animals, when the latter's heart blood contains the organisms.

Fifth. The fact that these mites contain the bacilli so frequently naturally leads one to suspect that they may be one of the means of transmitting the disease from rat to rat, but up to the present time we have no positive evidence that such is the case.

#### ATTEMPTS TO CULTIVATE THE BACILLUS OF RAT LEPROSY.

As reported in our first paper, we have made many attempts to cultivate the bacillus of rat leprosy on artificial culture media; both on the media ordinarily employed in the laboratory, and by the method of Clegg in symbiosis with amœba and cholera. We have now to report that we have continued these experiments for nearly a year, and that our results have been entirely negative, not having secured a single culture of an organism which we considered to be the bacillus of rat leprosy. In one of our attempts to cultivate this organism from the ulcer on the abdomen of a leprous rat, we succeeded in growing what appeared to be an acid-fast streptothrix. As one might expect to obtain such organisms on an exposed surface of that kind, we regarded this culture as an accidental contamination, and not the bacillus of rat leprosy.

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# A STATISTICAL STUDY OF THE NASAL LESIONS IN LEPROSY.

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## INTRODUCTION.

The published work of Sticker, in 1897, increased the interest in the theory, mentioned in 1891 by Goldschmidt and (according to Glück, *Wiener medizinische Wochenschrift*, 1901) in 1896 by Kobner, that the earliest lesions in leprosy were often found in the nasal mucosa.

The following table is based upon data secured by the examination of the nasal cavities of 500 persons suffering from leprosy. These 500 cases gave a history of having had the disease in a recognizable form for periods varying from 3 months to 25 years, and all of them showed unmistakable leprosy lesions on other parts of the body at the time the examinations were made.

*Results of the examination of the nasal mucous membrane of 500 lepers.*

	Predominating gross lesions present.				Total examinations made.	
	Perforation of nasal septum.	Atrophic rhinitis.	Hypertrophic rhinitis.	Absorption of cartilage.	Lesions present.	Lesions absent.
Nodular type.....	27	15	13	97	152	19
Anasthetic type.....	63	43	9	59	174	53
Mixed type.....	10	10	7	57	84	18
Total.....	100	68	29	213	410	90

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## LIST OF PUBLIC HEALTH BULLETINS.

The following is a list of the Public Health Bulletins that have been issued :

- \*1. Report on Trichinæ and Trichinosis. By W. C. W. Glazier. 1881. 212 pages. 87 il. 1 map. Paper. Senate Executive Document No. 9, Forty-sixth Congress, third session. Out of print.
- \*2. Report on the Etiology and Prevention of Yellow Fever. By George M. Sternberg. 1890. 271 pages. 21 pl. 20 il. Cloth. Out of print.
- \*3. Mortality Statistics in the United States for the year ending December 31, 1897. From Annual Report Marine-Hospital Service, 1898. 24 pages. Paper. Out of print.
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- \*30. **The Rat and Its Relation to the Public Health.** By various authors. 1910. 254 pages. 60 figs. 6 pl. Paper. Exhausted.
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TREASURY DEPARTMENT

Public Health and Marine-Hospital Service of the United States

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PUBLIC HEALTH BULLETIN No. 51

NOVEMBER, 1911

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THE CAUSATION AND PREVENTION  
OF TYPHOID FEVER

WITH SPECIAL REFERENCE TO CONDITIONS  
OBSERVED IN YAKIMA COUNTY  
WASHINGTON

BY

L. L. LUMSDEN

*Passed Assistant Surgeon*

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PREPARED BY DIRECTION OF THE SURGEON GENERAL



WASHINGTON  
GOVERNMENT PRINTING OFFICE  
1912

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no. 51





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# CAUSATION AND PREVENTION OF TYPHOID FEVER

WITH SPECIAL REFERENCE TO CONDI-  
TIONS OBSERVED IN YAKIMA COUNTY, WASH.

[From the Hygienic Laboratory.]

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By Passed Assistant Surgeon L. L. LUMSDEN.

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## GENERAL DISCUSSION.

Typhoid fever is a preventable disease. Compared with many of the other infectious and contagious diseases it is a readily preventable disease.

The measures to prevent typhoid fever are well known. A problem in the average community under a democratic form of government is how to get intelligent public sentiment sufficiently aroused to make the enforcement of the necessary measures feasible.

In the United States about 450,000 persons are incapacitated and about 35,000 are killed by typhoid fever each year. A large proportion of the cases are in persons at their period of maximum earning capacity. Thus the Nation suffers from this disease a tremendous economic loss, amounting to many times over what the work required to prevent such loss would cost.

Typhoid fever is a filth-borne disease. It is caused by germs which are parasites and which depend for their perpetuation upon multiplication in the bodies of human beings. The germs are discharged from the bodies of persons in the stools and urine. To cause the disease in other persons these germs must be swallowed. Every person who has typhoid fever has recently swallowed some typhoid germs which have come in some way from the excreta of some infected person. Unless we put into our mouths and swallow something which has been soiled or contaminated with human filth we will not have typhoid fever.

Typhoid germs, or typhoid bacilli as they are called, are very minute organisms. Twelve thousand of them placed end to end measure only about 1 inch. On account of their minute size many of them may be contained in a small particle of matter. A drop

of urine or a few grains of feces from an infected person may contain hundreds, or even thousands, of typhoid germs. A house fly having had access to the contents of a bed pan or a privy used by an infected person may carry enough typhoid germs on its legs and body to infect large quantities of foods and beverages and so cause a large number of persons to be exposed to typhoid infection. Fingers mechanically clean—that is, free from gross dirt—may carry typhoid germs to mouths directly or indirectly through foods. Water, clear, sparkling, and free from objectionable taste and odor may contain them. Milk apparently clean and sweet and rich may be teeming with typhoid germs.

Every person who swallows typhoid germs does not have typhoid fever. Neither does every person who inhales or swallows tubercle germs have tuberculosis; nor does every person who gets diphtheria bacilli into the mouth or nose have diphtheria. Disease germs, like other seeds, must get into favorable soil for growth and multiplication to occur. In epidemics of typhoid fever caused by heavily infected public water supplies it is unusual for more than one out of ten of the persons who drink the water to have typhoid fever. As a rule the proportion is smaller, frequently not more than one per hundred of the population exposed. Science has not yet determined definitely just what constitutes individual susceptibility to typhoid infection. Epidemiological evidence is opposed to the view that it is a matter of general health. In extensive outbreaks, or epidemics, when many persons presumably are equally exposed to infection, the disease appears to attack as large a proportion of those in apparently vigorous health as of those in obviously poor general health. It is quite possible that a person who is highly resistant at a given time may be highly susceptible the next year, month, week, or even the next day. One who has had an attack of the disease should not take any unnecessary risks of exposure to infection, because some persons have two or more attacks of the disease.

#### CAUSATION OF THE DISEASE.

When a susceptible person swallows typhoid germs the germs multiply in the alimentary canal, and from the intestine they invade the blood and are carried throughout the body. In the blood and tissues the germs elaborate a poison whose effects on the different tissues and organs of the body give rise to the symptoms of the disease. Persons sick with the disease discharge myriads of living typhoid germs in the feces and urine and rarely some in the sputum. Every typhoid patient, therefore, should be regarded as a reservoir of infection and the discharges from the body treated as a very dangerous poison. (See pp. 50 to 53.) The disinfection of the dis-

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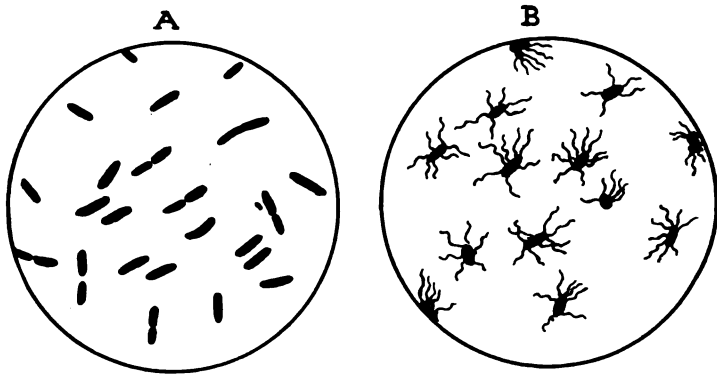


FIG. 1.—TYPHOID GERMS AS SEEN WHEN MAGNIFIED 1,000 TIMES.

A. The germs as usually seen under the microscope. B. The germs stained to show the fine hairs (flagellae) by means of which the germ moves in a liquid.

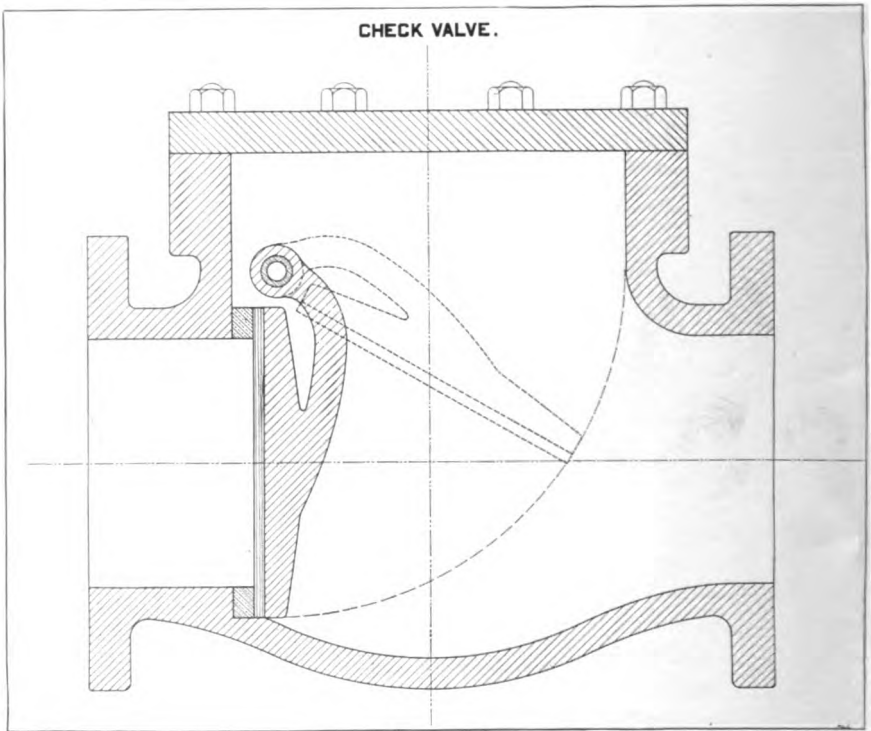


FIG. 2.—A CHECK VALVE SUCH AS WAS DEPENDED UPON TO KEEP THE WATER IN THE SPRINKLER SYSTEM IN THE CASCADE MILL YARDS FROM ENTERING THE CITY WATER MAINS.

charges as they leave the body of the patient may be accomplished simply and with very little expense, but if proper precautionary measures are not carried out at the bedside the infection in the discharges from a single patient may be disseminated by various agents, such as fingers, flies, foods, and water, and cause the disease in many persons.

#### **NATURE AND VIABILITY OF THE INFECTIOUS AGENT.**

Typhoid germs are plants belonging to the general group of plants known as bacteria. Bacteria exist as separate cells, thus differing from higher forms of plant life which are made up of cells gathered together into groups to make fibers, leaves, stems, roots, etc. Bacteria in general are so small that the individuals can not be seen by the unaided human eye, and a glassful of water containing a considerable number in each drop may still appear perfectly clear. Under the magnification given by a powerful microscope, however, the bacteria become readily visible, and typhoid bacilli present the appearance shown in figure 1.

Typhoid bacilli under favorable conditions multiply rapidly—each bacillus dividing into two in about 45 minutes—and if a needle point is touched to a growth of typhoid bacilli and then dragged along the surface of some culture medium, such as nutrient gelatin, there will soon appear along the track of the needle a growth readily visible to the unaided eye and resembling somewhat the growths of ordinary molds and yeasts. In this way the bacteriologist can cultivate typhoid bacilli in large quantity—even by the pound if desired.

Milk is a favorable culture medium for typhoid bacilli, and consequently if a small particle of matter containing these organisms is introduced into milk the bacilli may undergo rapid multiplication and become disseminated throughout a large volume of milk. For this reason it is necessary in order to safeguard a milk supply against typhoid infection to have exercised extraordinary precautions in the handling of the milk, so that nothing soiled to the slightest extent with human excreta will get into the milk or into the milk vessels. A finger or a single fly soiled with infected excreta may introduce into a vat of milk in a city dairy the seeds of infection for an extensive typhoid epidemic.

Under most natural conditions, typhoid bacilli outside the human body do not multiply and do not live for a very long period, but gradually die off. In water some of the bacilli may survive long enough to be carried for miles in flowing streams. The factors which operate for the purification of streams are very variable and in many instances it is hazardous to depend upon a stream to have purified itself after it has flowed even as much as 15 or 20 miles from the last point of dangerous pollution. Typhoid bacilli in water

stored in tanks, reservoirs, or lakes will die out usually in a month or two, but there is probably an element of danger in depending upon storage alone, even for a considerably longer period than a month or two, to remove typhoid infection from water. Freezing kills a large proportion of typhoid germs in water, but the number surviving usually is ample to cause infection. Outbreaks of typhoid fever have been traced quite definitely to infection in ice harvested from polluted waters and stored for several months before being used. Experimentally it has been found that butter made from infected cream may retain living typhoid germs for as much as 60 days. On vegetables, such as lettuce, sprinkled with infected water or grown in infected soil, typhoid bacilli may survive for several weeks. The bacilli will survive drying for a short period, and under some circumstances dust may serve as a factor in the dissemination of the infection. In the contents of privy vaults and cesspools typhoid germs may survive for weeks and in some instances probably for as much as a year. Septic tanks should not be relied upon to destroy typhoid bacilli in sewage, because many of the bacilli will withstand such septic action as septic tanks are usually designed to accomplish.

#### **PRINCIPLES OF TYPHOID-FEVER PREVENTION.**

If only persons sick with the disease harbored typhoid-fever germs, the prevention of typhoid fever would be very much simplified and would require only the carrying out of rigid precautions to secure the destruction of the infection in the discharges of typhoid patients from the beginning to the end of illness; but some persons recovered from all clinical manifestations of typhoid fever continue to discharge typhoid bacilli in the feces or urine, or both, for weeks, months, or even years, and others who have never had a clinically recognizable attack of the disease become temporary or permanent typhoid-germ carriers and distributors. Any person in a community where typhoid fever is prevalent may harbor in the intestines and discharge in the excreta for a few days or weeks typhoid bacilli without presenting in the meantime any of the usual symptoms of typhoid fever. In view of these facts, it is obvious that to prevent typhoid fever measures must be directed toward securing a proper disposal of the excreta of all persons—the sick and the well—so that the food and drink and other things which we may put into our mouths will be free from contamination with the excreta from human beings. In communities under comparable climatic conditions typhoid fever will be prevented in proportion to the degree to which these measures are carried out and typhoid fever will prevail in proportion to the neglect of these measures.

The proper disposal of human excreta will prevent not only typhoid fever but also the dysenteries, much of the diarrheal disease of infant and adult life, hookworm disease, and many of the diseases caused by the larger animal parasites, and will furnish a complete safeguard against the spread of Asiatic cholera. In view of the fact that persons with consumption swallow their sputum and discharge tubercle bacilli in their feces, the proper disposal of human excreta is an important measure to be carried out for the prevention of tuberculosis.

#### PREVALENCE OF THE DISEASE IN THE UNITED STATES.

The typhoid-fever death rate of a community, with due allowance made for the climatic conditions, furnishes a fairly accurate measurement of the degree of sanitation attained by that community. Typhoid fever is largely a disease of warm weather, and under comparable sanitary conditions the disease will be more prevalent in localities having warmer and longer summer seasons. The average annual typhoid death rate for the United States as a whole in recent years has been about 45 per 100,000 of population. This rate is over three times as high as those for a number of other advanced nations of the world. Some of the European countries now having low typhoid rates formerly had rates as high or higher than the present rate for the United States. Their climatic conditions appear to be about as favorable for typhoid infection as are those for the average section of the United States. The comparatively high typhoid rate in the United States must mean, therefore, that the people of the United States have been comparatively negligent in carrying out reasonable sanitary measures.

Busied with the exploitation of the wonderful natural resources of the country, the American people have not yet given due attention to sanitation. Under a republican form of government the will of the majority, though frequently slow of expression, is supreme, and progress in sanitation as in other fields is made just as fast as the masses of the people demand. Unless public sentiment is behind a sanitary campaign satisfactory results can not be obtained. Administrators of the law will hesitate about appropriating the public funds for sanitary improvements until they are assured that the majority of the people wish them to do so.

The American people are preeminently a business people, and before a community can be stirred into intelligent action for marked sanitary improvements it must be made apparent in the majority of instances that without such improvements business interests are going to suffer. This is not the case because the average American citizen has no appreciation of the value of human health and human life, but it is because the masses of the people are not and as a rule do not

become organized in a way to give that concerted effort necessary to the success of a sanitary campaign until the business people through their organizations make sanitation a business issue and advance it in a businesslike way.

Extensive typhoid outbreaks in the majority of instances occur because of the existence of obviously faulty and dangerous conditions which should be corrected on general principles before the outbreaks occur. No community having a reasonably safeguarded water supply and general food supply and a decent system of disposal of human excreta will have either outbreaks or a high annual prevalence of typhoid fever.

A review of the sanitary and civic conditions in any section of the country in which typhoid fever is highly prevalent will present many of the salient features of the great general problem of typhoid-fever causation and prevention in America.

### **THE TYPHOID FEVER SITUATION IN YAKIMA COUNTY, WASH.**

The greater part of Yakima County is made up of valley land lying immediately to the east of the Cascade Mountains. Much of the land has as its superficial stratum a volcanic ash which, when watered, is of wonderful fertility. In recent years extensive irrigation projects have been carried out and a considerable proportion of the land is now irrigated and is in a high state of agricultural development. The crops of fruit, garden truck, hay and grain which can be obtained from this fertile land are really phenomenal, and in the irrigated sections much of the land used for agricultural purposes has a valuation of over \$2,000 per acre. The resources of the section have attracted people from far and wide, and the population of the county increased, according to the United States census, from 13,462 in 1900 to 41,709 in 1910. Towns and villages have sprung up throughout the valley. The largest city is North Yakima, the county seat.

The populace impresses one as being distinctly and intensely American. There is much money to be made, and to be made rapidly, and the people generally are energetically engaged in making it. As is usually the case under such circumstances, time has not been taken for due attention to sanitation, and sanitary conditions throughout the county are obviously faulty.

Few of the towns have any sewerage system or public water supply, and in those that have the sewerage system and public water supply have not been extended to keep up with the growth of the town. In the nonsewered parts of the towns and in the rural districts generally there are in use privies, privy vaults, or cesspools of grossly insanitary type permitting soil pollution and fly contamination. In many

instances there is free communication between privy vaults and shallow wells, and in some instances the communication is so obvious that it seems almost an extravagance to have two holes in the ground when one might have been used both as a privy vault and as a source of water for drinking without adding very greatly to the existing danger. The irrigation ditches generally are more or less exposed to pollution from privies so that at times vegetables watered from these ditches may be dangerously contaminated. The irrigation of the land causes extensive surface drainage and subsoil seepage and thus unquestionably operates as an important factor in the distribution of infection from faultily disposed of human excreta to shallow well waters.

In the irrigated sections of the rural districts the residences are close together. Farming is intensive and many of the farms consist of less than five acres. The population in these sections has been aptly compared to that of the suburbs of a large city. The summers are hot and dry. Horses are used generally for work about the farms. The number of horses per square mile in the cultivated sections of the valley is relatively large. It is exceptional to find stable manure handled and disposed of in a way to keep it from affording a breeding place for flies, and throughout the valley flies are remarkably abundant during the summer and early fall seasons. For the rural districts and for most of the towns and villages adequate provisions have not been made for the maintenance of efficient local health organizations, and consequently there is a lack of efficient official supervision to secure the enforcement of proper prophylactic measures about the bedsides of typhoid-fever patients.

In the summer and fall seasons of each year typhoid fever is highly prevalent in Yakima County, just as should be expected in view of the climatic and obviously insanitary conditions.

The annual typhoid fever death rate for the county since 1907 has been, according to the somewhat unsatisfactory records, about 150 per 100,000 of population, or about three times the average rate for the whole United States. The conditions responsible for the high typhoid fever death rate in Yakima County are thoroughly correctable. The people of the county, when compared with the people of the average American community, are a remarkably prosperous and intelligent people. They are exceptionally well qualified to cope with a serious typhoid fever situation, such as confronts them at the present time. Judging by all the indications the vastly greater part of the typhoid fever in the county could be prevented by reasonable and comparatively inexpensive sanitary measures directed especially toward securing a proper disposal of human excreta. It is a safe prediction that if every residence in

Yakima County were provided with properly constructed, properly maintained, and properly used water-closets or privies the typhoid fever rate there would soon be reduced by 80 or 90 per cent.

Everyone owning a property fit for human habitation in the county is financially able to bear without serious inconvenience an expenditure of the few dollars needed for the installation and maintenance of such sanitary devices. Improvements in the method of disposing of human excreta would effect a reduction not only in the typhoid fever rate, but also in the case and death rates from a number of other diseases which result from excretal dissemination. At the present time the intelligent expenditure of a reasonable amount of money for the improvement of sanitary conditions would appear, not only from the all-important standpoint of saving human health and life, but also from a strictly business standpoint, to be one of the very best investments that could be made with the county's public funds. Whatever is accomplished in the way of sanitary improvements at once will give encouraging immediate results and will lessen and facilitate the work to be done in the future.

Between the urban and rural districts of the county there is, under existing conditions, a free interchange of typhoid infection. A reduction of typhoid in the incorporated towns will effect a reduction in the typhoid-fever rate in the rural districts, and vice versa. Therefore cooperation between the towns and the rural districts in carrying out an energetic county-wide sanitary campaign is vastly important.

Each locality has, of course, its own particular sanitary problems, but the general situation as regards the causation of typhoid fever presents a number of features which are common to practically all the localities in the county, and consequently certain measures for the prevention of typhoid fever may be recommended for application throughout the county.

#### RECOMMENDATIONS.

(1) *The formation of an efficient county health organization.*—What is everybody's business is nobody's business, and in order for sanitation to be satisfactorily advanced in a community it must be made the business of some one to coordinate the forces and to direct the work. The recent arrangement by which the health office for Yakima County and the health office for the city of North Yakima have been placed in charge of one health officer, paid jointly by the county and city, is to be commended as an important step in the right direction. By combining the two offices a position is created which carries a reasonably adequate salary, and efficient services may be expected accordingly. An extension of this system throughout the county seems highly advisable. The following plan is suggested:

Divide the county into sanitary districts. Provide an adequate force of deputy county health officers and sanitary inspectors to cover every district in an efficient manner, the work in each district to be under the immediate charge of a deputy county health officer, but the work in all the districts to be under the general supervision of the county health officer. In each sanitary district containing an incorporated town it would be advantageous to have one health officer serve for both the town and the sanitary district. By this arrangement the salary of the officer could be borne jointly by the town and county and the administration of health affairs simplified and strengthened. The formation of an efficient county health organization along these lines would cost something, it is true, but nothing like as much as typhoid fever alone is costing the county in actual dollars and cents year after year. Sanitary improvements to effect a saving of human health and life and of economic resources can be accomplished only by intelligent labor, and intelligent labor costs money. Improvements in sanitation, just as improvements in public roads, will be accomplished in proportion to the amount of money intelligently expended in the enterprise.

(2) *Rigid enforcement of the law requiring the prompt reporting of all cases of typhoid fever.*—Many typhoid-fever patients discharge infection from their bodies from the very beginning of illness. Therefore, measures to prevent the spread of infection should be started early at the bedside of every case. Experience has shown that without official supervision over cases in a community the carrying out of proper prophylactic measures at the bedsides will be neglected in many instances. Until the cases are reported the health officials have no opportunity to exercise supervision over them. If the carrying out of prophylactic measures is delayed until a positive diagnosis based on clinical symptoms alone can be made, infection may be spread from many doubtful cases. Physicians and others in charge of patients should be encouraged, and also required by law or regulation, to report all cases of illness which may reasonably be suspected to be typhoid fever within 24 or 48 hours after they have taken charge of such patients. With the facilities of the now well-equipped laboratory in North Yakima available for both county and city work there is no reason why practicing physicians should not have definite diagnoses established promptly in practically all doubtful cases.

(3) *Adequate official supervision over all recognized and suspected cases of typhoid fever to secure disinfection of the stools and urine of patients and the carrying out of other measures to prevent spread of infection from the bedsides of patients.*—In getting the preventive measures carried out, the cooperation of attending physicians and families of patients should be obtained to the fullest extent possible,



but health officials should be given as complete legal control over typhoid-fever patients as they are now given quite generally over smallpox patients. Official supervision over a person recovering from typhoid fever should be continued until the person has been up and around for at least two weeks and, so far as practicable, until bacteriological examinations of two specimens of stools and urine of the person have given negative results for the typhoid bacillus. All typhoid convalescents presenting a readily obvious cloudiness of the urine should be regarded and from a prophylactic standpoint treated as cases of typhoid bacilluria until a contrary diagnosis has been indicated by bacteriological examination of the urine.

(4) *The safeguarding of water supplies against dangerous pollution.*—The most dangerous matter with which water supplies are commonly polluted is the excreta, the stools and urine, from human beings. If the excreta from a large number of persons for a short period of time or if the excreta from a small number of persons for a long period of time find their way into a water supply, through discharge from sewers or through drainage or seepage from privies or cesspools, or in any other way, the only safe view to take is that that water supply from time to time will be infected with typhoid-fever germs. Therefore water which has been exposed to pollution with human excreta should not be used for drinking or culinary purposes until it has been subjected to some purification process which will certainly remove from it or kill whatever disease germs it may contain. By boiling, by filtration, or by treatment with hypochlorite of lime water may be rendered free from typhoid infection. Boiling is simple, thoroughly efficient, and is feasible in practically every home. Filtration on a large scale, as for a city's water supply, is, when skillfully done, an efficient but somewhat costly method of purifying water. Some types of small filters for use in private homes are dangerous in that they are entirely inefficient and give a false sense of security. Those of the Berkefeld and Pasteur types if operated with great care and intelligence may be efficient, but on account of the accidents to which they are liable and the natural tendency of people to overwork them they should not be unhesitatingly recommended for general use. Hypochlorite of lime treatment is an efficient method of destroying typhoid infection in water. It has the great advantage of cheapness and may be employed on a large or small scale. A plant for treating the water supply for a town or city can be installed in a few days. The amount of hypochlorite of lime required for each million gallons of water is usually from 6 to 10 pounds. Good (fresh) chloride of lime, containing at least 25 per cent of available chlorine, should be used, and the efficiency of the process determined by bacteriological examination of samples of the water taken before and after the solution is added.

To treat 5,000 gallons of water in a tank or cistern proceed as follows: Put 1 ounce of good chloride of lime into a vessel containing about a gallon of water. Shake or stir rapidly for about a minute. Let vessel set for a few minutes, so that most of the insoluble part of the lime will settle to the bottom. Pour the solution into the cistern, and by the manipulation of a board or by the operation of some mechanical device stir the water in the cistern so that the solution will be quickly diffused throughout the volume of water.

Hypochlorite of lime is an efficient agent for the destruction of typhoid bacilli and other bacteria of the intestinal group, but as employed for the treatment of drinking water it will not kill tubercle bacilli nor the eggs of certain disease-producing animal parasites which may be in any water supply polluted with human excreta. Therefore, even if a water supply is being treated with hypochlorite of lime it should be protected so far as practicable against pollution.

The shallow wells quite generally in the towns and thickly settled districts of Yakima County are dangerous sources of water for drinking. There is extensive soil pollution from the many insanitary privies and cesspools. The soil generally has poor filtering quality. Irrigation causes extensive subsoil seepage and so assists materially in the conveyance of pollution from privies and cesspools to wells. Shallow wells should be abandoned as rapidly as other and safer sources of water can be made available. The people who use water from polluted shallow wells should be urged to boil the water before using it for drinking or general domestic purposes. The wells should be protected against pollution so far as is possible by the use of sanitary privies. There appears to be an element of danger, certainly, in the use of grossly polluted water for the irrigation of the land on which are cultivated certain fruits and vegetables usually eaten uncooked. This is particularly true if the plants are sprinkled or washed with the water. Furthermore, there is always a likelihood that some persons will drink water from the irrigation ditches if the pollution is not such as to cause the water to be offensive to taste or smell.

The sewage of North Yakima is discharged into the Yakima River. Within the county and downstream from North Yakima this river is used as a source of supply of water for irrigation ditches, and on a number of farms the water either directly from the river or from the irrigation ditches, fed by the river, is stored in cisterns and used for drinking and culinary purposes. In the town of Sunnyside, about 30 miles below North Yakima, the water mains are so arranged that the Yakima River water in the Sunnyside Canal can be used as an emergency supply, and for several weeks in the spring of this year the river water was used as the public-drinking-water supply for the town. The streams in the county should be used either as sewers or

as sources of drinking water and not for both purposes. Streams which are to be used as sources of drinking water should be protected not only against dangerous pollution with the sewage of cities and towns, but also against dangerous pollution with human excreta promiscuously deposited or from privies, privy vaults, cesspools, and septic tanks in the urban and rural districts through which the streams flow. The water of the Yakima River downstream from North Yakima should be regarded under existing conditions as a dangerously polluted water, and should not be used for drinking and culinary purposes until after it has been subjected to some efficient process of purification. It may become highly advisable for the people living downstream from North Yakima to demand that the sewage of North Yakima be either diverted from the Yakima River or be purified before being discharged into the river; but it would not appear entirely reasonable for them to do so until steps had been taken also to prevent the pollution of the river with human excreta from the many privies, etc., located upstream from, in, and downstream from North Yakima. The pollution of drinking-water supplies with stable manure is objectionable, certainly from an æsthetic standpoint and possibly from a sanitary standpoint, since the droppings from animals may contain germs capable of predisposing toward or of causing disease in persons; but no evidence has been presented that the feces or urine of horses, cattle, sheep, hogs, or poultry ever contain typhoid bacilli. In this connection it should be borne in mind, however, that it is not an infrequent practice for persons who work in and around stables to defecate and urinate in or nearby the stalls, and if a manure dump contains human excreta it may contain typhoid germs.

(5) *The disposal of human excreta in a sanitary manner so that the soil will not be polluted and flies will not be contaminated with this dangerous material.*—This is by all odds the most important single measure needed for the prevention of typhoid fever in Yakima County. The sooner it is accomplished throughout the county the sooner will the typhoid-fever rate throughout the county be reduced to a reasonably low rate. So long as it is neglected, and in proportion to its neglect, the residents of Yakima County should expect to suffer the great losses, and in view of the preventability of the disease the needless losses, incident to a high typhoid-fever prevalence. The few dollars per household required to construct and maintain a sanitary privy at every home in the county not provided with a sanitary water-closet would be unquestionably the most profitable investment which the citizens of Yakima County could make for insurance against losses in life, health, and business prosperity. It is terrible to contemplate what the ravages of a cholera outbreak might be under the insanitary conditions obtaining in respect to the

disposal of human excreta in most of the thickly settled sections of the county. All residences in the county not within sewerred sections should be provided with properly constructed, properly used, and properly maintained sanitary privies. (See Appendix A.) Adequate official supervision should be exercised over all privies so that the maintenance of them in proper condition and the safe disposal of their contents could be assured. In sewerred sections all residences should be provided with sanitary water-closets connected with the sewerage system. In the partially sewerred town no single public improvement is generally so important as is the extension of the sewerage system so that it will be kept up with the growth of the town.

If promiscuous defecation and urination are practiced, or if insanitary privies, privy vaults, cesspools, or septic tanks are used in a community, the excreta on or in the soil may be spread by seepage, by surface drainage, by flies and other insects, by feet and hands of persons, by domesticated animals, and by other agents to foods or beverages. By preventing such excretal dissemination typhoid fever will be prevented, and such excretal dissemination can be prevented by the use of sanitary privies or sanitary water-closets.

(6) *The carrying out of an energetic campaign against flies to lessen their numbers and to prevent them from having access to infectious matter and to foods and beverages.*—House flies (*musca domestica*) are remarkably abundant in many sections of Yakima County. These insects are among the filthiest of living creatures. They breed in and feed on stable manure, privy contents, and garbage. They are dangerous as regards the spread of typhoid infection in proportion to their numbers and to their opportunities to travel from human excreta to foods and beverages for human consumption. Under existing conditions flies must play a considerable part in the spread of typhoid infection in Yakima County. To prevent flies from spreading typhoid and other excretal infections the most important as well as the most feasible measure is the use of sanitary privies or water-closets so that flies will not have access to human excreta. So long as there is a possibility that the flies in a community have had access to human excreta it is highly important that all foods and beverages for human consumption in that community be protected as completely as possible—by screening or otherwise—against fly invasion.

Since it is very difficult practically where flies are abundant to obviate the possibility of flies traveling from collections of human excreta to foods the adoption of measures to lessen fly abundance as much as practicable is highly advisable. The number of flies in a community may be reduced somewhat by very extensive trapping, and such trapping is to be recommended, because for every fly caught and

killed the danger of spread of infection is lessened to some extent. But while hundreds of flies in a neighborhood are being trapped millions may be breeding in near-by collections of stable manure (horse manure especially), human excrement, garbage, and other filth, and the cheapest and certainly the most effective way to lessen the number of flies in a community is to attack their breeding places. All filth, such as stable manure, etc., which will serve as a breeding place for flies should be kept in flyproof containers until it can be hauled away and disposed of properly. Stables should be kept clean. The manure should be removed from the stalls and deposited in flyproof receptacles every day, and be removed from the premises every eight days, so that the fly eggs deposited in it will not have time to hatch out. If it be desired to store the manure for a period of more than eight days the manure should be kept in flyproof sheds, boxes, or vats. For ultimate disposal the manure may be burned or spread on fields and either plowed under at once or left on the surface in a very thin layer so that it will dry rapidly.

(7) *The diffusion of information in respect to sanitation among the people generally.*—Through health-office bulletins, newspaper publications, and by public addresses much may be done to enlighten the people generally about the causation and prevention of infectious diseases and the importance of sanitation. Sanitary progress depends very largely upon sanitary instruction, and no effort should be spared by health officers and other administrators of civic affairs to advance as rapidly as possible the education of the masses of the people in sanitary matters.

Typhoid fever is prevented by applying the elementary and very reasonable principles of decent sanitation, or cleanliness, in respect to the disposal of the bodily wastes from human beings. If a large majority of the intelligent citizens of Yakima County should become correctly informed about the prevalence of typhoid fever in the county and about the modes of spread of typhoid infection there is hardly a doubt that an effective campaign would be started without delay for the sanitation of every insanitary privy, privy vault, cesspool, and septic tank in the county. If all the insanitary privies, privy vaults, cesspools, and septic tanks in the county were made sanitary, and if promiscuous defecation and urination by persons in the county were prevented, perennial typhoid fever in Yakima County would soon be reduced to a remarkably low rate.

### **TYPHOID FEVER IN NORTH YAKIMA.**

North Yakima, the seat of government for Yakima County, is located in the north central part of the county, on the west bank of the Yakima River, a short distance below the confluence of the Yakima and Naches Rivers. The country immediately surrounding

the city is remarkably fertile, and is in a high state of agricultural development. The city is prosperous, and has a rapidly increasing population. According to the United States census reports the population increased from 3,154 in 1900 to 14,082 in 1910.

For some years, certainly as far back as the records go, typhoid fever in North Yakima, as in the towns and the rural districts generally of Yakima County, has been highly prevalent. The high rate of prevalence of the disease, year after year, in North Yakima finally attracted public attention, and a demand arose for a determination of the measures needed to eradicate the disease. In response to this demand, Dr. Eugene R. Kelley and Mr. T. R. Wilber, of the State board of health, made a painstaking study of the situation in the summer and fall of 1910.

The occurrence of an explosive outbreak of typhoid fever in North Yakima in May, 1911, caused a keen awakening of the people to the seriousness of the situation. At the request of the city, county, and State authorities the Surgeon General of the United States Public Health and Marine-Hospital Service detailed the writer to proceed to North Yakima and to make an investigation of typhoid fever in that city and vicinity with a view to determining the causes of the prevalence of the disease and the measures necessary for its prevention. This investigation was conducted in cooperation with the county and city health officer and with representatives of the State board of health. It was begun on June 17 and terminated on July 22. While the bulk of the field work was done in North Yakima and its immediate vicinity, sanitary inspections were made practically throughout the county, and public addresses describing the insanitary local conditions and urging corrective measures were made in the following villages or towns: Naches City, Selah, Wapato, Zillah, Toppenish, Granger, Grand View, Mabton, Sunnyside, and Moxee City. The work was carried on to a special extent in North Yakima and its immediate environs for several reasons:

(1) North Yakima is the largest town in the county, and consequently conditions responsible for typhoid fever there would affect more persons, including travelers to and from other sections of the county, than would comparable conditions in any other town in the county.

(2) The people in the county generally, and those in the city particularly, were keenly interested in the situation in North Yakima on account of the outbreak which had just occurred there.

(3) The usual season (summer and fall) of high prevalence of typhoid fever appeared from the records to be the same for North Yakima as for the county generally, and the insanitary conditions in North Yakima seemed to be quite typical of local insanitary conditions found generally in other sections of the county and presumed to

be responsible for the high annual typhoid fever rate throughout the county.

(4) General measures to prevent typhoid fever in North Yakima would be applicable in practically all parts of the county.

(5) A successful campaign against the disease in North Yakima would furnish an object lesson for all the towns, villages, and rural districts in the county.

The investigation at North Yakima comprised an epidemiological study of the cases of typhoid fever occurring in the city from May 1 to June 15, a review of the records at the city health office to ascertain the prevalence of the disease for previous years, a sanitary survey of the watershed of the Naches River to determine the degree of pollution of the city's water supply, bacteriological examinations of the water supply, inspections to determine the likelihood of contamination of the water after it enters the mains for distribution to the city, a sanitary survey of the city and its environs—especial attention being given to the sewerage system, privies, privy vaults, cess-pools, and to the irrigation ditches as possible factors in the spread of typhoid infection—and inspection of the public dairies, markets, groceries, restaurants and other places where foods were sold or prepared for sale.

#### PREVIOUS INVESTIGATION.

During August, September, and October of 1910, Dr. Eugene R. Kelley and Mr. T. R. Wilber of the State board of health made a careful epidemiological study of typhoid fever in North Yakima. Their investigation was conducted under considerable difficulties in that but a small proportion of the cases of typhoid fever then occurring in the city were being reported. The data collected, however, were quite extensive and facilitated greatly the subsequent investigation. The report of Dr. Kelley and Mr. Wilber, published in a bulletin issued in the spring of 1911 by the State board of health, and entitled "Studies in Typhoid Fever by the Washington State Board of Health during 1909-10," contained the following general conclusions and recommendations:

First. That typhoid fever as it appears in North Yakima and surrounding country is not in epidemic form, but endemic, subject to periodical variations of intensity.

Second. That as far as North Yakima is concerned, fully two-thirds of the cases originated within that city, and are due to causes prevailing therein; and that about one-third of the cases are brought from the surrounding country and may be or may not be caused by the conditions prevailing within the city of North Yakima.

Third. That only to a limited extent can milk be considered as a carrier of the infection, though it is evidently a source of danger, and the milk supply of the city, the sanitary conditions at the dairies, and sickness in the families of the producers and handlers of milk, should be very carefully scrutinized.

Fourth. That it is not a water epidemic and, hence, the city water supply can not be held solely responsible for the marked increase and severity of typhoid during the past year. However, the city water supply is one which has a number of objectionable features, and is of the class that sanitarians would consider a dangerous supply; very liable to accidental pollution through the fact that its intake is directly from a river flowing through an irrigated section, without adequate protection at or before water enters the main conduit, and it is only by an act of Providence this system has escaped direct pollution up to this time. That while evidence of the water ever having been polluted with the typhoid-fever germ is entirely wanting, examinations made in connection with the Geological Survey at the intake, showed that the water is occasionally polluted with other germs coming from human or animal excrement, and that the bacterial count runs occasionally high, and the further fact that the system contains many dead ends from which water containing gross evidences of putrefaction have been taken, indicates that the water supply is one which, while it is not directly polluted with the typhoid-fever germ, tends indirectly to favor the prevalence of typhoid fever in its users, as it is a well-known fact that deleterious water, by its tendency to cause intestinal irritation and diarrheal troubles, materially reduces the natural resistance of each individual to an invasion of the typhoid-fever germ.

Fifth. The fact that practically one-third of the cases examined come from users of water from shallow wells, while only a small percentage of inhabitants use such water, taking into consideration the general topographical lay of the land and the conditions of the soil, indicates that the shallow well water is even more deleterious than the city water supply, and while we have no evidence of direct contamination of any of the wells, these facts alone are sufficient to lead to the conclusion that the water from the shallow wells must be considered as a factor in reducing the resistance of the individual to an invasion of typhoid fever to a far greater extent than the city water supply.

Sixth. That while we must conclude that the sewerage system of North Yakima is inadequate and should be extended, and that the extension thereof would render more easy the disposal of the excreta of typhoid fever patients, nevertheless, the present sewerage system must be considered as only an incidental factor in the prevalence of this disease. The topography of this section and the geological formation, together with the surrounding irrigated country, has, during the summer months, a very marked influence on the increase of the subsurface water in this locality. This is so great that during the irrigation season the water in the surface wells is raised, water appears in cellars, and the sewers are flooded to their extreme capacity; and while all these conditions have a detrimental effect and are dangerous, yet we could obtain no evidence that they influenced the disease except indirectly.

Seventh. The number of contact cases lead inevitably to the conclusion that great carelessness has existed in handling and disinfecting the discharges of the patients sick with this disease, and this in itself must be considered as one of the most important causes for the prevalence of typhoid fever in this locality during the time it was investigated.

Eighth. The fact that 70 per cent of the residences of those studied were in an insanitary condition, and that more than 85 per cent, where residences and locality are combined, showed an unsatisfactory sanitary condition, compels us to the conclusion that unsatisfactory sanitary conditions, through their numerous possibilities of conveyance of the germs from the discharges of the patients to the food of others, by means of flies, other persons, and other agencies is an even more important factor in the prevalence of the disease than direct contact. This is further substantiated by the fact of the large prepon-



derance of male cases, as it is well known that the men, to a very much larger extent than the women, eat at public eating houses where, to a considerable degree, the sanitary conditions are far from ideal.

These conclusions lead us to believe that to reduce this prevalence and eventually stamp out the disease in this locality, the following recommendations are absolutely essential and should be strictly enforced :

First. That the city of North Yakima and the county of Yakima should cause a thorough removal of all insanitary conditions existing in the city and in the country. All cesspools should be absolutely prohibited. All open toilets frequently cleaned and disinfected. All vault toilets frequently disinfected, and toilets of all kinds should be rendered flyproof. That it is not sufficient to cause one removal of insanitary conditions, but the city and the county should be frequently reinspected and these conditions kept in abeyance.

Second. That the watershed of the city supply should be carefully patrolled and all insanitary conditions removed and kept removed, and that this should continue until a proper purification system is installed. That all dead ends in the city mains should be frequently flushed and eventually discontinued by extending these mains until a circulating system is established. That the water main should be extended to all parts of the city, and shallow wells, as far as possible, absolutely prohibited, and where impossible to prohibit, should be kept under strict surveillance. That the old reservoir of the city water supply, which is now used for emergencies, should be discontinued and a properly constructed storage reservoir installed, which would receive its water from the main conduit, and where the water could be kept in a perfectly fresh and pure condition.

Third. That prompt reports of all cases of typhoid fever, or those suspicious of this disease, should be strictly enforced.

Fourth. That each case reported as typhoid fever, or as suspicious of being such, should be promptly investigated by the health department, and all insanitary conditions at the place of residence and in the vicinity thereof, and at the place where the disease was probably contracted, should be abated. That the houses wherein such cases are should be placarded, and the room or patient screened from flies. That careful rules for disinfection of all the excreta, linen, and other things coming in contact with the patient should be furnished by the health department, and careful instructions should be given how to carry out these rules, which should be strictly enforced ; and every case should be reinspected by the health department at sufficiently frequent intervals to satisfy this department that all insanitary conditions are kept removed and the rules for disinfection are strictly followed.

Fifth. That it would be wise for the city in building new sewers and sewer extensions to provide the double system, one for the sewage itself, which should be water tight with waterproof joints, and one for surface drainage.

To enforce these measures will be moderately expensive, but when one considers that during the past year more than \$30,000 was spent by the citizens of this city in caring for those sick with typhoid fever alone, and that the economic loss to the city must be close to \$70,000, while the economic loss to the county, including the city, must have been between \$250,000 and \$300,000, and that these losses occur, to a greater or lesser extent, each year, and have so occurred for the last 20 years or more, this is the best evidence that can be obtained that these expenditures would be true economy and would be many times repaid, not alone in the direct saving in the reduction of the prevalence of this disease, but in the added prosperity which must eventually follow such improvement in sanitary conditions.

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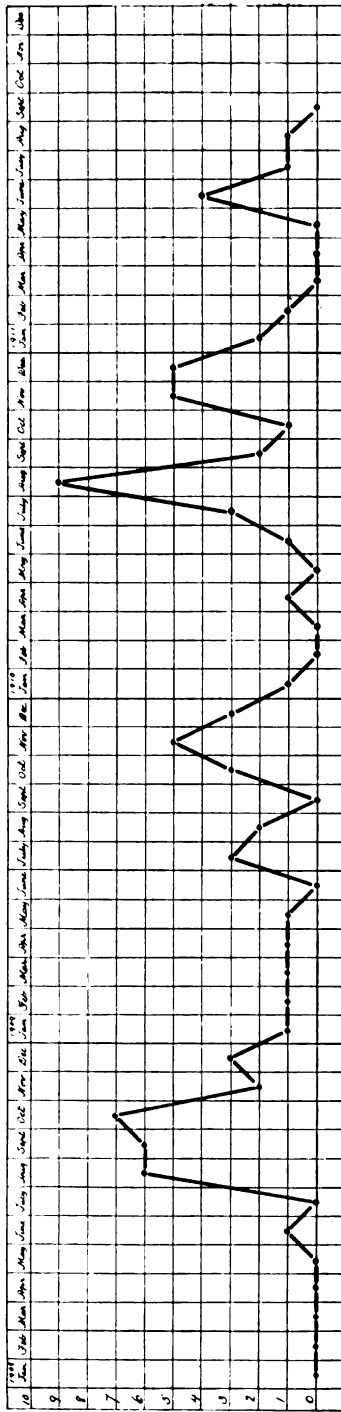


CHART NO. 1.—DEATHS FROM TYPHOID FEVER IN NORTH YAKIMA REPORTED, BY MONTHS, FROM JANUARY, 1908, TO OCTOBER, 1911.

It appeared that even before the report was published that the actual process of the investigation itself had had a good educative effect upon the community.

### PREVALENCE.

The report of cases of typhoid fever in North Yakima was only fragmentary until 1911, and the records of deaths (regarded as complete since 1907) give the only figures available from which the prevalence of the disease can be estimated. The following table and chart (No. 1), based on compilations of the records at the city health office, show the number of deaths reported from typhoid fever in North Yakima by months since January, 1908:

	1908	1909	1910	1911		1908	1909	1910	1911
January.....	0	1	1	2	August.....	6	2	9	1
February.....	0	1	0	1	September.....	6	0	2	0
March.....	0	1	0	0	October.....	7	3	1	0
April.....	0	1	1	0	November.....	2	5	5	0
May.....	0	1	0	0	December.....	3	3	5	0
June.....	1	0	1	4					
July.....	0	3	3	1	Total.....	25	21	28	9

The table and chart indicate (1) that the death rate from typhoid fever in North Yakima has been high as far back as the records go, (2) that the period of high-causation rate of typhoid fever in North Yakima is usually in the summer and fall, and (3) that the number of deaths in June of 1911 was much larger than the average for that month in the previous years.

Twenty-eight deaths from typhoid fever in a population of 14,082 gives a typhoid-fever death rate of 198.83 per 100,000 of population for North Yakima in 1910. With due allowance made for differences in population, the average annual rate for the two years 1908 and 1909 probably was about the same as the rate for 1910. Thus, the typhoid death rate for North Yakima has been about five times as great as the average rate for the whole United States. In the three years 1908-1910 the number of deaths reported from typhoid fever even exceeded the number of deaths reported from either pulmonary tuberculosis or pneumonia, as is shown in the following compilation from the official records:

Cause of death.	Number of deaths.			
	1908	1909	1910	Total.
Pulmonary tuberculosis.....	16	25	23	64
Pneumonia.....	25	20	19	64
Typhoid fever.....	25	21	28	74

Charts 1 and 2 show that typhoid fever in North Yakima has quite a distinct seasonal (summer and fall) prevalence, from 76 to 96 per cent of the deaths for each year (1908-1910) occurring in the latter half of the year. Since the time of death from typhoid fever averages about six weeks subsequent to the time of infection, it appears that the period of high-causation rate of the disease in North Yakima extends usually from about the middle of June to about the last of October. The seasonal prevalence of typhoid fever in North Yakima, taken as a single fact, suggests strongly that the public water supply has not been the predominating factor in the distribution of the infection and that the greater part of the disease in the city year after year has been caused by infection disseminated by various agents—such as fingers, flies, foods, and well water, and from improperly disposed of human excreta in the city and in the immediate environs of the city.

All of the available data go to show that the seasonal prevalence of typhoid fever throughout the Yakima Valley corresponds very closely to that of North Yakima and suggest that if complete reports of cases were at hand the rate of prevalence of the disease would be found to have been in the past few years slightly higher for the whole county than for the city of North Yakima.

#### **TYPHOID FEVER OUTBREAK IN MAY AND JUNE, 1911.**

In May of this year an outbreak of typhoid fever occurred among persons living in the section of the city to the east of Third Street. (See map No. 1.) In the period from May 4 to July 12, inclusive, 54 cases developed among persons living in that section of the city, while during the same period only 1 case was reported as having occurred in the section of the city to the west of Third Street. The case developing in the western section of the city was in a boy who attended Sunday school in the section east of Third Street. So far as could be ascertained, and a painstaking effort was made to learn of all the cases that occurred, the 55 cases reported comprised all the cases to contract the infection in the city and to develop the disease there during the period of the outbreak. Besides the 55 cases, there were 3 reported as under treatment in the city at the time, but these 3 cases were in persons who had contracted the infection while away from North Yakima.

The population of the section of the city east of Third Street is estimated at about 3,000. Thus, the persons residing in that section compose about 20 per cent of the city's population and furnished all of the cases occurring in the outbreak except 1. Of the 54 cases in the section especially affected, 35 were in persons who lived in

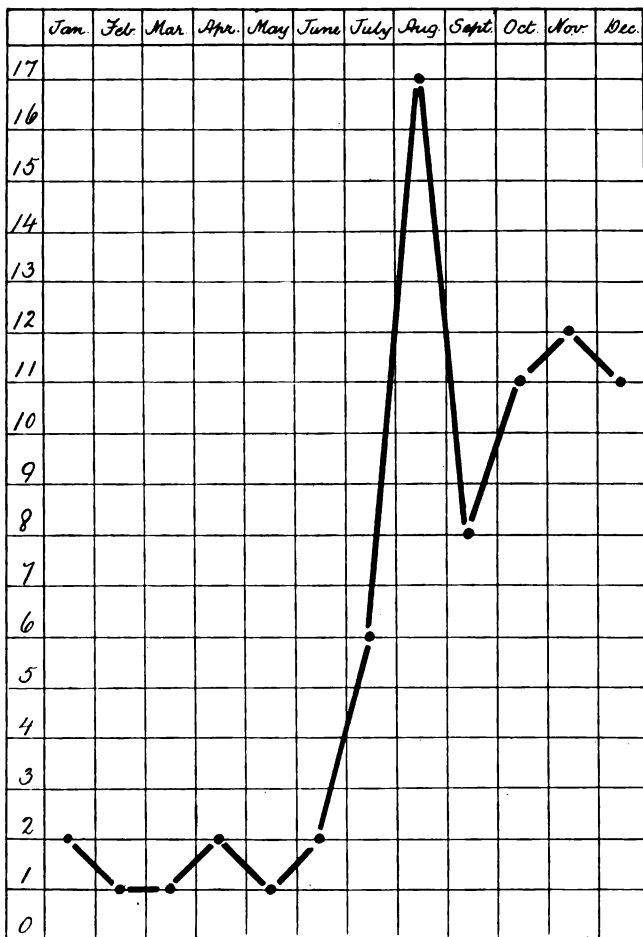


CHART NO. 2.—NUMBER OF DEATHS FROM TYPHOID FEVER REPORTED IN NORTH YAKIMA DURING THE THREE YEARS, 1908-1910, IN MONTHLY AGGREGATES.



residences to the north and 19 in persons who lived in residences to the south of Yakima Avenue. Since the number of persons living in the section north of the avenue is not much greater than the number living south of the avenue it is evident that the rate of prevalence of the disease was disproportionately high among those who lived north of the avenue. Estimating the population in the section of the city to the east of Third Street at 3,000, about 1 person out of every 50 who lived in the affected section developed typhoid fever during the outbreak. The rate was still higher among those who lived in the portion of the affected section north of Yakima Avenue.

The disease was distributed among persons living under good, fair, and bad sanitary conditions at about a proportionate rate, so it appeared that the disease did not result from insanitary conditions at place of residence of persons affected.

The ages and sex of the persons affected were as follows:

Age, in years.	Number of cases.			Age, in years.	Number of cases.		
	Male.	Female.	Total.		Male.	Female.	Total.
0-4.....	1	1	2	40-44.....	1	2	3
5-9.....	10	7	17	45-49.....	0	1	1
10-14.....	7	4	11	50-54.....	0	0	0
15-19.....	1	5	6	55-59.....	0	0	0
20-24.....	0	0	1	60-64.....	1	0	1
25-29.....	2	2	4	Total.....	27	28	55
30-34.....	3	6	9				
35-39.....	1	0	1				

The number of cases in children appeared to be somewhat disproportionately large.

The occupations of the persons affected were as follows:

Occupation.	Cases.	Occupation.	Cases.
School boy.....	12	Janitor.....	1
School girl.....	12	Stenographer.....	1
Housewife.....	7	Laborer.....	1
Carpenter.....	2	Stableman.....	1
Postman.....	1	Hospital nurse.....	1
Furniture dealer.....	1	None.....	13
Electrician.....	1		
Dressmaker.....	1	Total.....	55

Occupational influences seemed to have little, if anything, to do with the distribution of the disease.

The outbreak was explosive in character and must have been caused by infection which was distributed by some agent which reached the general population of the affected area. Thirty of the cases came down sick within a period of 10 days, notably May 14-23.



The dates of definite onset of illness of the cases, shown graphically in chart 3, were as follows:

Date of taking to bed.	Number of cases.	Date of taking to bed.	Number of cases.	Date of taking to bed.	Number of cases.
May 4	1	May 21	3	May 31	2
10	1	22	2	June 1	1
11	1	23	5	2	1
12	2	24	1	3	1
14	6	25	1	6	1
15	7	26	1	7	1
16	1	27	2	10	1
17	2	28	3	12	2
18	2	29	1		
19	2	30	1		

Considering the usual incubation period of typhoid fever, when occurring as an outbreak or in epidemic form, the period of infection for the cases was between April 15 and June 8. The majority of the cases almost certainly became infected between April 25 and May 25.

The outbreak occurred at a time of year when, as shown by the records for previous years, there is usually comparatively little typhoid fever in North Yakima. Therefore it was clear that this outbreak was caused by some unusual condition, presumably separate and distinct from the conditions which are largely responsible for the high rate of prevalence of typhoid fever which obtains with striking regularity year after year in the city during the summer and fall.

Subsequent to the period of the outbreak, that is, since June 12, the number of cases developing in the city has been much smaller than usual for this period of the year. From June 13 to July 25 only 10 cases were reported in the city, and of that number 8 were cases in which the infection was contracted away from North Yakima, and 1 was in the person of a nurse who prior to illness was in attendance on a case which developed in May. From July 25 to September 1 only 11 cases were reported in the city, and of that number 9 (8 certainly and 1 almost certainly) were in persons who had contracted the infection outside of North Yakima, and the remaining 2 were in persons who within the 30 days prior to illness had been exposed to infection through personal contact with previous cases.

Considering the geographical distribution of the disease and the period of occurrence and the explosive character of the outbreak, personal contact and flies could be definitely eliminated as predominant factors in the distribution of the infection.

On general epidemiological principles the possible immediate sources of infection to be especially considered were milk, green gar-

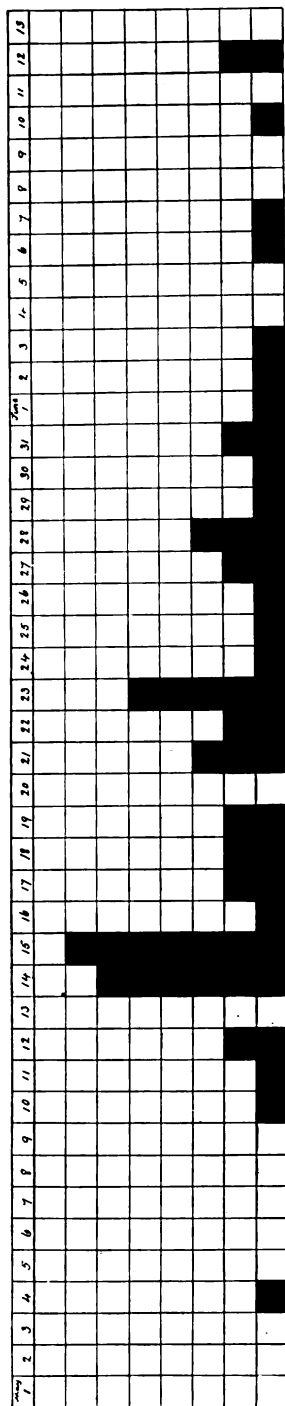


CHART NO. 3.—CASES OF TYPHOID FEVER OCCURRING IN NORTH YAKIMA DURING THE OUTBREAK OF MAY-JUNE, 1911, ACCORDING TO DATES OF DEFINITE ONSET OF ILLNESS.



den truck, and water. An epidemiological investigation was made of each case to determine to what conditions, particularly in respect to food and drink, the persons had been exposed during the 30 days prior to onset of illness.

Milk was definitely eliminated as the distributing agent of the infection which caused the outbreak. The different milk supplies used prior to illness by the 55 persons affected were derived from 20 different sources. Six of the cases had used no milk. There was no disproportionately large number of cases among the customers of any dairyman. The larger milk dealers who had two or more cases among their customers in the infected area of the city had no cases develop among their customers who lived in other parts of the city.

Twenty-eight of the cases gave a history of having eaten ice cream, 25 had eaten none, while for 2 of the cases definite histories as to the eating of ice cream were not obtainable. There was no disproportionately large number of cases among the customers of any one of the ice-cream makers. Ice cream could not have been the source of the infection.

Thirty-seven of the cases gave a history of having eaten uncooked garden truck of one kind or another, 16 gave a history of having eaten none, and for 2 of the cases definite histories about the eating of garden truck were not obtainable. The cases in persons who during the 30 days prior to onset of illness had eaten no green vegetables developed synchronously with cases in persons who had eaten such vegetables. The vegetables and fruits used by the majority of those who had eaten such foods prior to illness were obtained from markets in the section of the city west of Third Street, and from these same markets large numbers of persons who lived west of Third Street also obtained their fruits and vegetables.

All foods and all beverages except the city water supply were eliminated beyond reasonable doubt as the distributing agents of the infection which had caused the outbreak.

The histories given by the cases in respect to the sources of water used for drinking purposes during the 30 days prior to onset of illness were as follows:

Unboiled and unfiltered city water: Solely, 37; principally, 14; occasionally, 4; a total of 55.

From private wells: Principally, 2; occasionally, 6; a total of 8.

Sumach Park Spring: Occasionally, 4.

Irrigation ditches: Occasionally, 3.

Artesian wells: Principally, 1; occasionally, 1; total, 2.

Wells out of town: Occasionally, 2.

Boiled city water: Principally, 1.

Thus the city supply was the only water which had been used by a sufficient number of cases to be implicated as the principal source of the infection which had caused the outbreak. This and all the other evidence obtained by the epidemiological investigation of the cases pointed to the city water supply as the only probable source of infection to which all, or even the large majority, of the persons affected had been exposed.

As the outbreak was confined to the section of the city east of Third Street, it was clear that if the infection had been distributed in the public water supply it must have been introduced into the water mains at some point east of Third Street. If the water supply prior to entering the city mains had contained the infection the greater part of the infection certainly would have been distributed in the section of the city west of Third Street. It appeared that the only places at which the infection which caused the outbreak could have been introduced into water mains in the section of the city east of Third Street were (1) the crossings of certain street water mains and sewers and (2) the yard of the Cascade Lumber Co. All water mains in the affected section at their crossings over sewers were exposed and examined, but no evidence of leakage was found. The pumping of water from the Cascade mill pond into the city mains seemed to be the only working hypothesis left to account for the outbreak.

Chart No. 4, prepared by Mr. H. J. Doolittle, the city engineer, shows the arrangement of the water pipes in the yards of the Cascade Lumber Co. The power of the pump used for pumping the water from the mill pond was much more than sufficient to overcome the pressure of the city supply and to force the water from the pond into the city mains. Therefore, if the check valve (X), which was being depended upon to prevent the water from the pond (used for supplying the sprinkler system) from being pumped into the city mains, had failed to close properly at any time, the water from the pond would have been forced into the city mains. The arrangement was a dangerous one and should have been corrected on general principles before any typhoid outbreak occurred to direct attention especially to it. It is well known that such check valves (see fig. 2) should not be relied upon to keep two water supplies, each with variable pressures, separated; and this is particularly true for water containing sticks and small rocks, as both the city water and the mill-pond water do. Whenever the city-water pressure would fall below a certain point the pump would start working automatically and pump water from the pond to restore the required pressure in the sprinkler system. A stick or rock lodging in the valve at any such time might

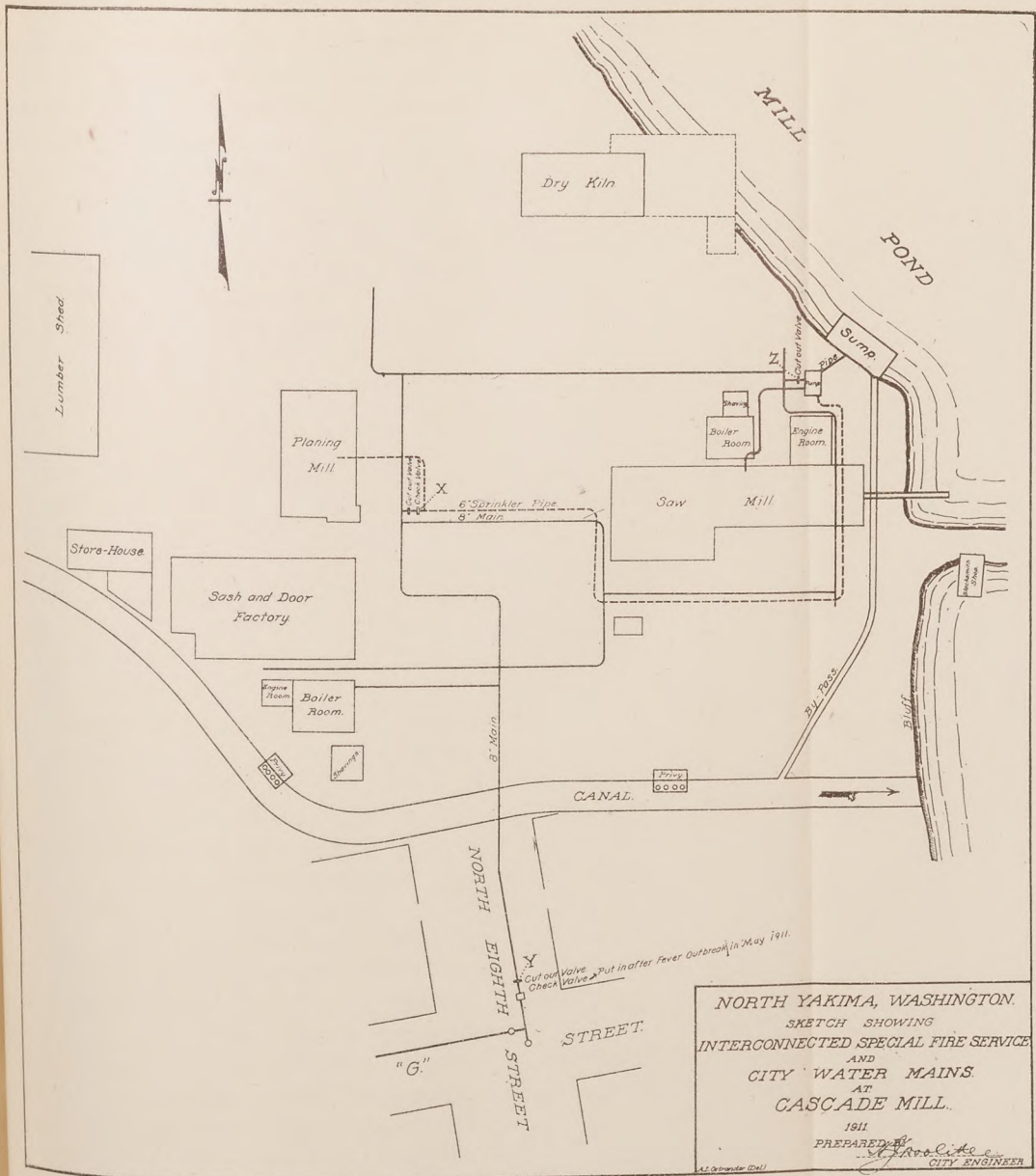


CHART NO. 4.—DISTRIBUTION OF WATER PIPES AND ARRANGEMENT OF VALVES AT CASCADE MILL. 7

- Mains carrying city water except in times of fire.
- ..... Pipes to sprinklers carrying either city water or mill-pond water according to pressure required and as regulated by automatic pump.
- X Check valve which was supposed to close tight when the automatic pump pumped water from the mill pond into the sprinkler system.
- Y Cut-out valve which when closed was depended upon to prevent water from the mill pond when distributed through the yard mains from entering the city mains. This valve was found to leak when tested in the latter part of June, 1911.
- Z Cut-out valve which could be opened voluntarily at any time to permit the mill-pond water to be pumped throughout the yard system, and, if desired, into the city mains.



have prevented the proper closing of the valve. It is certainly possible that, due to such accident, the water from the mill pond found its way into the city mains during the period in which the typhoid fever outbreak was caused.

In time of fire in the lumber yards the cut-out valve (Y) at Eighth and G Streets was supposed to be closed, the cut-out valve (Z) next to the pump opened, and the water from the pond pumped through-out the system of pipes in the mill yards. This valve (Y) at Eighth and G Streets was found to be leaking when tested on or about June 23. Leakage through this valve would have furnished a reasonable explanation of the way in which the pond water got into the city mains and so conveyed the infection which caused the outbreak, if there had been a fire at the mill within the period in which the outbreak must have been caused. But the last fire at the mill, according to the records of the city fire department, was on March 30, which was nearly a month prior to the beginning of the period of causation of the outbreak.

Rumors to the effect that the water from the mill pond was intentionally pumped into the city mains during the period in which the outbreak is assumed to have been caused were persistent. The investigators were unable to determine definitely just how much truth there was in the rumors.

The mill-pond water at the time of this investigation was dangerously polluted with human excreta. It was contaminated by sub-soil and surface drainage from a number of insanitary privies and privy vaults within a mile of the upper edge of the pond. The privies used by the 500 or 600 employees at the mill were overhanging a canal which discharged into the lower pond, but when the water from this canal was diverted through a by-pass into the upper pond, as was done from time to time, a considerable proportion of the matter from the overhanging privies had to go but a few hundred feet to reach the sump from which the upper-pond water was pumped. When it was desired to float logs from the lower into the upper pond the level of the water in the lower pond would be raised and then the gate between the two ponds would be opened so that the water would flow from the lower into the upper pond. When this was done whatever infection was in the lower pond could have been diffused to a considerable extent through the water of the upper pond.

The area of the city which was affected by the typhoid outbreak corresponds with striking accuracy to the area which would have been reached by water pumped from the Cascade mill pond through the city water mains. (See map No. 1.) As the water flowed through the pipes leading south from the neighborhood of the mill yards it would have been held back somewhat and diluted when it met the



current of water in the large main on Yakima Avenue. Therefore, infection entering the city mains in the lumber yards would have been distributed principally to those who used water from the taps located north of Yakima Avenue, and in the outbreak the disease was much more prevalent among the residents north of Yakima Avenue than it was among those south of that avenue.

Convinced of the danger associated with the arrangement of the water pipes and valves at the Cascade Lumber Yards and of the likelihood that infection in the water pumped from the mill pond had caused the outbreak, the writer within a few days after beginning his investigation of the situation recommended to the mayor and city council that the Cascade Lumber Co. be required to effect within the shortest time practicable a complete separation of the two systems of pipes in the mill yard so that there would be no possibility through human fallibility or inefficiency of valves for the water from the mill pond to be pumped into the city water mains. This recommendation was acted upon, and on August 15 the installation of a concrete reservoir, for storing city water to be used as an auxiliary supply in case of fire, was completed and the suction pipe leading from the mill pond to the pump in the lumber yard taken out.

On August 5, 1911, the Pacific Power & Light Co., before a justice of the peace court in North Yakima, on a charge brought by the city health officer, was found by a jury guilty of criminal negligence in allowing water from the Cascade Lumber Co.'s mill pond to be pumped into the city mains, and was fined \$99.99.

#### THE WATER SUPPLY.

The public water supply for North Yakima is obtained from the Naches River. Some of the water passes through a small, open, and unlined reservoir located near the pumping station on the western edge of the city, and some is distributed directly to the mains without being passed through the reservoir. The reservoir is on an elevated ground and the general surface drainage is away from it; but there is a possibility of dangerous contamination through subsoil seepage and through occasional surface drainage from immediately around the edge of the reservoir.

Arrangements are such that the water supply can be obtained from the river through any one of several intakes. Upstream from and within a few miles of each of the intakes except the uppermost one the river is constantly exposed at various points to pollution with human excreta. There are no towns upstream from North Yakima which discharge sewage into the river, but there are a number of privies at farmhouses, at temporary camps, and in Naches City,

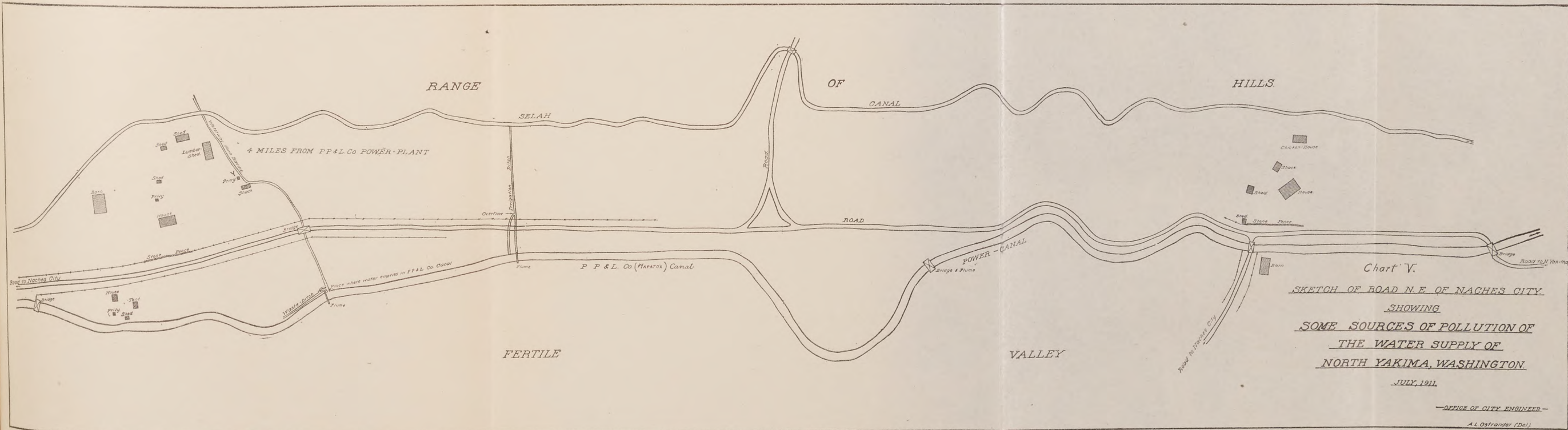


Chart V.  
 SKETCH OF ROAD N.E. OF NACHES CITY  
 SHOWING  
 SOME SOURCES OF POLLUTION OF  
 THE WATER SUPPLY OF  
 NORTH YAKIMA, WASHINGTON

JULY, 1911.

—OFFICE OF CITY ENGINEER—  
 A. L. Ostrander (Del.)







FIG. 3.—REPRODUCTION OF PHOTOGRAPH, TAKEN BY MR. A. L. OSTRANDER ON JULY 17, 1911, SHOWING PROXIMITY OF AN OPEN PRIVY TO THE WAPATOX CANAL.

whose contents reach the river through surface drainage or subsoil seepage, and at some places the privies overhang streams which flow into the river.

It is stated that only the uppermost intake is to be used after certain repairs of the conduit have been made. This intake is located on the left bank of the river about 300 yards below the point at which the Tieton River flows into the Naches. Above the mouth of the Tieton the watershed of the Naches is uninhabited, except for occasional camping parties. The water received at this upper intake is conveyed for a distance of about 8 miles through an open canal, which is operated by the Pacific Power & Light Co. as a power canal. From the open canal the water enters a closed conduit and through that is conveyed to the city. The open canal for the greater part of its course is down hill from and less than 100 yards from a much-traveled public road. At many points the canal receives whatever drainage there is from the road. At the time of the investigation there was drainage into the power canal from at least 8 or 10 residences located along its course. Some of these residences are located within a few yards of the canal and the drainage from them carried stable manure, offal from pigpens and chicken houses, and contents of privies.

Chart No. 5, prepared in the office of the city engineer and based on observations made by the city health officer, the city engineer, Mr. A. L. Ostrander and the writer, presents a somewhat typical set of conditions along the course of the canal. The section shown in the chart is about 4 miles upstream from the power plant, where the water from the canal enters a closed conduit which conveys the water to the mains in North Yakima.

The privy marked "X" on the chart, and of which a photograph is shown in figure 3, was located about 30 feet from the bank of the canal. The privy marked "Y" in the chart, and of which photographs are shown in figures 4 and 5, was located about 400 feet from the canal, and was overhanging a small stream which carried the excreta from this privy directly into the water in the canal. By the sanitary survey it was definitely determined that the city's water supply as obtained both from the river directly and from the canal was polluted to a dangerous extent with human excreta.

In the course of the investigation samples of water from different taps in the city were obtained, practically every day, and examined bacteriologically. The bacteriological examinations were made conjointly by the writer and the bacteriologist for the city and county.

The results of the examinations are presented in the following table:

Sample No.	Source.	Date of examination.	Number of bacteria per cubic centimeter as determined by incubation for 48 hours in—		Gas formation in lactose-bouillon from—		B. coli in—	
			Gelatin plates at 20° C.	Agar plates at 37° C.	1 c. c.	10 c. c.	1 c. c.	10 c. c.
1	Laboratory tap.....	June 22			—	+	—	+
2	do.....	June 23			+	+	+	+
3	Fisher tap.....	do.....			—	+	—	+
4	Laboratory tap.....	June 24			—	+	—	+
5	Fisher tap.....	do.....			+	+	+	+
6	do.....	June 26			—	+	—	+
7	Laboratory tap.....	June 27			—	+	—	+
8	Fisher tap.....	do.....			—	+	—	+
9	Laboratory tap.....	June 28			—	+	—	+
10	Fisher tap.....	do.....			—	+	—	+
11	Laboratory tap.....	June 29	440	Spreader.	—	+	—	+
12	Fisher tap.....	do.....			—	+	—	+
13	Laboratory tap.....	June 30	Liquefied.	280	+	+	+	+
14	Fisher tap.....	do.....			—	+	—	+
15	Laboratory tap.....	July 1	Liquefied.	300	—	+	—	+
16	Fisher tap.....	do.....			—	—	—	—
17	Laboratory tap.....	July 3	Liquefied.	180	—	—	—	—
18	Fisher tap.....	do.....			—	+	—	+
19	Laboratory tap.....	July 5	560	260	—	+	—	+
20	Fisher tap.....	do.....			—	+	—	+
21	Laboratory tap.....	July 6	500	320	—	+	—	+
22	Fisher tap.....	do.....			+	+	+	+
23	Laboratory tap.....	July 7	440	230	—	—	—	—
24	Fisher tap.....	do.....	300	210	—	—	—	—
25	Laboratory tap.....	July 8	260	260	—	+	—	+
26	Fisher tap.....	do.....			—	—	—	—
27	Laboratory tap, 10 a. m.	July 9	Liquefied.	215	+	+	+	+
28	Laboratory tap, 2 p. m.	do.....	do.....	Spreader.	+	+	—	+
29	Laboratory tap.....	July 10	380	200	—	—	—	—
30	do.....	July 11	Liquefied.	180	—	+	—	+
31	Fisher tap.....	do.....	do.....	220	—	—	—	—
32	Laboratory tap.....	July 12	do.....	190	—	+	—	+
33	Fisher tap.....	do.....			—	+	—	+
34	Laboratory tap.....	July 13	Liquefied.	180	—	+	—	—
35	Fisher tap.....	do.....			—	—	—	—
36	Sheeley tap.....	July 14			—	—	—	—
37	Laboratory tap.....	do.....		360	—	+	—	+
38	do.....	July 15		660	—	+	—	+
39	Sheeley tap.....	do.....			—	—	—	—
40	Laboratory tap.....	July 16		Spreader.	+	+	—	+
41	do.....	July 17		300	—	+	—	+
42	Sheeley tap.....	do.....			+	+	+	+
43	Laboratory tap.....	July 18		498	+	+	+	+
Average.....			411	280				
Percentage positive.....					20.9	74.4	16.2	69.0

The results of the bacteriological examinations of the water were about what could have been anticipated from the sanitary survey and added nothing material to the information obtained by the field inspection of the water supply except the fact that bacteria of intestinal origin in the water would survive after the water had traversed the closed conduit and the city mains.

Although the general epidemiological features of the situation suggested that the public water supply had not been the predominant factor in the distribution of typhoid infection in North Yakima year after year, it seemed quite probable that the water supply had

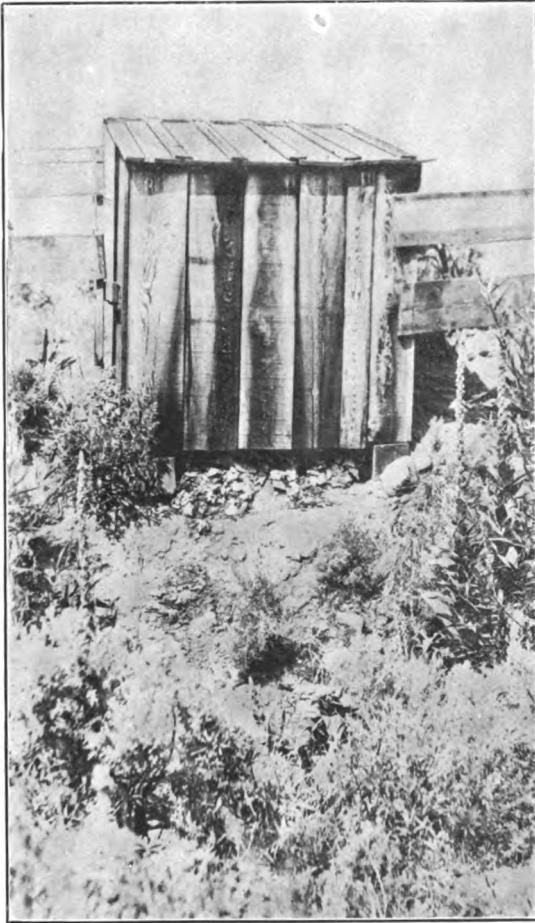


FIG. 4.—REPRODUCTION OF A PHOTOGRAPH, TAKEN BY MR. A. L. OSTRANDER ON JULY 17, 1911, SHOWING A PRIVY WHICH WAS OVERHANGING A SMALL STREAM WHICH FLOWED INTO THE WAPATOX CANAL (SEE Y IN FIG. 5 AND CHART V).



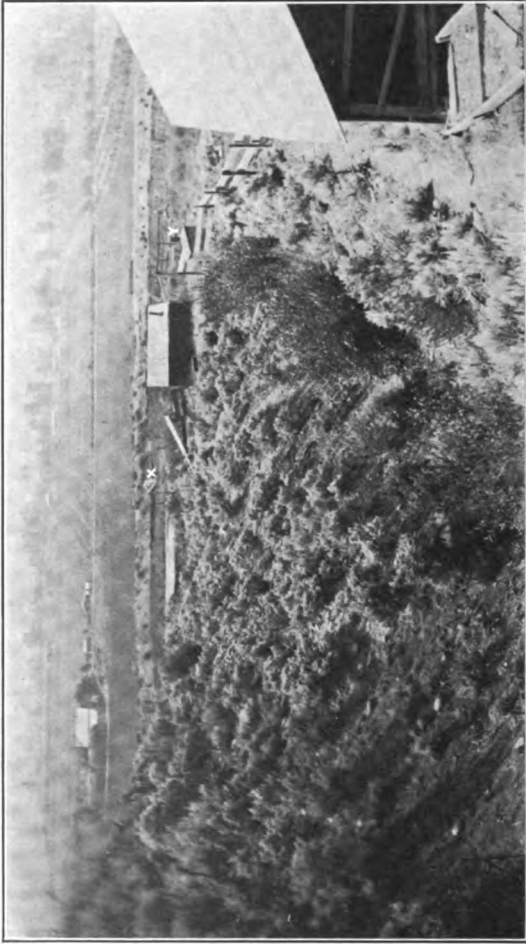


FIG. 5.—REPRODUCTION OF A PHOTOGRAPH, TAKEN BY MR. A. L. OSTRANDER ON JULY 17, 1911, SHOWING LOCATION OF PRIVY (Y) IN RELATION TO THE WAPATOX (THE PACIFIC POWER & LIGHT CO.) CANAL (+).

been at times a contributing factor. Any water supply contaminated with human excreta to the extent that this supply was can not reasonably be regarded as being other than a potentially dangerous supply and one which is liable at any time to convey sufficient infection to cause an extensive epidemic of typhoid fever among the users of such water.

In view of all the conditions, the writer, on June 19, just after having made an inspection of the watershed, recommended to the city council and to the manager of the water company (the Pacific Power & Light Co.) that the city's water supply be subjected to some process of purification which would remove from the water such dangerous contamination as might enter it from time to time from the constant sources of pollution, such as privy contents, stable manure heaps, etc., on the watershed, and to which the water was exposed in its course along both the river and the Wapato (the Pacific Power & Light Co.) Canal. On account of its recognized efficiency when properly applied, its cheapness, its freedom from danger, and the ease and quickness with which it may be applied, treatment of the water supply with hypochlorite of lime was suggested as the process of purification to be applied at once.

The apparatus was installed and the treatment of the whole public water supply with hypochlorite of lime was begun in the latter part of July.

#### THE MILK SUPPLY.

Practically all of the milk consumed in North Yakima originates in or within 10 miles of the city. About one-half of the supply is obtained from cows kept in the city and owned by private families, and the rest of it is obtained from dairy farms in the vicinity of the city and is distributed by public dairymen. Many of the families keeping one or two cows in the city sell milk to as many as 10 or 15 households. At some of the private homes from which milk was being distributed the general sanitary conditions were found to be very poor and the methods of handling the milk very faulty.

The milk from the dairy farms is distributed by six dealers. Some of the dealers bottle the milk at the dairy farm and others bring the milk to the city in bulk and bottle it there. The writer made an inspection of all the dairy farms and of all the milk depots in the city. At each and all of them the conditions were found, from a sanitary standpoint, to be far from satisfactory. On the farms generally, polluted water supplies were used for washing the milk cans and bottles. Privies of grossly insanitary type, with contents freely exposed to flies, were in use. Throughout the processes of handling, the milk and the milk vessels were being exposed to dangerous contamination by flies.

At one of the city dairies the bottles of milk were placed for cooling in a shallow box through which flowed water from an irrigation ditch which at that time was grossly polluted with the contents of a number of privies in the immediate neighborhood. The irrigation ditch water was very liable to get into the milk in any of the bottles not having absolutely tight-fitting stoppers, and small amounts of it certainly reached the mouths and pasteboard caps of practically all of the bottles. The owner of this dairy stated that the water used for washing cans and bottles was boiled city water brought from his residence, which was about 60 feet distant from the dairy house. The water of the irrigation ditch which flowed through the dairy house, where the bottling and canning was done, seemed, however, to be suspiciously convenient for washing purposes.

At another one of the city dairies the room in which the bottling of the milk was done was found at the time of inspection to be literally swarming with flies. In each of several cans of milk, which milk a short while before had been run through the pasteurizer and the cooling machine, from 10 to 15 drowned or drowning flies were found. On the cloth through which the milk was being strained as it ran from the cooling machine into the cans there was a layer of dead flies about two deep and covering an area of about 4 inches square. The owner and manager of this dairy claimed that he operated his pasteurizing machine most carefully, but he seemed to be working on the theory that milk once cleansed would always be clean, no matter how much filth was added to it subsequently.

At most of the dairy farms and city dairies no pretense was made at sterilization of milk bottles, the bottles after having been distributed to various homes in the city being returned to the dairy, washed usually with soap powder and lukewarm water, refilled with milk, and redistributed.

In view of all the conditions, it seems very probable that milk has been one of the important factors in the distribution of typhoid infection in North Yakima.

In May of this year the city council passed a fair, reasonable, and quite adequate ordinance for the safeguarding of the city's milk supply. That ordinance should be rigidly enforced, and all persons selling milk, in however small or however large quantities, in the city of North Yakima should be required to comply with its provisions.

#### **GENERAL SANITARY CONDITIONS.**

In certain respects the sanitary conditions in North Yakima are far above those in the average American city of comparable population. There are no congested districts. The city is laid out along modern lines. The streets are wide and generally well paved. The

city blocks are bisected by alleys of ample width to permit wagons to pass through. The majority of the dwelling houses are of good construction and are maintained in a satisfactory state of cleanliness. In the residential sections there are no continuous closely built rows of houses—practically every home having a yard around it. At many of the homes the yards are quite extensive and well kept. The climate is salubrious. The winters are mild, and the summers, though hot, are dry and not depressing. At the time of the investigation the garbage disposal service was found to be quite good. The ordinance requiring every household to be provided with a water-tight and properly covered garbage can was being remarkably well enforced. The garbage is removed from the houses and ultimately disposed of by the municipality. An objection to the garbage wagons is that they are not covered. The garbage is hauled to a public dumping ground outside the city, mixed with street sweepings, and other rubbish from the city, and burned.

In certain respects the sanitary conditions in North Yakima were found at the time the investigation was begun to be obviously faulty and dangerous. About two-thirds of the city's area were reached by both the water-carriage sewerage system and the public water supply. (See maps 1 and 2.) In some sections there were water mains but no sewers, and in others there were sewers but no water mains. At residences in the nonsewered sections, privies, privy vaults, or cesspools of grossly insanitary type were generally in use. At many of these residences shallow wells, varying in depth from 15 to 35 feet, and dangerously exposed to pollution with human excreta from near-by privies, were being used as sources of water for drinking and general domestic purposes. According to the observations of Kelley and Wilber, typhoid fever was especially prevalent in the summer of 1910 among the users of water from these wells. A number of the residences in the sewerred sections, some in the heart of the city, had not been connected with the sewerage system. It was estimated that at the time the investigation was begun there were about 800 insanitary privies and about 200 insanitary cesspools within the incorporated limits of the city. The contents of the privies were freely exposed to flies. The contents of cesspools, though usually not directly exposed to flies, contributed greatly to general soil pollution. In many instances chickens, dogs, cats, and other animals had free access to the excreta in the privies. Many of the privies drained into irrigation ditches. Open privies in some instances were practically overhanging irrigation ditches.

In the sections not supplied with city water a certain proportion of persons, regardless of warnings, would use the polluted irrigation-ditch water for washing dishes and occasionally for drinking. The water from the irrigation ditches is used quite generally throughout

the city for watering small truck patches in private gardens. The soil has poor filtering quality and consequently infectious matter may be carried considerable distances by subsoil seepage. The subsoil seepage resulting from irrigation is extensive. During the irrigation season (May to December) many of the basements and cellars in the city are flooded to a depth of several feet with the subsoil water. The drainage through the city follows the slope of the land from west to east. Conditions in respect to privies in a western section of the city, locally referred to as "the modern addition," were particularly bad. The city government is to be commended for the steps which it has taken recently to have the irrigation ditches in the western section incased and to have drainage canals constructed for the purpose of preventing the periodic flooding of the city with subsoil water. It should be stated, however, that strictly from a standpoint of typhoid-fever prevention it would be much less costly and much more efficacious to prevent the dangerous pollution of the subsoil and the irrigation-ditch water by putting into and keeping in sanitary condition the privies and cesspools in the western section of the city. There were many private stables in the city, and at practically none were there fly-proof receptacles provided for the horse manure. Thus ample breeding grounds for flies were afforded, and flies were remarkably abundant. The writer has been in no city at the height of the fly season in which flies were more numerous than they were in North Yakima in the latter part of June, 1911.

The very obvious insanitary conditions in the community, permitting extensive dissemination of human excreta by fingers and flies and water and through foods, afforded an all-sufficient explanation of the high rate of prevalence of typhoid fever in North Yakima in the summer and fall seasons year after year.

The importance of insanitary privies and cesspools as sources of typhoid infection in the city may be appreciated when considered in connection with the probable number of typhoid-bacillus carriers in the community. From the results of a canvass made by the writer, about 14 per cent of the population have had typhoid fever at some time in their lives. About 3 per cent of persons recovered from typhoid fever are chronic typhoid-bacillus carriers. Hence 14,000 (the city's population) multiplied by 0.14 multiplied by 0.03 equals 58. With 50 or 60 chronic carriers and, during the summer season, probably a considerably larger number of temporary carriers in the city, it is readily conceivable that if many persons in that population use insanitary privies that a number of foci of endogenous typhoid infection will certainly be established.

There were ample city ordinances prohibiting the maintenance on premises of nuisances—such as insanitary privies and improperly

stored collections of stable manure—detrimental to health, but in view of the large number of violators the practical enforcement of such laws was a difficult problem.

#### THE CAMPAIGN AGAINST TYPHOID FEVER.

The investigation was begun at a time which, judging by the records for previous years, was about one month prior to the beginning of the usual annual period of maximum causation rate of typhoid fever in North Yakima. Judging from the general features of the situation and from the findings of a previous investigation (by Kelley and Wilber) it seemed clear that the high annual prevalence of typhoid fever in the city had been due very largely to insanitary local conditions and neglect of proper precautionary measures at the bedsides of persons sick with the disease. The people generally were unusually aroused about the situation. For all these reasons, the time appeared to be particularly opportune for an energetic sanitary campaign. By applying the measures apparently indicated their efficacy could be determined by the results.

The work was directed especially toward the correction of the conditions most obviously at fault. Steps had already been taken for the maintenance of an exceptionally efficient city health organization. A well-equipped bacteriological laboratory had been established. On July 1 the position of county health officer and that of city health officer were combined. Thus a position was created which carried a reasonably adequate salary, viz, \$5,000 per annum, and the health officer was required to devote all of his time to health work. The services of a well-qualified physician, appointed on the recommendation of the local medical society, were secured.

On the recommendation of the writer a professional female nurse was engaged by the health department for the special purpose of visiting homes of typhoid-fever patients to advise about and supervise bedside precautions. Provision was made for furnishing free disinfectants from the health office to homes of typhoid-fever patients when the families were not readily able to purchase disinfectants. The writer recommended that the health department treat liberally with strong chloride of lime solution every privy, cesspool, and septic tank in the city. The disinfection in the section east of the railroad (see map No. 1), comprising the area in which the outbreak of May-June had occurred, was completed on July 10. The sluicing of privies with the disinfectant solution was a kind of "shot-gun disinfection," it is true, but it probably did some good.

Frequent public addresses were made urging the people generally to cooperate. The local press rendered signal service in arousing and keeping aroused intelligent public sentiment. The cooperation of the medical profession, of the citizens' health committee, of the

commercial club, and of other business organizations in the city was especially solicited and obtained to a gratifying extent. In the writer's opinion the most important single measure to be carried out was the abolishment of insanitary privies and cesspools, and their replacement with either sanitary and properly connected water-closets or sanitary privies. A citizens' sanitary league was formed under the auspices of the commercial club. This league had as its primary and chief purpose the correction of insanitary conditions in respect to human excreta, stable manure, and garbage on premises. Eligibility to membership was constituted by having all residences either occupied or owned by the applicant provided with (1) sanitary water-closets, properly connected with the sewerage system, or sanitary privies, and (2) with sanitary (fly-proof) receptacles in which whatever garbage or stable manure was on the premises could be and would be properly stored for ultimate disposal. In order to become a member the candidate had to present at the headquarters of the league an application setting forth that all the conditions of membership had been complied with and viséed by the health department. After registration and upon the payment of a fee of 25 cents the member would be presented with a button which bore the impressive motto "Do it now." The money collected from the payment of fees was used for charitable work in furtherance of the purposes of the league. The expressed intention of the league was to enlarge the enrolled membership to such an extent that every good citizen would have a feeling of shame if seen on the street without having on one of the distinctive buttons. At the health office an exhibit consisting of models of sanitary privies, manure boxes, garbage cans, and fly traps, of pictures, charts, etc., was open to the public at all hours of the day.

The popular sentiment aroused through the various agencies served not only to cause many individuals to set to work at once, on their own initiative, to put their premises in order, but also to strengthen and facilitate the work of the health department in the enforcement of the laws and regulations. During July and August nuisances were abated at the rate of about 20 a day. During June, July, and August 271 sanitary privies were installed in the place of insanitary privies or cesspools. In the same period 146 residences at which insanitary privies or cesspools had been in use were connected with the water-carriage sewerage system. Sanitary manure boxes were installed at a good rate, and thus the breeding of flies greatly reduced. Extensive trapping of flies was carried on in the business district of the city. Many large traps—some measuring 2 or 3 feet in width and height—were kept on the streets in front of or in the alleys to the rear of business places such as restaurants, grocery stores, livery stables, etc. The trapping was done by interested individuals or

business firms. The writer saw a collection of flies which measured over a bushel and a half and which represented the catch at one place in eight days. In the middle of July, 1911, it was generally agreed by intelligent observers that there appeared to be in North Yakima only about half as many flies as had been usual for the corresponding period of previous years. The public water supply was somewhat improved by the treatment with hypochlorite of lime, but according to the record of the results of the examinations of the water by the city bacteriologist the treatment of the water during the greater part of the period from July 25 to September 20 was far from efficient. It seems, from all the data now at hand, that the reduction accomplished in the prevalence of typhoid fever in North Yakima for the summer and fall of 1911 can be reasonably attributed in but small part, if any, to the improvement in the public water supply.

#### RESULTS OF THE CAMPAIGN.

On September 1, 1911, there were reported as being under treatment in the city of North Yakima only five cases of typhoid fever. Of that number four of the patients had been brought, after onset of illness, from their homes outside of North Yakima to the hospital in the city for treatment, and one of the patients was a man who, though having his permanent residence in the city, had spent the greater part of his time during the 30 days just prior to the onset of his illness away from North Yakima and in different sections of the surrounding country. In view of the splendid spirit of cooperation manifested by the practicing physicians toward the health department of the city, there is every reason to believe that all clinically recognizable cases of typhoid fever developing in North Yakima since May 1, 1911, have been reported to the health office. No accurate records are available, but from the data at hand the writer estimates that there were under treatment in North Yakima on September 1, 1910, between 50 and 100 cases of typhoid fever. Even if the lowest figure is taken, the number of cases on September 1, 1911, was only one-tenth of the number under treatment on the corresponding date of 1910. In other words, the prevalence of the disease, as indicated by the number of cases on hand at the height of the usual typhoid-fever season, showed a reduction for 1911 of over 90 per cent as compared with the average for the several previous years.

From June 13 to September 21, 1911, 24 cases of typhoid fever were reported in North Yakima. Of that number, 20 certainly contracted the infection away from the city and only 4 contracted the infection and developed the disease in North Yakima during that period.<sup>1</sup> For

<sup>1</sup> From September 21 to November 23, 1911, 23 cases of typhoid fever were reported in North Yakima. Of that number 16 were in persons who contracted the infection while away from the city.



the corresponding period of 1910 the writer estimates from the report of deaths and from the data collected by Kelley and Wilber<sup>1</sup> that between 150 and 200 cases of typhoid fever occurred among persons who contracted the infection and developed the disease in North Yakima. It is unfortunate that complete statistics are not available for the purpose of pointing out accurately the very marked reduction in the rate of prevalence of typhoid fever in North Yakima for 1911. The results of the campaign, however, even when estimated most conservatively, are very striking.

North Yakima has demonstrated the effectiveness of reasonable and practicable measures for the prevention of typhoid fever, and has furnished for every community in the world where this preventable disease is highly prevalent an example most worthy of emulation.

#### CONCLUSIONS.

1. The high rate of prevalence of typhoid fever in North Yakima in the summer and fall of the years 1908, 1909, and 1910 was due for the most part to the local dissemination of human excreta from insanitary privies, privy vaults, cesspools, septic tanks, and bedsides of the sick to the mouths of persons by fingers, flies, foods, and water.

2. Exogenous infection introduced into the city through the public water supply, milk supply, and fruit and vegetable supply very probably has contributed from time to time to the prevalence of the disease, but the high rate of prevalence of typhoid fever in North Yakima year after year has been caused chiefly by infection of distinctly endogenous character.

3. The outbreak of typhoid fever in North Yakima in May-June, 1911, was caused beyond reasonable doubt by infection in water pumped either wilfully or by accident from the Cascade Lumber Co.'s mill pond into the city water mains.

4. The prevalence of typhoid fever in North Yakima for the summer and early fall of 1911 was reduced by about 90 per cent as compared with the rate for the corresponding period in previous years by the carrying out of reasonable measures directed especially toward the correction of insanitary local conditions.

5. The results of the campaign against typhoid fever in North Yakima in the summer of 1911 are striking and indicate that the high annual prevalence of typhoid fever in the towns and rural districts generally of Yakima County is amenable to very marked reduction by the application of simple measures for the correction of insanitary local conditions.

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<sup>1</sup> Studies in Typhoid Fever by the Washington State Board of Health during 1909-10, pp. 23-24 and 40.

**RECOMMENDATIONS.**

1. Abolish every insanitary privy, privy vault, cesspool, and septic tank in the city and replace those in the nonsewered areas with sanitary privies.

2. Exercise rigid official supervision over all privies to make sure that they are maintained at all times in sanitary condition.

3. Provide a municipal service for the proper disposal of privy contents.

4. Rigidly enforce laws and regulations requiring every habitation within the publicly sewerred and watered areas to be properly connected with the sewerage system.

5. Extend the public water system and the water-carriage sewerage system as rapidly as possible to reach all sections of the city.

6. Enact an ordinance prohibiting the occupancy of any new or any vacated building until after a permit to occupy has been granted by the health department, the health department to issue such permit only after due inspection and determination that the prospective residence is provided with proper sanitary devices.

7. Rigidly enforce ordinances prohibiting the maintenance on premises of such nuisances as collections of stable manure and garbage not kept in fly-proof containers.

8. Make every day clean-up day for all streets, alleys, and back yards in the city.

9. Have exercised under official supervision at the bedsides of all patients suffering from or suspected to be suffering from typhoid fever rigid precautionary measures to prevent spread of the infection.

10. Safeguard the public water supply by the following measures:

(a) Sanitary patrol of the watershed to prevent pollution of the water with human excreta.

(b) A change of location of the intake so that the water will be received from the river at a point upstream from the mouth of the Tieton River.

(c) An extension of the closed conduit so that the water will be protected from pollution throughout its course from the river to the mains in the city.

(d) Replacement of the old reservoir on Nob Hill, if there be need for a reservoir, with a reservoir constructed either of cement or of other material impervious to water.

11. Pass and strictly enforce an ordinance requiring the purification of the public water supply to such a degree that the water will not contain at any time more than 100 bacteria to the cubic centimeter, nor an average for 10 days of more than 1 colon bacillus to 200

cubic centimeters. The measures for purifying the water suggested for consideration are:

- (a) Adequate treatment with hypochlorite of lime.
- (b) Filtration.

12. Enact an ordinance prohibiting the sale or the offering for sale in the city of any water which may be shown by bacteriological examination not to be within the standard of purity defined in recommendation 11 for the public water supply.

13. Abolish the shallow wells in the city as rapidly as the extension of the public water supply makes practicable, and in the meanwhile prevent, so far as practicable, the use of water from dangerously polluted wells or springs.

14. Rigidly enforce the ordinance passed in May of 1911 for the safeguarding of the milk supply.

15. Enact an ordinance prohibiting the sale or the offering for sale in the city of any milk or green garden truck obtained from farms not provided with either sanitary privies or sanitary water-closets.

16. Enforce, as rigidly as is practicable, measures directed toward the prevention of contamination of any foods or beverages whatsoever in North Yakima by fingers or flies soiled with human excreta.

17. Maintain the strength of the health department so that the city government can perform with reasonable adequacy its duty for the preservation of the health and lives of the people of North Yakima.





FIG. 6.—A SINGLE-SEATED SANITARY PRIVY. (STILES, 1910.)

## APPENDIX A.

### CONSTRUCTION AND MAINTENANCE OF A SANITARY PRIVY.

"The prevention of typhoid fever in the United States to-day depends on an improvement in the present methods of disposing of human excreta. Until all the people can be taught that the most dangerous material with which they come in contact in their daily lives is filth from human bodies, and until their sanitary habits are so changed that human filth is prevented from reaching human mouths, the prevention of typhoid fever can not be consummated." (From the Report of the Committee on Typhoid Fever to the Section on Preventive Medicine and Public Health of the American Medical Association, at the Sixty-second Annual Meeting, held at Los Angeles, June, 1911. Journal Am. Med. Assn., Sept. 9, 1911, Vol. LVII, pp. 891-895.)

A privy to be sanitary must meet the following requirements:

(1) The excreta must be received in a water-tight receptacle (tub, pail, box, barrel, tank, or vault) so that pollution of the soil under and around the privy is prevented, and so that the excreta may be readily removed from the privy and safely disposed of.

(2) Flies and other insects, domesticated animals, and all other living creatures liable to scatter disease germs must be prevented from having access to the excreta.

Any type of privy, no matter how simple and cheap, which meets these requirements is sanitary, and any type of privy, no matter how elaborate and costly, which does not meet these requirements is insanitary.

Two types of sanitary privies are generally recognized, namely, the so-called "dry system" and the so-called "wet system."<sup>1</sup> In the "dry-system" privies, dry earth, wood ashes, or lime is kept in the privy and is sprinkled liberally over the excreta in the receptacle under the privy seat every time the privy is used. In the "wet-system" privies some fluid is used in the receptacle either (1) to disinfect the excreta, or (2) to serve as an insect repellent, or (3) to aid in the liquefaction of the excrement by natural fermentations.

Figures 6 and 7 represent an outhouse which may be used either as a "dry system" or as a "wet system" privy. Note (1) the water-tight receptacle under the seat, (2) the screening (*w*) over the ventilators to keep out flies, (3) the cover (*k*) over the seat to prevent flies, which may occasionally get into the house as persons pass in and out through the door, from having access to the excreta in the receptacle, and (4) the back trapdoor (*oc'*) to prevent animals from having access to the receptacle. The trapdoor should be kept closed down except when the receptacle is being removed or replaced. If the location of the privy is such that there is no particular advantage in removing the receptacle, for the purpose of emptying and cleansing it, through the rear of the house the construction of the privy may be simplified somewhat by having the back of the house boarded up solidly and the seat and

<sup>1</sup>The construction and the advantages and the disadvantages of different types of privies are given in detail in a recent article prepared by C. W. Stiles and L. L. Lumsden and published by the U. S. Department of Agriculture as Farmers' Bulletin 463. Copies of this bulletin, entitled "The Sanitary Privy," may be obtained without cost by sending a request to the Department of Agriculture or to a Congressman.

the receptacle arranged as in figure 8. In fact, the receptacle with the seat and framework over it, as shown in this figure, may be placed in one of the outhouses, such as the barn, stable, or a shed already on the premises—thus saving the expense of building a special house for the purpose. If the receptacle is of sufficient stoutness to support the weight of a person sitting on it the contrivance may be still further simplified by dispensing with the box around the receptacle and having only a simply constructed and readily removable seat fitted tightly over the top of the receptacle, as indicated in figure 9. Whatever place the contrivance is kept in for use should be screened, otherwise flies are very liable to gain access occasionally through the hole in the seat to the excreta in the receptacle. This is particularly true if all persons using the contrivance are not very careful to keep the cover over the hole closed down except when the seat is occupied.

As a receptacle for the excreta any vessel which is water-tight may be used. The half of an oil barrel or a vinegar barrel, an ordinary wooden tub, a tin pail, a stone jar, a box made of boards and either zinc lined or heavily tarred, or even an ordinary candy bucket, which costs only 10 cents, will serve the purpose; but for safety, convenience, and (in the long run) economy, a tub, can, or pot made of iron and which will withstand repeated heatings to the boiling temperature has advantages. The receptacle should fit snugly under the seat so that there will be no space between the framework of the seat and the top of the receptacle through which flies or other insects may pass.

The privy should be maintained so that the contents of the receptacle will be free from decidedly disagreeable odors and in such form as to be conveniently removable for safe ultimate disposal. It is much safer to keep a disinfectant solution in the receptacle, so that all disease-producing bacteria in the excreta will be killed as the excreta are deposited in the privy, than it is to use a disinfectant only when the receptacle is to be emptied.

If dry earth, wood ashes, or dry air-slaked lime are sprinkled liberally over the excreta in the receptacle every time the privy is used the privy contents will be kept free from markedly disagreeable odors, but not all disease germs in the excreta will be killed, and the contents of the receptacle, being solid, can not be disinfected so readily and disposed of so conveniently and safely as they can be if kept in liquid form. If water is added and sufficient time allowed the natural fermentation or septic action will liquefy the excrement, and, due to evaporation and the evolution of gases, may lessen somewhat the volume of the excreta to be disposed of. If this "wet system" is applied to the ordinary type of sanitary privy (see fig. 7) the receptacle should be filled about one-fourth full of water and a cup of petroleum poured on the surface of the water to serve as an insect repellent. Two sets of receptacles should be provided. While one set is being used under the seat the other set should be covered and permitted to stand for about a week so as to lengthen the period of fermentation. The disadvantages of this system are the splashing, the frequency of emptying needed to prevent offensiveness, the liability to freezing, the expense of an extra set of receptacles, and the care needed to prevent the liquefied but still potentially infectious excreta from being split about when the cans are being removed or emptied. These disadvantages appear to more than surmount the slight advantages to be obtained from the natural fermentation or septic action, and in maintaining the ordinary type of sanitary privy (figs 7, 8, and 9) it seems much safer to use a disinfectant solution in the receptacle.

A disinfectant may be used conveniently and cheaply and under practically all climatic conditions as follows: Keep a vessel containing the disinfectant solution in or convenient to the privy and every time the privy is used for



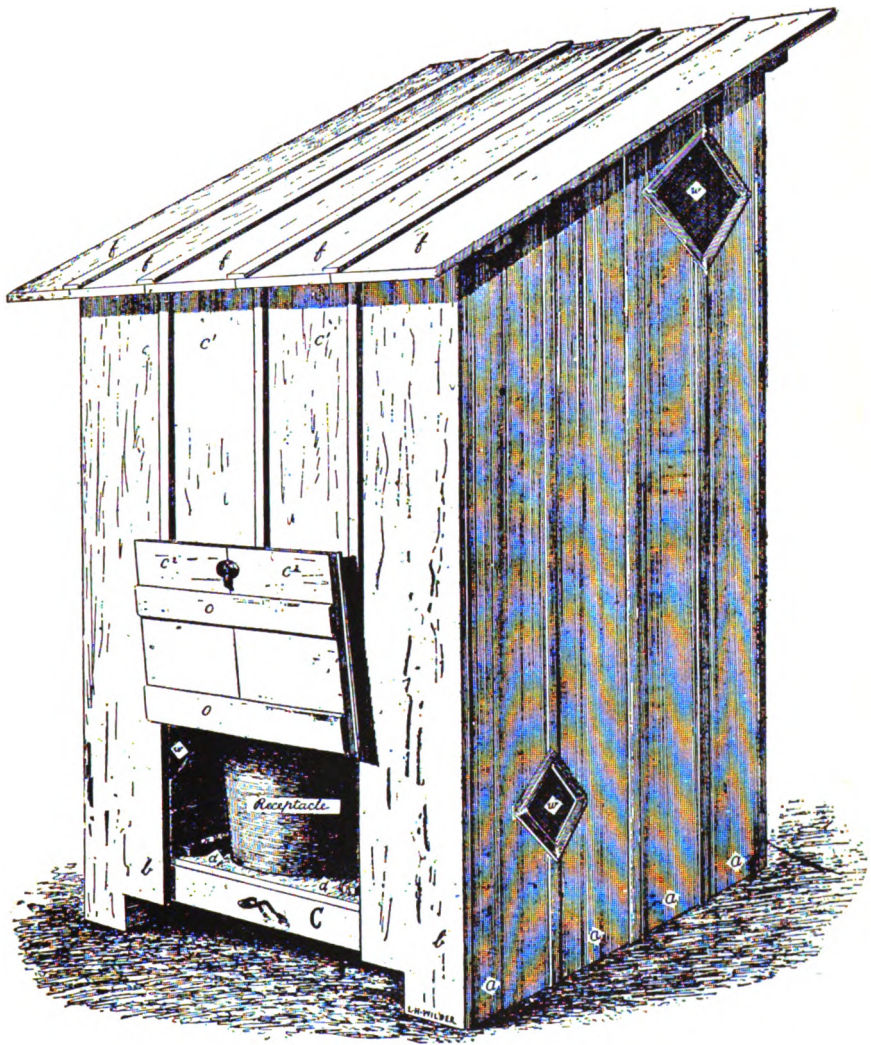


FIG. 7.—REAR AND SIDE VIEW OF A SINGLE-SEATED SANITARY PRIVY.  
(STILES, 1910.)



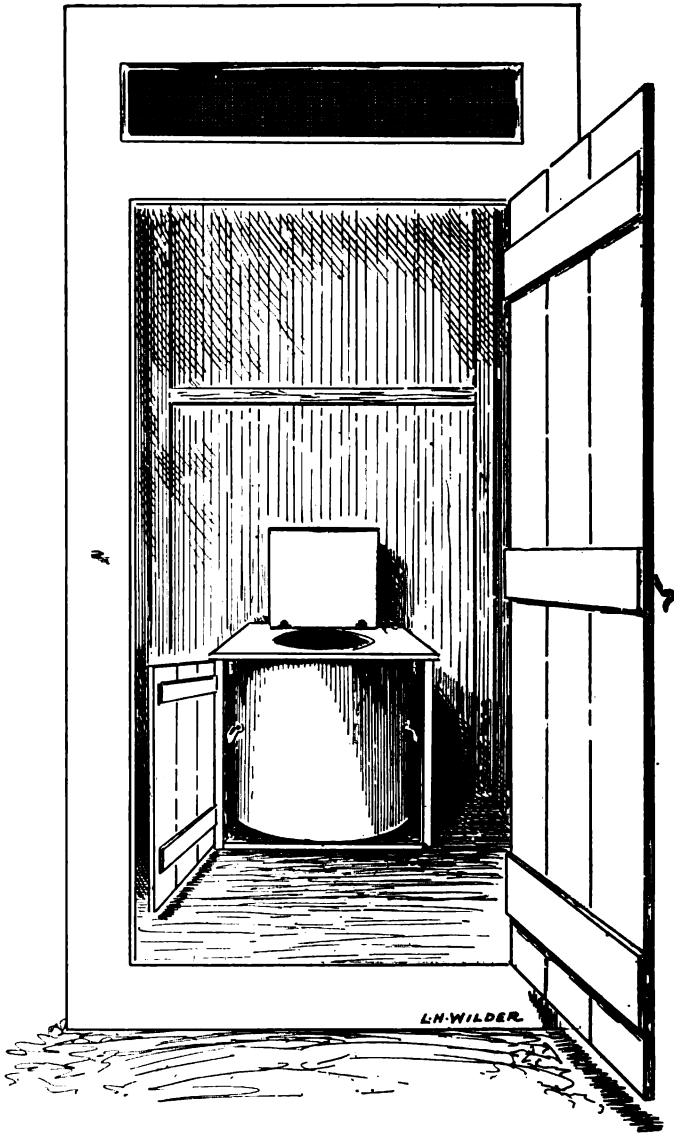


FIG. 8.—SANITARY PRIVY CLOSED IN BACK.

Box encasing receptacle is detached from structure of the house. Such a com-  
mode may be kept for use in a room in the dwelling house or in a barn or  
stable.

defecation or urination, or both, pour about 1 pint of the solution into the receptacle. As the solution is added along with the excreta and the toilet paper the contents of the receptacle will be kept at a sufficient consistency to prevent objectionable splashing, and will be also free from decidedly objectionable odor. Furthermore, since most or all of the disease-producing bacteria in the excreta will be killed by the disinfectant solution, the chances for the occasional fly which may gain access to the contents of the receptacle to spread infection from the excreta will be greatly lessened. When the receptacle has become about two-thirds full it should be filled nearly to the top with the disinfectant solution and left standing for an hour or two, or more when convenient, before being emptied. For ultimate disposal privy contents treated in this way may be emptied in the manhole of a sewer (when practicable) or buried. If burial is resorted to the matter should be deposited not less than 300 feet from and downhill from any sources of water supply and not less than 2 feet underground.

Since chemical disinfectants can not be relied upon to destroy certain animal parasites liable to be in human excreta, chemically treated night soil should not be used as fertilizer, nor thrown out on the surface of the ground, nor carelessly buried.

Any one of the following disinfectant solutions may be used in the way described above for maintaining a "wet-system" privy:

(1) *Chloride-of-lime solution.*—Add 1 pound of good (fresh) chloride of lime to 8 gallons of water. Shake well and keep the solution in a well-stoppered vessel. This solution has the great advantage of cheapness and is thoroughly efficient. Dry chloride of lime which is exposed to the air rapidly loses its disinfectant properties. Chloride-of-lime solution if exposed to the air gradually loses its disinfectant properties. These facts should be kept in mind and precautions taken accordingly in the preparation and storage of the solution.

(2) *Quick lime solution.*—Made by adding good unslaked lime to water in the proportion of 10 pounds of lime to 10 gallons of water, just in the way that ordinary "whitewash" is made. Lime which has become air-slaked will not make a reliable disinfectant solution. Lime which does not steam up when added to water is not good. A barrel of milk of lime or "whitewash" can be made up conveniently at one time and kept with a tight-fitting cover over it in or near the privy and the solution added to the contents of the privy receptacle as needed. The milk of lime should always be well stirred up before being used.

(3) *Carbolic-acid solution.*—Add 1 pint of carbolic acid to 19 pints of water. If the ordinary "crude carbolic acid," which is only slightly soluble in water, is used, some soap or caustic potash or soda should be added to make a uniform emulsion. Carbolic solution has the advantage of retaining its disinfectant properties when exposed to the air, but has the disadvantages of being a dangerous poison and of being more expensive than solutions (1) and (2).

If a suitable (metallic) vessel is used for the receptacle, a fire may be built under the vessel and the excreta heated to boiling temperature (212° F.). If a wooden or concrete tank is used, the excreta may be transferred to some other vessel for heating. After disinfection by heat human excreta may be safely used for fertilizer.

From what has been said above it is clear that some intelligent care, labor, and expense are required to maintain a privy in sanitary condition. The results in the saving of human life and health and in the prevention of economic loss unquestionably more than justify the cost.

In every community where it is practicable an efficient scavenger service under proper official direction should be provided for the care of privies and for the disposal of night soil. It has been found that when this work is left entirely to private families a sanitary condition of the privies in many instances will not be maintained.

Whatever can be done in simplification and in lessening expense and labor in the installation and maintenance of a safe system for the disposal of human excreta will increase the chances for its adoption.

#### THE L. R. S. PRIVY.<sup>1</sup>

An effort has been made to construct a device which will decrease the disadvantages and at the same time increase the advantages connected with the older types of privies. The results obtained from various experiments have been applied to an apparatus known as the L. R. S. privy. (Figs. 10, 11, 12, and 13.)

This apparatus consists of the following parts:

(1) A water-tight barrel or other container to receive and liquefy the excreta.

(2) A covered water-tight barrel, can, or other vessel to receive the effluent or outflow.

(3) A connecting pipe about 2½ inches in diameter, about 12 inches long, and provided with an open T at one end, both openings of the T being covered with wire screens.

(4) A tight box, preferably zinc lined, which fits tightly on the top of the liquefying barrel. It is provided with an opening on top for the seat, which has an automatically closing lid.

(5) An antislashing device, consisting of a small board placed horizontally under the seat about an inch below the level of the transverse connecting pipe. It is held in place by a rod, which passes through eyes or rings fastened to the box and by which the board is raised and lowered. The liquefying tank is filled with water up to the point where it begins to trickle into the effluent tank.

As an insect repellent a thin film of some form of petroleum may be poured on the surface of the liquid in each barrel.

*Practical working of the apparatus.*—When the privy is to be used, the rod is pulled up so that the antislashing board rises to within about 1 inch below the surface of the water. The fecal material falls into the water, but this board prevents splashing, and thus overcomes one of the greatest objections thus far raised to the wet system. After use the person sinks the antislashing board by pushing down the rod, and the fecal matter then floats free into the water.

Although some of the fecal matter floats, it is protected both from fly breeding and fly feeding in the following ways: First, by the automatically closing lid; second, by the water; third, by the film of oil; and fourth, by having the apparatus located in a screened place, which should be done for additional safety. The film of oil also prevents the breeding of mosquitoes in the barrel. Accordingly, so far as the privy as a breeding or feeding place for flies and mosquitoes is concerned, the model in question completely solves the problem.

<sup>1</sup> Lumsden, Roberts, and Stiles: "Preliminary note on a simple and inexpensive apparatus for use in the safe disposal of night soil." Public Health Reports, 1910, Nov. 11, v. 25 (45), pp. 1623-1629. Stiles and Lumsden: *The Sanitary Privy*. Farmers' Bulletin 463 (U. S. Department of Agriculture), pp. 17-21.

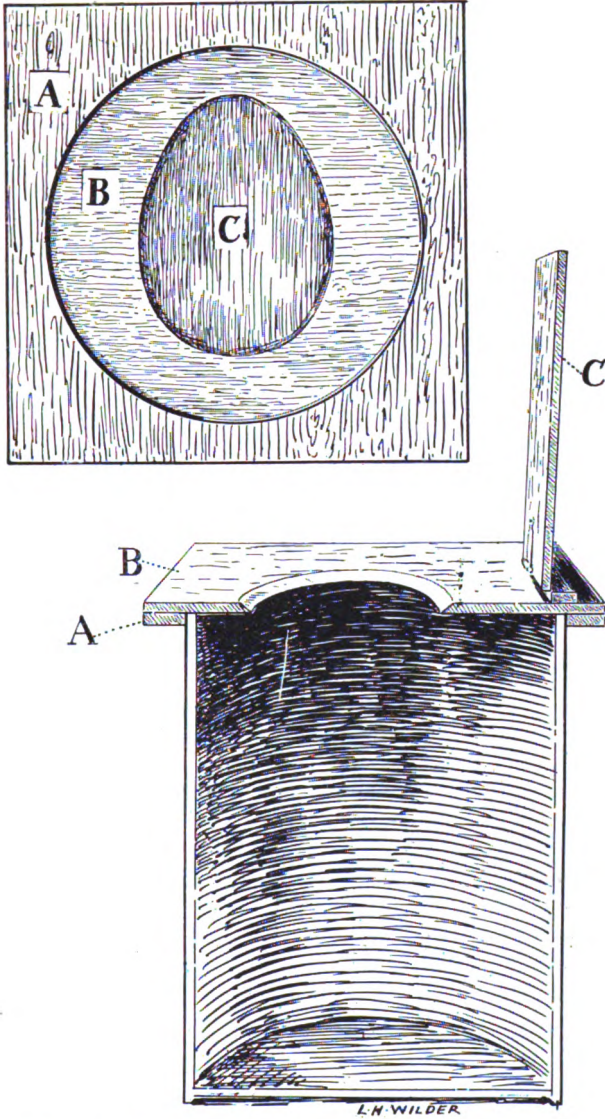


FIG. 9.—A SINGLE SANITARY DEVICE CONSISTING OF A RECEPTACLE, THREE BOARDS, A FEW NAILS, AND A HINGE.

The board A is sawed so as to fit snugly around the top of the receptacle, and is nailed to board B. The board C is fixed with a hinge on top of board B. Such a device may be kept for use in any suitable place on the premises.

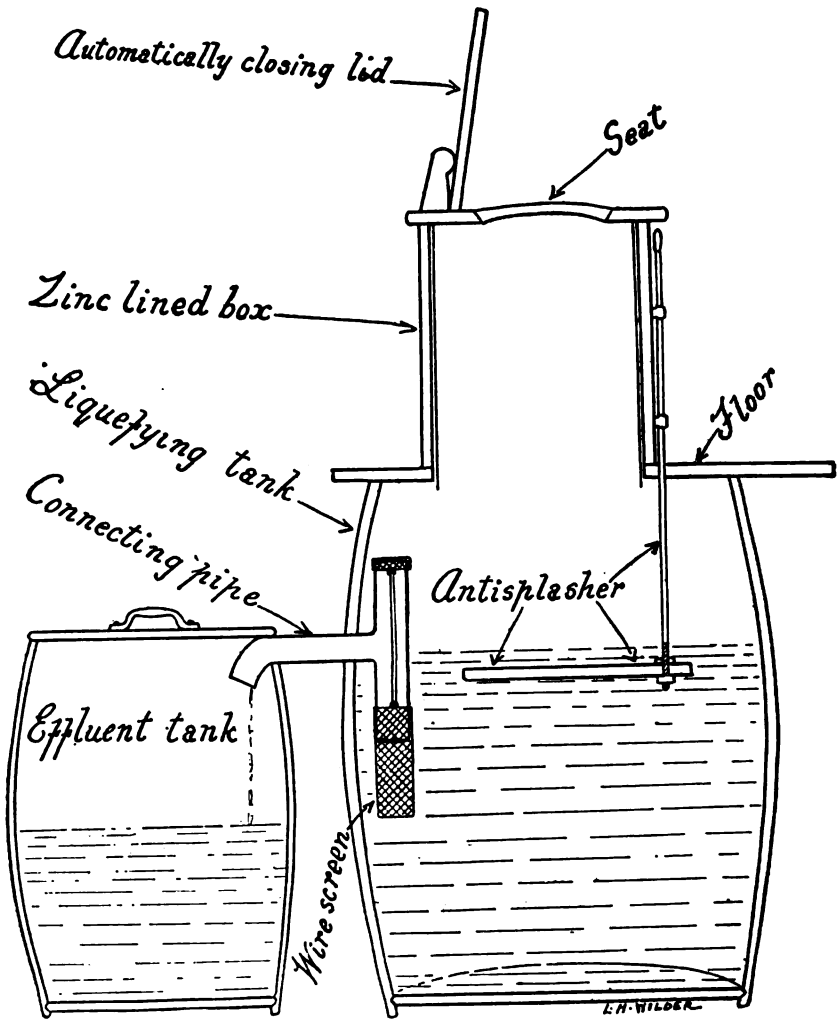


FIG. 10.—THE ORIGINAL L. R. S. PRIVY (LUMSDEN, ROBERTS, STILES, 1910).

The fecal material becomes fermented in the water and gradually liquefies. As the excreta settle the level of the liquid is raised and the excess flows into the effluent tank, where it is protected from insects by the cover and a film of oil. This effluent may be allowed to collect in the tank until it reaches the level of the connecting pipe, when it may be safely disposed of in any one of the following ways:

(1) *Heat*.—Heat to boiling and then bury, or, if desired, it may be safely used after boiling as fertilizer.

(2) *Chemical disinfection and subsequent burial*.—A suitable combination of these two methods may be used certainly with reasonable safety.

(3) *Sewers*.—In partially sewered towns the effluent may be emptied into the sewers.

It is thus seen that this device appears to meet the following requirements:

(1) It solves the fly problem and the mosquito problem, so far as the privy is concerned.

(2) It liquefies fecal material and reduces its volume, so that it may be safely disposed of more easily and cheaply than the night soil from other types of privies.

(3) It reduces odor.

(4) It reduces the labor of cleaning the privy and makes this work less disagreeable.

(5) It is of simple and inexpensive construction.

This device has been in constant operation in one of the workrooms on the main floor of the Hygienic Laboratory at Washington for 15 months and has been found entirely satisfactory. From July 12, 1910, to April 1, 1911, namely, 262 days, it was used 738 times, giving an average of 2½ defecations (with urination) per day. The amount of overflow (effluent) from the liquefying tank was 59 gallons. The liquefying tank itself consists of an ordinary water-tight 40-gallon whisky barrel, and it was not necessary during the period of experimentation (8 months) either to add water or empty it.

Tests of this device are now being made in out-of-doors privies in order to determine the effect upon it of varying conditions of temperature and humidity. Tests are also being made to bring out whatever objectionable features may arise in connection with its general use and to determine the simplest methods of managing the device so that any family may keep it in proper working order without difficulty.

The handle of the antislasher should come up through the seat board at the side of the hole. By this arrangement the antislasher can be raised entirely out of the water and thus used to sink the toilet paper and fecal matter if too much floats on the surface. (Fig. 12.)

As an effluent tank various receptacles can be utilized. If an iron pot is used, it can be placed on stones or provided with legs, so that a space is left under it to permit the building of a fire and the effluent easily and cheaply disinfected by heat.

As a liquefying tank one may use either a barrel (fig. 10) or an iron tank, or a box (fig. 11), or a brick vault, or a concrete vault (fig. 13). Whatever is used for this purpose must be strictly water-tight. Iron or concrete will cost more than wood, but on account of greater durability will be more economical in the long run.

The larger the family the larger the liquefying tank must be. A 40-gallon barrel, such as a whisky or oil barrel, seems sufficient for a family of three adults. For a larger family the capacity should be increased by using two

or more barrels or one larger receptacle, in the proportion of about 40 gallons' capacity to every three or four adults in the family.

One advantage the device possesses is that with very little expense it can be put in the outhouses already in use; in fact, it can be placed in any of the outhouses on the farm, such as barn or woodshed, and thus save the expense of building for this special purpose. Wherever put, it is very important to have it in a place screened against flies.

From the out-of-door experiments thus far it can be readily foreseen that two factors come into consideration which have not been found important in the indoor privy, namely, evaporation and changes of temperature.

In cold weather the contents of the tank may freeze, or, due to lessened fermentation, gradually become thickened.

The evaporation out of doors will vary greatly with the wind, humidity, and temperature in different regions, and the greater the evaporation the thicker the material in the liquefying tank becomes.

Should such thickening occur the odor will increase, and it will be necessary to add water to the liquefying tank. In order to prevent such thickening it may be found necessary in some instances to add water from time to time. Just how often and how much water should be added under adverse conditions has not yet been determined, but, so far as can be foreseen at present, probably a bucketful (about 2 gallons) added once a week will be sufficient for a single barrel used by a family of three or four adults.

Experiments have conclusively demonstrated that the principle of the L. R. S. privy is good. The details regarding the addition of water must be determined experimentally in different localities. Any intelligent man should be able to determine this point for his own locality.<sup>1</sup>

If this type of privy is managed fairly intelligently, the indications are that the liquefying tank will rarely need cleaning, probably not more than once a year. When cleaning does become necessary, this can be done in several ways: The tank may be taken out, and its contents burned or boiled; or the contents may be pumped or dipped out and burned or boiled; or a considerable amount (several barrelfuls) of water can be poured gradually into the liquefying tank and the sludge thoroughly stirred until it runs over into another vessel.

In the experimental L. R. S. privy the only paper used has been the regular toilet paper. This has liquefied with sufficient promptness. If heavier paper (such as newspaper) were used, this would break up more slowly, and allowance for it might have to be made by increasing the capacity of the tank. It is well to bear in mind the fact that the ink on newspaper is likely to irritate the skin. Corncobs and similar objects would certainly interfere materially with the successful working of any apparatus of this kind.

The device is better adapted for sections having warm or moderate climates than for those having long cold winters. But if the apparatus were kept in a room with a temperature maintained above the freezing point, or if the liquefying tank were sunk in the ground below the freezing line, or embedded in a pile of stable manure, or otherwise protected against freezing, the indications are that it could be operated successfully even in cold climates. Since the same outhouse may be operated either as a pail-system privy or as an L. R. S. privy, it probably would be convenient in some localities to alternate the systems with the seasons, the L. R. S. system being used during the warm-weather months, which are the months of greatest danger from excreta-borne infections, and the pail system during the cold-weather months.

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<sup>1</sup> It should be understood that the L. R. S. privy is described simply as a type and may be modified to suit varying conditions.

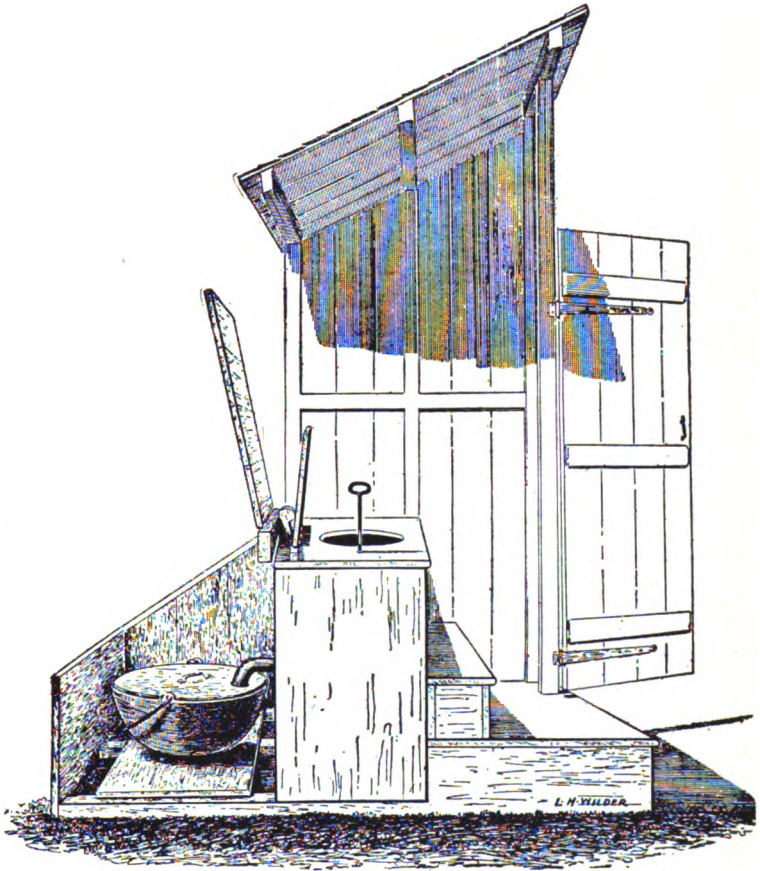


FIG. 11.—INSIDE VIEW OF L. R. S. PRIVY (STILES AND LUMSDEN, 1911).  
The liquefying tank may be of wood (zinc lined or heavily tarred) or of iron.



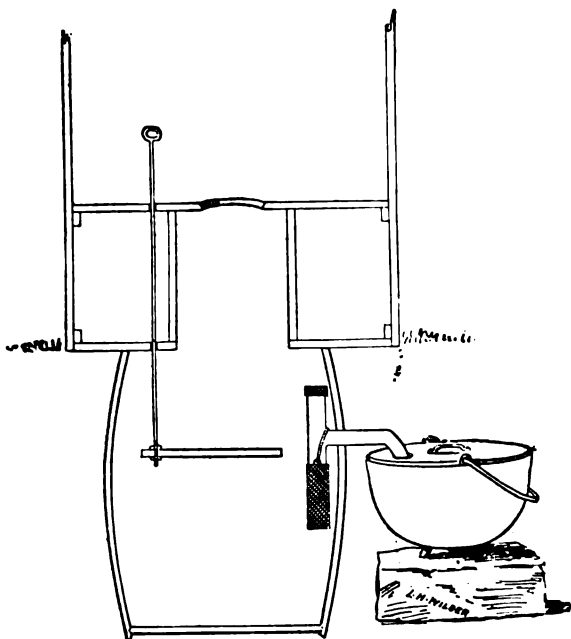
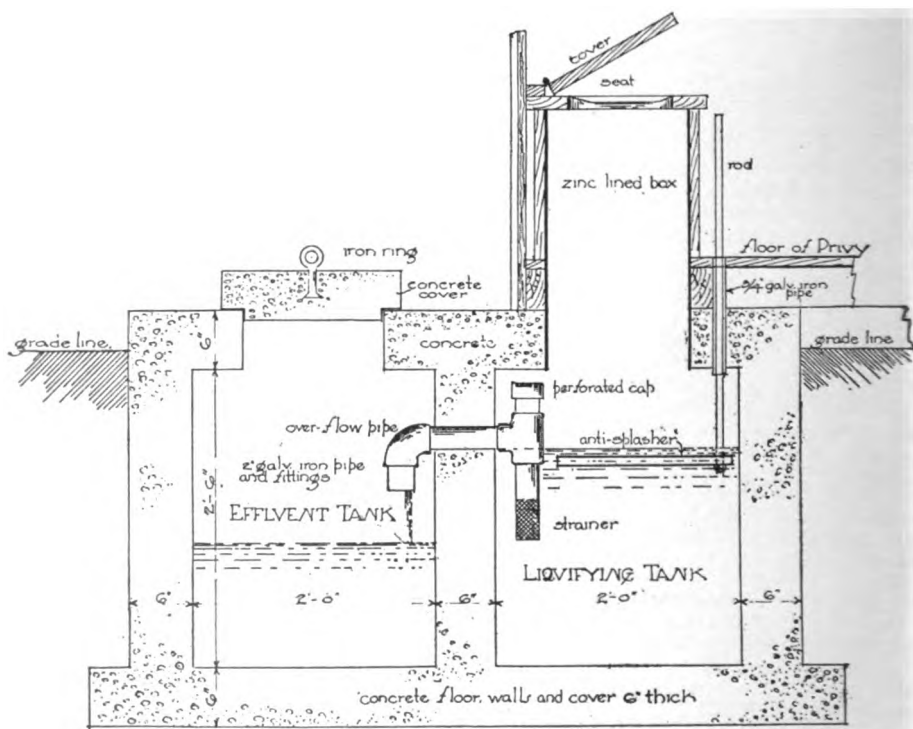


FIG. 12.—IMPROVED L. R. S. PRIVY. (STILES AND LUMSDEN, 1911.)



SECTION THROUGH CONCRETE TANKS & SEAT

FIG. 13.—CONCRETE TANKS AS A MEANS OF PERMANENCY IN USING THE L. R. S. METHOD.

This has all the advantages had by the barrels and will last indefinitely. It will cost more, perhaps, in the beginning than barrels, but in the end be cheaper. (Ferrell, 1911.)

## BILL OF MATERIAL AND DIRECTIONS FOR CONSTRUCTING PERMANENT CONCRETE TANKS.

[By John A. Ferrell, M. D., assistant secretary for hookworm disease to North Carolina Board of Health, Raleigh, N. C.]

To construct the concrete tank as a modification of the L. R. S barrel privy (fig. 13), excavate a pit at the site selected for the privy 3 feet 2 inches deep and slightly larger than the outside dimensions of the tank. The bottom of the excavation should be perfectly level to receive the concrete forming the floor for the tank.

Build the forms to the dimensions given on drawings, the outer form to be 3 feet wide by 5 feet 6 inches long, inside measurements. The two inner forms should be 2 feet square, outside measurements. When the two inner forms are set inside of the outer form there should be 6 inches left all around and between the inner forms, so that when filled all walls and the partition between the tanks will be 6 inches thick.

Mix the concrete in the proportions 1 part Portland cement, 2 parts clean sharp sand, and 4 parts clean creek or bank gravel free from loam or other foreign matter, or crushed stone of a size to pass a  $\frac{3}{4}$ -inch mesh screen. In mixing the materials the sand should be first spread in a mortar box or on a tight platform or mixing board, and the cement spread on top of the sand; the sand and cement should first be mixed dry, and then wet and mixed until it shows a uniform color. The gravel should be spread over the mortar and the whole batch turned over at least three times and until the gravel or stone is all incorporated into the batch and the consistency uniform throughout. Sufficient water should be added to make a wet mixture that will flow into place in the forms, and that can be puddled against forms with a shovel or tamping bar.

In depositing the concrete, first put down a 6-inch layer on the bottom of the excavation and puddle and tamp into place with a shovel or tamping bar. Next set up the forms on this base, keeping the spacing by using spacing blocks of wood cut 6 inches long, set between the forms. These blocks should be removed as soon as enough concrete is deposited in the bottom of the forms to hold them in place. The concrete should be well puddled and tamped against forms in order to insure a dense and water-tight wall.

The lid for the effluent tank can be cast in a mold of the required dimensions, and should have an iron ring embedded in the top while the concrete is green, to serve as a handle in lifting the cover.

In order to use the sanitary privy shown by accompanying cuts (figs. 6, 7, and 10) with this tank system, it is only necessary to line the space occupied by the can with zinc, cut a hole in the floor under the seat and immediately over the liquefying tank, and provide a float with rod, as shown by drawings.

Materials required for one concrete liquefying and effluent tank, as shown by drawings:

Walls and floor 6 inches thick.

Two and a half barrels Portland cement.

Three-fourths yard of sand.

One and one-fourth yards clean gravel of a size to pass a  $\frac{3}{4}$ -inch mesh screen and under.

One hundred and fifty feet  $\frac{3}{4}$ -inch surfaced sheathing for forms.

One overflow pipe built up out of 2-inch galvanized-iron pipe and fittings, and with strainer and zinc lining for box under seat.

One piece  $\frac{3}{4}$ -inch galvanized-iron pipe 12 inches long, to act as a guide for antislplash rod. This pipe should be run through an augur hole in the forms before the concrete is poured and plumbed up to come level with privy floor.

The antislplash rod can be a  $\frac{1}{2}$  or  $\frac{3}{8}$  inch heart pine or hardwood rod let into augur hole in the antislplash and fastened with a brad.

Oil or vinegar barrels (fig. 10) can be used for tanks if a cheaper and less permanent construction is desired. The barrels to be sunk below the surface of the ground or set on the surface and a platform and steps provided up to entrance. If set at the surface of the ground, additional materials will be required to board up around privy from the surface of the ground to floor line and for platform and steps, the quantity required depending on the height at which the tanks are set above the grade line.

## APPENDIX B.

### MEASURES TO PREVENT THE SPREAD OF INFECTION FROM THE BEDSIDE OF A TYPHOID-FEVER PATIENT.

"The means by which typhoid fever may be prevented from spreading are very simple, very sure, and their cost next to nothing." (William Budd. Typhoid Fever. London, 1873.)

"The case of typhoid fever now in your house was caused by the ignorance or the carelessness of some one; don't let your carelessness cause the illness, and maybe the death, of others." (Health Department of Richmond, Va., 1909.)

Typhoid fever is communicable from the sick to the healthy. The disease is both "infectious" and "contagious." Every person who has typhoid fever has recently swallowed some typhoid germs which have come in some way from some other person. The germs (the infection) of typhoid fever leave the body of a person sick with the disease in the stools and urine. A number of these germs may be contained in a particle of feces or in a droplet of urine too small to be seen by the unaided human eye. Fingers soiled to the slightest extent with the excreta from a typhoid-fever patient and flies which have had access to such excreta may carry typhoid germs directly to human mouths or to beverages and foods which are subsequently to be swallowed by persons. If excreta from typhoid-fever patients are carelessly disposed of, they may be carried by seepage or drainage, on the feet of animals, and in other ways to water supplies and to certain fruits and vegetables. Infection in water may be transmitted to milk, oysters, and other foods.

In these various ways the infection proceeding from the discharges of the typhoid-fever patient may be distributed far and wide.

To prevent the spread of infection from a typhoid-fever patient the following measures should be rigidly carried out:

(1) *Disinfect the stools and urine (and the expectoration if there be any) immediately upon their escape from the body.*—Keep constantly in the bedpan or other vessel used to receive the discharges a small quantity of the disinfectant solution. As soon as the stools or urine are received in the vessel add a quantity (1 to 2 pints) of the disinfectant solution equal in volume to about double that of the excreta to be disinfected. Wipe the soiled parts of the patient first with dry paper and then with paper or a cloth moistened with a solution made by adding 1 part of the disinfectant solution for use in the bedpan to 2 parts of water. If clothes are used, they should be either burned or thrown into a vessel containing the full-strength disinfectant solution and afterwards boiled in the solution. The paper which has been used for wiping should be submerged in the disinfectant solution in the bedpan. The disinfectant solution and the excreta should be mixed thoroughly, and if there are lumps of fecal matter they should be broken up, because disinfectants can not kill germs unless brought in actual contact with them. Cover the vessel containing the excreta and disinfectant solution and let it stand for about one hour before emptying. The disinfected excreta should be emptied into a water-closet or a sanitary privy, or else into a hole in the

ground at least 2 feet deep, dug especially for the purpose, protected against invasion by animals, and remote from wells, springs, or other sources of water supply. If deposited in the ground, the excreta should be kept thoroughly covered with earth. After being emptied, the bedpan should be thoroughly rinsed inside and out with the disinfectant. One of the best disinfectants for the stools and urine is chloride of lime solution, made by adding one-half pound of good chloride of lime to 2 gallons of water. A fresh solution should be made up every day, or if a supply for several days is prepared at one time the solution should be kept in a practically air-tight vessel. An ample quantity of the disinfectant solution should be kept in the patient's room, convenient for use at all times. Carbolic acid (1 part to 19 parts of water) and formalin (1 part to 9 parts of water) are thoroughly efficient disinfectants for stools and urine, but much more expensive than chloride of lime. If carbolic acid or formalin solutions are used, they should be applied in the same quantity and in the same way as described above for the chloride of lime solution. Only disinfectants of thoroughly recognized efficiency should be used. Many of the patented preparations advertised as "disinfectants" or "germicides" have little or no germ-destroying property. If good chemical disinfectants are not immediately available, the stools and urine may be disinfected with boiling water as follows:

Pour into the vessel containing the excreta an ample quantity (a quart to a half gallon, or at least three or four times as much as the volume of stools and urine to be disinfected) of actually boiling (and bubbling) water. After the boiling water is added, cover the vessel and let stand for one-half hour before emptying.

(2) *Disinfect promptly (and certainly before removal from the room) everything which may possibly have become soiled to the slightest extent with either the stools or the urine of the patient.*—Great care should be exercised to prevent so far as practicable the articles in the room from becoming soiled with the slightest (even microscopic) quantities of the patient's excreta. In preparing the room for the care of the patient, all unnecessary hangings, draperies, and upholstered furniture should be removed. The room should be clean, well ventilated, and furnished only with articles which may be readily and thoroughly cleansed. Textile carpets and rugs should be removed and replaced, if need be, with linoleum. The room should be freed and kept freed from flies and other insects. Dogs, cats, and other domestic pets should be kept out. The mattress of the bed should be protected from soiling by keeping a rubber sheet or folds of paper (newspapers will do) placed over it and under the bed sheet. It is decidedly advantageous to dispense with bed-clothes for the patient's body which extend below the abdomen. Bed linen, towels, and other clothes used about the patient should be placed in a tub, washbowl, or other vessel containing sufficient disinfectant solution to cover them thoroughly and boiled in the solution before being washed at home or sent out to be washed. Chloride of lime solution (2 ounces of the powder to the gallon of water) or carbolic acid solution (6 tablespoonfuls of the 95 per cent acid to the gallon of water) may be used as the disinfectant. Water which has been used for bathing the patient should be disinfected, by adding  $\frac{1}{2}$  ounce of chloride of lime to each gallon of the water, before being thrown out. Spoons, dishes, glasses, etc., used by the patient should be placed in a disinfectant solution and boiled before being washed for further use. So far as is practicable, articles removed from the sick room, even after immersion in a disinfectant solution, should be kept away from the kitchen and dining room used for the preparation of foods for the well members of the household.

(3) *Have all persons who have been in the patient's room disinfect their hands upon leaving the room.*—A basin of disinfectant solution should be kept at all times on a stand or chair next to the door, so that all persons leaving the room can conveniently soak their hands in the solution before going out. This should be required not only of those who have touched the patient, or the bedding of the patient, but of all who have come into the room, because the hands may receive infection from touching anything in the room. The attending physician, especially, should set a good example by disinfecting his hands thoroughly upon leaving the bedside. Those who have handled the patient, the bedding, or the bedpan, and so have been especially likely to get infection on their hands, should, before touching foods for themselves or others and before putting their fingers to their mouths for any purpose, disinfect their hands as follows:

- (1) Soak in the disinfectant solution for several minutes.
- (2) Scrub with soap and warm water.
- (3) Dip again into the disinfectant solution or wash with alcohol (95 per cent).

Any one of the following may be used as a disinfectant solution for the hands:

- (1) Chloride of lime, 1 tablespoonful to 1 quart of water.
- (2) Carbolic acid (95 per cent pure), 6 tablespoonfuls to 1 gallon of water.
- (3) Lysol, 3 tablespoonfuls to 1 gallon of water.
- (4) Bichloride of mercury, 15 grains to the quart of water, or 1 part of the bichloride to about 1,000 parts of water.

(4) *Have the patient's room thoroughly screened to keep out flies and kill all flies which get into the room.*—All windows and doors should be screened. Mosquito netting will serve for temporary screening. All flies which get into the room should be either caught on sticky fly paper or in traps or killed with "swatters." Flies caught or killed should be burned.

(5) *Isolate the patient to a reasonable extent.*—Although one is not liable to get the disease by breathing the air of the room or house occupied by the patient, persons who go into the sick room may touch infected things and afterwards carry infection directly to their own mouths, or through touching foods, by shaking hands, and in other ways carry infection indirectly to the mouths of other persons.

It is better for the patient and for all other persons in the community for all unnecessary visitors to be kept out of the patient's room. As a rule, only those needed in the actual care of the patient should be permitted in the room. If visitors do enter the room, they should be required to exercise, under the supervision of the regular attendants, all due precautions while in and upon leaving the room. It is particularly inadvisable to permit children to go into the sick room.

(6) *Continue precautionary measures as long as the discharges from the person recovering or recovered from typhoid fever are infectious.*—Disinfection of the excreta and of all things liable to have become soiled with the excreta should be continued for at least two weeks after the person affected has recovered from all clinical manifestations of the disease, and, whenever practicable, until it has been determined by bacteriological examinations that the excreta are no longer infectious. Persons recovered from typhoid fever should be especially careful, for at least two months after recovery, about their toilet and about washing thoroughly their hands immediately after going to stool or to urinate.

(7) *Disinfect the room and all articles in the room upon the termination of the case.*—The room should be fumigated with some gaseous disinfectant, such as formaldehyde or sulphur dioxide. Before fumigation the room should be made as nearly air-tight as possible and surface exposure of all things in the room, such as bureau draws, bedding, etc., secured as thoroughly as practicable. Formaldehyde may be generated conveniently by mixing formalin and permanganate of potassium in a bucket or tub. They should be used in the proportion of 2 pints of formalin to 1 pound of permanganate. One pint of formalin should be used for each 1,000 cubic feet of space and the gas left in the room for six hours. After fumigation of the room the floors, walls, and woodwork should be scrubbed with a disinfectant solution such as chloride of lime solution (strength 1 to 64) or bichloride of mercury solution (strength 1 to 500) and the room aired thoroughly and sunned as thoroughly as practicable. The bed clothes and other textile materials in the room should be soaked in a disinfectant solution and then boiled. The mattress should be burned, soaked in a disinfectant solution, or disinfected in a steam chamber. If the mattress has not been obviously soiled with the excreta, it may be rendered reasonably safe after having been exposed to the gaseous disinfectant by sponging its cover with a disinfectant solution and then keeping it out of doors thoroughly exposed to sun and air for about a week.

If the proper precautionary measures can not be thoroughly carried out in the home where there is a typhoid-fever patient, the patient should invariably be taken for treatment to a hospital or some other place where the precautionary measures can and will be carried out.

To follow the instructions given in and under the (above) seven captions is some trouble, but not as much as will be the caring for a second case in the home.

Where such measures are strictly carried out, the spread of infection from the typhoid-fever patient will be prevented; where they are neglected, the fever may become widespread and cause much needless suffering and loss of life.





# MAP OF NORTH YAKIMA, WASHINGTON.

WATER MAINS

1911.

— PREPARED BY —  
*A. L. Ostrander*  
— CITY ENGINEER —

A. L. Ostrander  
DRAFTSMAN

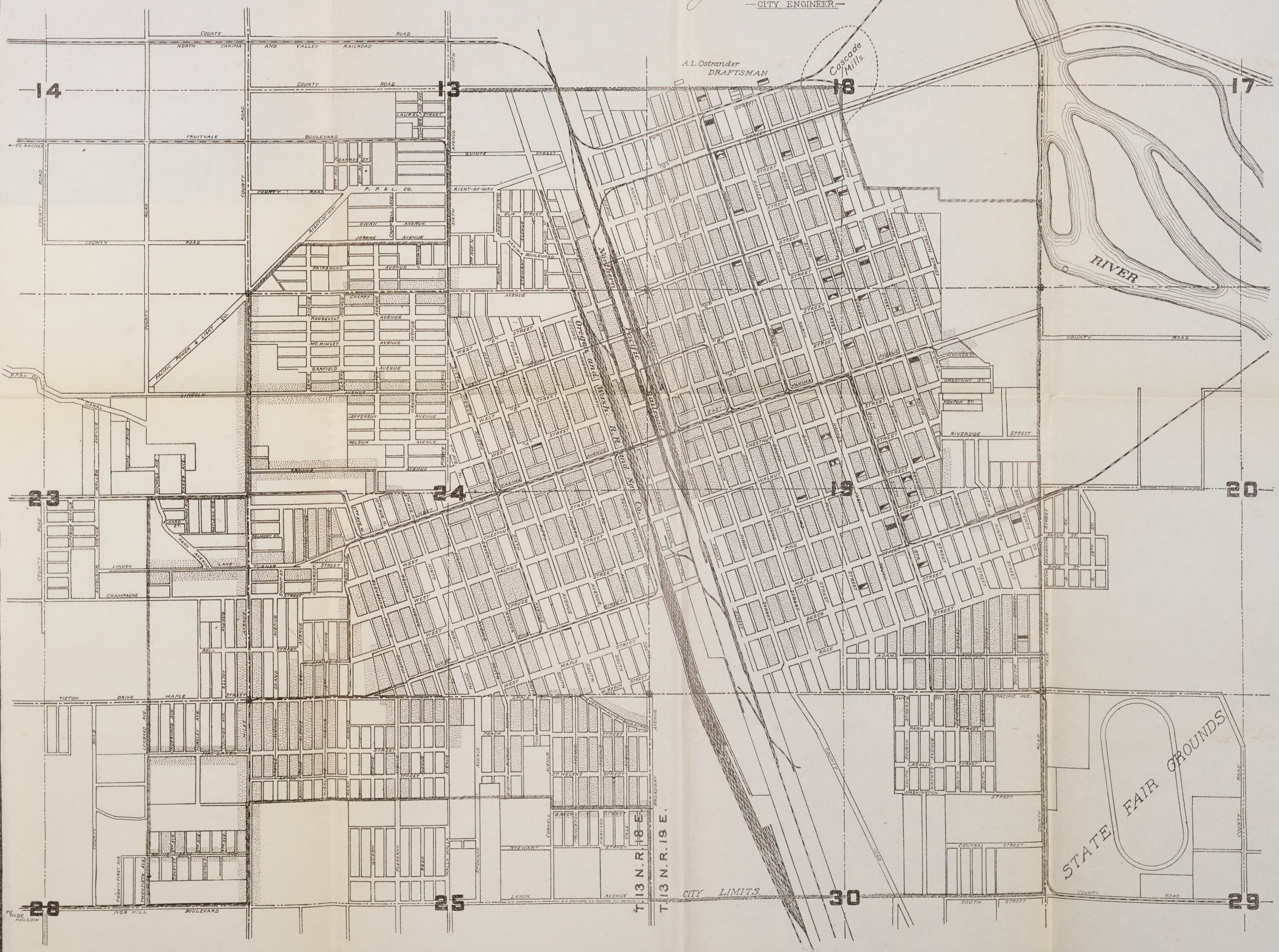
Cascade Mills



LEGEND

CASES DEVELOPING

□	May 1 <sup>st</sup> to 9 <sup>th</sup> 1911
□	" 10 <sup>th</sup> to 14 <sup>th</sup> "
□	" 15 <sup>th</sup> to 19 <sup>th</sup> "
□	" 20 <sup>th</sup> to 24 <sup>th</sup> "
□	" 25 <sup>th</sup> to 29 <sup>th</sup> "
□	" 30 <sup>th</sup> to JUNE 3 <sup>rd</sup> "
□	JUNE 4 <sup>th</sup> to 12 <sup>th</sup> "



MAP NO. 1.—SHOWING DISTRIBUTION, BY PLACE OF RESIDENCE, OF CASES OF TYPHOID FEVER IN THE OUTBREAK OF MAY-JUNE, 1911, IN RELATION TO THE PUBLIC WATER SUPPLY.

Stippled portions represent areas supplied with city water.  
Heavy lines in middle of street represent water mains.  
□ Typhoid fever cases.







# MAP OF NORTH YAKIMA, WASHINGTON.

SEWERS

1911.

— PREPARED BY —  
*Goodrich*  
— CITY ENGINEER —

A.L. Ostrander  
DRAFTSMAN.

Cascade  
Mills



MAP NO. 2.—SHOWING DISTRIBUTION OF CASES OF TYPHOID FEVER IN RELATION TO THE CITY SEWERAGE SYSTEM.

- Stippled portions represent areas reached by sewerage system.
- Sewers
- Cases of typhoid fever in outbreak of May-June, 1911.
- Cases of typhoid fever occurring in summer and fall of 1910 and collected by Kelley and Wilber.





## LIST OF PUBLIC HEALTH BULLETINS.

The following is a list of the Public Health Bulletins that have been issued:

- \*1. Report on Trichinae and Trichinosis. By W. C. W. Glazier. 1881. 212 pages. 87 ll. 1 map. Paper. Senate Executive Document No 9, Forty-sixth Congress, third session. Out of print.
- \*2. Report on the Etiology and Prevention of Yellow Fever. By George M. Sternberg. 1890. 271 pages. 21 pl. 20 ll. Cloth. Out of print.
- \*3. Mortality Statistics in the United States for the year ending December 31, 1897. From Annual Report Marine-Hospital Service, 1898. 24 pages. Paper. Out of print.
4. Yellow Fever: Its Nature, Diagnosis, Treatment, and Prophylaxis and Quarantine Regulations Relating Thereto. By officers of the Marine-Hospital Service. Reprint from Annual Report Marine-Hospital Service, 1898. 176 pages. 1 ll. Paper.
- \*5. Shipment of Merchandise from a Town Infected with Yellow Fever. By H. R. Carter. 1899. 15 pages. Paper. Out of print.
6. Report of Commission of Medical Officers Detailed by Authority of the President to Investigate the Cause of Yellow Fever. By Eugene Wasdin and H. D. Geddings. July, 1899. 98 pages. 26 charts. 2 ll. Paper.
- \*7. The Bubonic Plague. By Walter Wyman. January, 1900. 50 pages. Paper. Superintendent of Documents, 5 cents.
- \*8. Report of Commission Appointed by the Secretary of the Treasury for the Investigation of Plague in San Francisco. By Prof. Simon Flexner, Prof. F. G. Novy, and Prof. L. F. Barker. January 23, 1901. 23 pages. 1 map. Paper. Out of print.
- \*9. Report Relating to the Origin and Prevalence of Leprosy in the United States. By a Commission of Medical Officers of the U. S. Marine-Hospital Service. 1902. 119 pages. 25 ll. Paper. Senate Document No. 269, Fifty-seventh Congress, first session. Superintendent of Documents. Cloth, \$1.00.
- \*10. Plague Conference. Containing a copy of the address of the chairman, and resolutions passed by a conference called in accordance with requests from a number of State Boards of Health, and under authority of section 7, act of Congress approved July 1, 1902, to consider the plague situation. Reprint from P. H. R. No. 4, Vol. XVIII, January 23, 1903. 9 pages. And February 6, 1903. 41 pages. Paper. Out of print.
- \*11. Transactions of the First Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. June, 1903. 120 pages. Cloth. Out of print.
12. Transactions of the Second Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. June, 1904. 95 pages. Cloth.
13. The Public Health and Marine-Hospital Service of the United States. A Brief History. Prepared for the Louisiana Purchase Exposition. December, 1904. 16 pages. Paper.

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\*Exhausted and not for distribution.

- \*14. Sanatorium for Consumptives, Fort Stanton, N. Mex. By P. M. Carrington. Reprint from Annual Report Public Health and Marine-Hospital Service, 1904. 19 pages. Paper. Out of print.
15. Transactions of the Third Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. May, 1905. 52 pages. Cloth.
16. How to Prevent Yellow Fever—No Mosquitoes, No Yellow Fever. By Walter Wyman. July 31, 1905. 3 pages. Circular.
17. Transactions of the Fourth Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. May, 1906. 75 pages. Cloth.
18. Transactions of the Fifth Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. May, 1907. 47 pages. Cloth.
19. Trachoma, Its Character and Effects. By Tallafarro Clark and J. W. Schereschewsky. 1907. 34 pages. 6 il. Paper.
- \*20. The Public Health and Marine-Hospital Service of the United States. A Brief History. Prepared for the Jamestown Ter-Centennial Exposition. 1907. 12 pages. Paper. Out of print.
- \*21. Transactions of the Sixth Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. April, 1908. 79 pages. Cloth. Out of print.
- \*22. The Present Pandemic of Plague. By J. M. Eager. 1908. 30 pages. Paper. Out of print.
- \*23. Pellagra—A Precis. By C. H. Lavinder. July 24, 1908. 22 pages. 1 il. Paper.
24. The Marine-Hospital Sanatorium, Fort Stanton, N. Mex. Prepared for the International Congress on Tuberculosis, held in Washington, September, 1908. 32 il. 56 pages. Paper.
- \*25. Hookworm Disease. Reprint from Annual Report P. H. and M. H. S., 1908. 5 pages. Paper. Out of print.
26. Studies upon Leprosy.  
 I. The Present Status of the Leprosy Problem in Hawaii.  
 II. The Reaction of Lepers to Moro's "Percutaneous" Test.  
 III. A Note Upon the Possibility of the Mosquito Acting in the Transmission of Leprosy. By W. R. Brinckerhoff. 1908. Investigations made in accordance with the act of Congress approved March 3, 1905. 24 pages. Paper.
27. Studies upon Leprosy.  
 IV. Upon the Utility of the Examination of the Nose and the Nasal Secretions for the Detection of Incipient Cases of Leprosy. B. W. R. Brinckerhoff and W. L. Moore. 1909. Investigations made in accordance with the act of Congress approved March 3, 1905. 29 pages. Paper.
28. Studies upon Leprosy.  
 V. A Report upon the Treatment of Six Cases of Leprosy with Nastine (Deycke). By W. R. Brinckerhoff and J. T. Wayson, Honolulu, T. H.  
 VI. Leprosy in the United States of America in 1909. By W. R. Brinckerhoff. 1909. Investigations made in accordance with the act of Congress approved March 3, 1905. 25 pages. Paper.
- \*29. The Prevalence of Rabies in the United States. By J. W. Kerr and A. M. Stimson. 1909. 16 pages. Paper. Out of print.

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- \*30. **The Rat and its Relation to the Public Health.** By various authors. 1910. 254 pages. 60 figs. 6 pls. Paper. Exhausted.
1. Introduction. By Walter Wyman.
  2. Natural History of the Rat. By D. E. Lantz.
  3. Plague Infection in Rats. By G. W. McCoy.
  4. Rat Leprosy. By W. R. Brinckerhoff.
  5. Bacterial Diseases of the Rat other than Plague. By D. H. Currie.
  6. Organic Diseases of the Rat. By G. W. McCoy.
  7. Ecto Parasites of the Rat. By N. Banks.
  8. Intestinal Parasites of Rats and Mice in their Relation to Diseases of Man. By C. W. Stiles.
  9. Rodents in Relation to the Transmission of Bubonic Plague. By Rupert Blue.
  10. Rodent Extermination. Rats and Mice. By W. C. Rucker.
  11. Natural Enemies of Rats. By D. E. Lantz.
  12. Rat-Proofing as an Anti plague Measure. By R. H. Creel.
  13. Inefficiency of Bacterial Viruses in the Extermination of Rats. By M. J. Rosenau.
  14. Plague Eradication in Cities by Sectional Extermination of Rats and General Rat-Proofing. By Victor G. Heiser.
  15. The Rat in Relation to Shipping. By W. C. Hobdy.
  16. The Rat as an Economic Factor. By D. E. Lantz.
  17. The Rat in Relation to International Sanitation. By J. W. Kerr.
- \*31. **Transactions of the Seventh Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service.** June, 1909. 86 pages. Cloth. Exhausted.
32. Hookworm Disease (or Ground-Itch Anemia), its Nature, Treatment, and Prevention. By Prof. C. W. Stiles. 1910. 40 pages. Paper.
  33. Studies upon Leprosy. 1910. 25 pages. Paper.
    - VII. A Statistical Study of an Endemic Focus of Leprosy. By W. R. Brinckerhoff and A. C. Reinecke.
    - VIII. A Palliative Treatment for Leprous Rhinitis. By J. T. Wayson and A. C. Reinecke.
  34. Maritime Quarantine. By L. E. Cofer. 1910. 25 figs, 64 pages. Paper. Appendix: Disinfectants Authorized by United States Quarantine Regulations and the Proper Method of Generating and Using Same.
  35. The Relation of Climate to the Treatment of Pulmonary Tuberculosis. By F. C. Smith. 1910. 17 pages. Paper.
  36. Tuberculosis: Its Nature and Prevention. By F. C. Smith. 1910. 12 pages. 1 plate. Paper.
  37. The Sanitary Privy: Its Purpose and Construction. By Prof. C. W. Stiles, 1910. 24 pages. 12 figs. Paper.
  38. General Observations on the Blonemics of the Rodent and Human Fleas. By M. B. Mitzmain. 1910. 34 pages. Paper.
  39. Studies upon Leprosy. September, 1910. 50 pages. Paper.
    - IX. Mosquitoes in Relation to the Transmission of Leprosy.
    - X. Fleas in Relation to the Transmission of Leprosy. By D. H. Currie.
    - XI. Heredity Versus Environment in Leprosy. By H. T. Hollmann.
- \*40. **Transactions of the Eighth Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service.** November, 1910. 101 pages. Paper. Exhausted.

41. Studies upon Leprosy. November, 1910. 36 pages. Paper.  
 XII. Notes on the Study of Histories of Lepers from the Standpoint of Transmission. By D. H. Currie.  
 XIII. A Contribution to the Study of Rat Leprosy. By D. H. Currie and H. T. Hollmann.
42. Disinfectants: Their Use and Application in the Prevention of Communicable Diseases. By T. B. McClintic. December, 1910. 46 pages. Paper.
43. Experimental Studies of Plague and a Plague-like Disease among Rodents. By George W. McCoy. April, 1911. 71 pages. 7 pls. Paper.
44. Acute Anterior Poliomyelitis (Infantile Paralysis). By Wade H. Frost. February, 1911. 52 pages. Paper.
45. A Digest of the Laws and Regulations of the Various States Relating to the Reporting of Cases of Sickness. By J. W. Trask.
46. Transactions of the Ninth Annual Conference of State and Territorial Health Officers with the United States Public Health and Marine-Hospital Service. September, 1911.
47. Studies upon Leprosy. By D. H. Currie, Moses T. Clegg, and H. T. Hollmann. September, 1911.  
 XIV. The Artificial Cultivation of the Bacillus of Leprosy.  
 XV. Attempts at Specific Therapy in Leprosy.
48. Pellagra: A Précis. (Revised edition.) By C. H. Lavinder. September, 1911.
49. Ophthalmia Neonatorum. An Analysis of the Laws and Regulations Relating Thereto in Force in the United States. By J. W. Kerr. October, 1911.
50. Studies upon Leprosy. October, 1911.  
 XVI. Immunity. By D. H. Currie and M. T. Clegg.  
 XVII. Further Observations in Rat Leprosy. By D. H. Currie and H. T. Hollmann.  
 XVIII. A Statistical Study of the Nasal Lesions in Leprosy. By H. T. Hollmann.
51. The Causation and Prevention of Typhoid Fever, with Special Reference to Conditions Observed in Yakima County, Wash. By L. L. Lumsden. November, 1911.

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